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Business Information Systems

EXPLORING THE INFORMATION BEHAVIOUR OF EXPECTANT AND NEW MOTHERS: A LONGITUDINAL STUDY

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A Thesis Submitted for the Degree of Doctor of Philosophy in the National University of Ireland, Cork

Supervisors: Dr Ciara Heavin & Professor David Sammon

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The Author hereby declares that, except where duly acknowledged, this thesis is entirely her own work and has not been submitted for any degree in the National University of Ireland, or any other University.

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Abstract

The rise in online information-seeking raises important questions for information systems researchers, such as how can we tailor information resources to meet the needs of diverse user groups? The study of information behaviour may be able to provide the answers. Information behaviour is the study of human interaction with information resources, the influencers of that interaction, and how information is processed and used. Information behaviour studies place the user at the centre of the investigation. To-date, information processing and use is one area of information behaviour where uncertainty exists, caused by inconsistent defining terminology and a dearth of empirical investigation.

This thesis presents an adapted health information behaviour model, a revised version of Wilson (1997). The model is a key contribution of this thesis. The adapted health information behaviour model highlights the iterative nature of information behaviour while explicating information processing and use. Based on a review of existing definitions, information processing and use is divided into two concepts: 1) information processing and 2) information use outcomes. Information processing involves examining the quality of information resources to satisfy information needs. Information use outcomes are the internal and/or behavioural results of information processing.

The adapted health information behaviour model is evaluated using a prospective longitudinal case study of expectant and new mothers. As a user group, they are a challenge for information providers attempting to judge their information resource requirements. Expectant and new mothers seek and consume a diverse range of topics from a variety of resources. They do not just seek information for themselves, expectant and new mothers also seek information concerning the health and well-being of their families.

The main contribution of this thesis is identifying design guidelines for eHealth information resources for expectant and new mothers. This is achieved by understanding how expectant and new mothers process information resources. For the purpose of this research, information processing is determined based on subjective assessment criteria used by expectant and new mothers to evaluate and compare information resources. This thesis illustrates connections between subjective assessment criteria and other areas of information behaviour, such as information use outcomes and task type. These connections demonstrate the iterative nature of information behaviour and provide further context for the eHealth design guidelines for expectant and new mothers. The longitudinal nature of the study affords the opportunity to observe changes in information behaviour across the antenatal and postnatal periods.

Chapter 1: Introduction

1.0 Introduction

This chapter proposes that the study of information behaviour could offer new insights to information systems researchers, specifically in the area of electronic health (eHealth), due to the increase in online consumer health information-seeking. Expectant and new mothers are highlighted as a rich user group for information behaviour studies. Previous studies have demonstrated that this cohort (i.e. expectant and new mothers) are active consumers of information resources. They are also a group who undergo a major life event which is likely to impact their information needs.

Information behaviour is "*the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use*" (Wilson, 2000, p.49). Information behaviour and information systems are conjunct disciplines with common research interests (Ellis et al., 1999). Both disciplines focus on research questions concerned with the interaction of people, information, and technology (c.f. Sawyer and Huang, 2007). Researchers in each discipline pursue these questions in different ways, with little interaction (Ellis et al., 1999; Sawyer and Huang, 2007). It has been suggested that more collaboration could strength the theories and findings in each discipline (c.f. Sawyer and Huang, 2007; Hwang et al., 2010).

The growth in health information-seeking is often attributed to the increased availability of information online (Case, 2012). From a policy point of view, there is an interest in making more health information available to the public in the hope of creating better educated, and more empowered patients (Carolan, 2007). EHealth is seen as a way of creating more personalised healthcare, enabling patients to actively participate in their own healthcare decisions and to improve communication with healthcare professionals (European Commission, 2012; Ricciardi et al., 2013). Unfortunately, there is often a mismatch between what patients want and what providers think they want (Bechtel and Ness, 2010). Das and Svanæs (2013) suggest that more guidance is needed to help developers

produce patient-centred solutions. Previous studies suggest that a more in-depth understanding of health information behaviour would improve the design of eHealth information resources (Eysenbach and Köhler, 2002; Zhang et al., 2012).

Pregnancy and parenting have been identified as a rich context for exploring information behaviour (McKenzie, 2004). Mothers seek information for themselves and for the health and well-being of their families (O'Connor and Madge, 2004; Bernhardt and Felter, 2004). During the antenatal period, mothers fall into a unique category between being well and being ill (Cohen and Raymond, 2011). Previous studies have found that that expectant and new mothers actively seek information from multiple information resources across the antenatal and postnatal periods (Bernhardt and Felter, 2004). Existing research indicates that this cohort may consult a variety of information resources before making decisions (Sillence et al., 2007a). Researchers have highlighted the importance of understanding "*why, where and how*" expectant and new mothers seek information (Bernhardt and Felter, 2004). Plantin and Daneback (2009) highlighted the need for theoretically grounded research within this domain and proposed that a longitudinal study could add value by looking at the information resources accessed over time, throughout the different stages of parenthood.

The next section considers the research objective and research questions. This chapter concludes with a description of the structure of this research study.

1.1 Research Objective and Questions

The research objective for this study is as follows:

To propose design guidelines for eHealth information resources based on the information behaviour of expectant and new mothers.

Three research questions were developed in order to achieve this research objective. These are:

Research Question 1: What Subjective Assessment Criteria are used during Information Processing?

Information processing is an area of information behaviour that is frequently referenced but rarely explicated (Savolainen, 2009b). Information *processing is defined in this study as information-seeker's evaluating the quality of information resources. The purpose of the evaluation is to determine the ability of the information resource to resolve the seekers information needs* (c.f. Wilson, 1981). Yet, there is often a disconnect between the needs of patients and the information resources provided. The problems can stem from functional characteristics of the information resources (Kreps and Neuhauser, 2010) or information content (Bechtel and Ness, 2010).

This research question identifies the subjective assessment criteria used by the participants for information resources and information content. The assessment criteria for information resources and information content are separated because information-seekers may be able to obtain the same information from multiple information resources (Xu et al., 2006). Subjective assessment criteria are chosen because they allow information-seekers the freedom to articulate any perceptions concerning information resources and information content. Previous research into assessment criteria has been criticised for not being connected to other areas of information behaviour and only focussing on one information resource type (Zhang, 2014). As a result, there exist limited studies which understand why information-seekers selected one information resource type over another (ibid). This research study addresses this gap by gathering information on every type of information resource accessed by the study participants. In doing so, this provides a more holistic view of the participants' information-seeking and provides insight into differences in assessment criteria across different information resource types. The outcome of RQ1 is the identification of design guidelines based on the subjective assessment criteria of participants.

Research Question 2: What are the Information Use Outcomes?

Information use outcomes are the result of information processing (Savolainen, 2006). Information use outcomes can be either internal or behavioural (Kari, 2007). Internal use includes both cognitive and affective outcomes (c.f Dervin, 1992). Conversely, behavioural information use involves observable physical actions, such as taking medication (c.f. Niemelä and Huotari, 2008).

This research question examines an area of research that scholars attest lacks empirical investigation and an agreed consensus of defining terminology (Tuominen and Savolainen, 1997; Niemelä et al., 2012). Information use outcomes are examined through tracking the outcomes reported by the study participants as part of information-seeking episodes. Information-seeking episodes are periods of time where individuals seek information in order to achieve a goal or solve a problem. Information-seeking episodes are bounded by the tasks that the information-seeker is trying to solve (Belkin, 1993). Information-seekers may interact with multiple information resources, over several searches during a single information-seeking episode. This interaction can cause an evolution of the seekers information needs and tasks (Xie, 2000).

The research question explores the reasons behind the information use outcomes. Particular interest is paid to associations between information use outcomes and the participants' subjective assessment criteria. Links between the subjective assessment criteria and information use outcomes are utilised to provide additional context to the eHealth design guidelines identified in RQ1.

Research Question 3: What are the Primary Information Resources for Medical and General Tasks during the Antenatal and Postnatal Periods?

This research question examines the information resource(s) preferences for participants over time and based on task type. Tasks are an important variable within information behaviour, they are often the initial driver of information-seeking, influencing the development of information needs (Vakkari, 1999). For the within-participant analysis, tasks are divided into two categories, medical and

general. This enables a discussion on how those two broad categories influenced information needs and resource selection.

The longitudinal element in this question provides insight into how information behaviour evolves over the antenatal and postnatal periods. Any changes in the participants' subjective assessment criteria, linked to information resource selection, are highlighted. The cross-participant analysis divides the medical and general tasks into sub-categories that facilitate commentary on the changes in topic preference over time. The data on information resource preferences related to task type and any changes in topic preferences are combined to provide further context to the design guidelines identified in RQ1.

The next section details the research plan pursued to answer the research questions posed in order to fulfil the research objective.

1.2 Outline of the Research Plan

The plan of the research is as follows. ***Chapter Two*** presents a review of existing information behaviour literature with a specific focus on health information behaviour. The focus on health over general information behaviour is due to the objective of proposing design guidelines for eHealth resources. Chapter two argues that studying the information behaviour of individuals will provide greater insight into their requirements for information resources. The study of information behaviour links information-seeking, resource selection and information process and use to context variables such as task characteristics and information needs. Expectant and new mothers present an interesting opportunity for studying information behaviour. Previous studies have reported that expectant and new mothers employ a variety of information resources to search for information for both themselves and their families. Expectant mothers also find themselves in a unique category between being well and being ill. Considering the life changes that occur across pregnancy and early motherhood, this user group provide a unique opportunity to use a longitudinal study to observe the evolution of information behaviour and how it's impacts information resource requirements.

The main outcome of Chapter Two is the development of the adapted health information behaviour model. This model is an adapted version of Wilson's (1997) general information behaviour model. The Wilson model is used as a template to further guide the examination of the information behaviour literature. The changes to the model were based on the review of literature and are discussed in further detail as part of Chapter Two. Two key changes from Wilson's (1997) model are (1) the emphasis on multi-directionality to better demonstrate the iterative nature of information behaviour, and (2) an exploration of information processing and use, a concept that lacks clarity within information behaviour literature.

Taking cues from Webster and Watson (2002) the review in Chapter Two is presented in a series of concept centric summary tables. The data for the literature review was compiled first from a review of the top information behaviour and information systems journals. This was followed by a 'go backwards' and 'go forwards' approach, where the references and citations for key articles were reviewed (Webster and Watson, 2002). Finally a key-word search based on the core concepts was conducted using Google Scholar.

Chapter Three presents the research design considered the most appropriate for the study. An exploratory longitudinal case study approach was chosen based on the study objective and the conclusion generated from Chapter Two. Information behaviour is a complex phenomenon grounded in the context in which it occurs. This makes the case study approach an ideal fit. An exploratory study was deemed most appropriate considering the ambiguity surrounding the definition of information processing and use. A prospective longitudinal study affords the opportunity to observe changes in behaviour and preferences over time, using multiple waves (i.e. data collection periods). Prospective studies involve collecting data from the same individuals or cases at multiple points moving forward in time. Prospective studies have been shown to be more reliable and less prone to recall bias than studies relying solely on retrospective accounts.

Chapter Three discusses the reasoning behind choosing two data collection techniques, semi-structured interviews and activity diaries. A limitation of

prospective longitudinal studies is the volume of data which can prove challenging during data analysis. Chapter Three details the data reduction and data analysis techniques used on the data collected over seven waves. These techniques include qualitative tools such as analytic memos, summary tables and visual aids. Examples of the techniques used for data reduction (within participant analysis and cross-participant analysis) are also presented.

Chapter Four, Chapter Five, Chapter Six, and Chapter Seven presents the within-participant analysis. That is, each chapter focuses on one participant. From the nine participants included in the final analysis, these four participants were chosen based on the richness of the data that they provided. Each of the four chapters is organised in the same manner. They begin by providing the reader with an overview of the participant. Next, the chapter presents a series of information-seeking episode examples. These episodes represent key issues which emerged over the data collection period, approximately eighteen-months per participant. They illustrate how the participants searched for information to satisfy particular needs. Each episode is accompanied by a visual which helps to illustrate the pattern of information-seeking. Taken together these episodes help to demonstrate changes in the individual's behaviour over time.

Following the information-seeking episodes, each chapter includes an analysis of the participant under each of the three research questions. RQ1 demonstrates the participant's subjective assessment criteria for information resources and information content. This is then utilised to identify design guidelines for eHealth resources. RQ2 provides an analysis of the outcomes of information processing, otherwise termed information use outcomes. These outcomes provide additional insight into the eHealth design guidelines identified in RQ1. For example, when do participants (a) replace an information resource that does not supply enough information on a topic, or (b) supplement it with another information resource? Finally, RQ3 demonstrates changes in information resource preference over time based on task characteristics. This adds further insight for the eHealth design guidelines identified in RQ1.

Chapter Eight presents the cross-participant analysis for all nine participants included in the final analysis. As part of the cross-participant analysis the participants are divided into four user groups based on age (>/<35) and maternal experience (first-time mothers/mothers with children). For each research question, similarities and differences between the user groups are highlighted. The information is utilised to identify eHealth design guidelines tailored to each of the four user groups.

Following the cross-participant analysis, Chapter Eight presents the overall conclusions of the research study. The theoretical and practical contributions of this research are discussed. The chapter concludes with a discussion of the limitations of the study and recommendations for further research.

1.3 Research Publications based on Ph.D.

This section concludes this chapter by presenting the research publications that have emerged from this research study. The research contributions are divided by journal paper, conference paper and poster presentation.

JOURNAL PAPER:

- An Exploratory Study into the Information Behaviour of Expectant Mothers: An Irish Perspective
  C Mahony, D Sammon, C Heavin
  Journal of Decision Support Systems (Under Review)

CONFERENCE PAPER:

- Design Guidelines for Online Resources: A Longitudinal Analysis of Information Processing
  C Mahony, D Sammon, C Heavin
  IFIP *Working Group 8.3 on* Decision Support Systems *(*DSS*) (2016)*
- A Tool for Analysing the Information Behaviour of Expectant and New Mothers
  C Mahony, C Heavin, D Sammon
  Proceedings of the 21st European Conference on Information Systems (2013)

POSTER

- The Information Behaviour of Expectant and New Mothers: A Longitudinal Study
  C Mahony, C Heavin, D Sammon
  INFANT Research Day (2015)
- A Longitudinal Study of the Information Behaviour of Postmodern Women from Antenatal to Postnatal
  C Mahony, C Heavin, D Sammon
  The 6th European Conference on Information Systems Management and Evaluation (2012)

The next chapter presents a review of the information behaviour literature. The chapter includes the development of an adapted health information behaviour model based on Wilson (1997). The chapter also highlights the reasons why the health subject area combined with the expectant and new mother user groups are an interesting domain to situate an information behaviour investigation.

Chapter 2: Information Behaviour of Expectant and New Mothers

2.1 Introduction

Information behaviour "*focuses on people's information needs; on how they seek, manage, give, and use information, both purposefully and passively*" (Fisher and Julien, 2009, p. 1). Information behaviour is a sub-discipline of Library and Information Science (LIS). LIS is a discipline with such a long tradition and it is difficult to pinpoint an exact start date (Herner, 1984). Information behaviour is the modern term for information needs and uses studies (Julien and Duggan, 2000). The modern version of information behaviour emerged in the 1980's with the publication of three seminal works (1) Wilson (1981), (2) Belkin (1982) and (3) Dervin and Nilan (1986). These papers were concerned with the user's perspective. These studies have been credited with moving the user to the centre of information behaviour studies (McKechnie et al., 2006).

Hwang et al. (2010) suggest that the study of information behaviour could provide useful insights for information systems researchers and developers. Information behaviour research changes the focus of questions from systems use to information needs and task behaviours (Wilson, 2000). This type of additional insight could be particularly useful in an area like patient focused eHealth, where the aim is to develop information resources which empower individuals because they are based around the needs and opinions of users (Wilson, 2008).

Wilson (1999) depicted the information behaviour discipline as a nested model, see Figure 2-1. Information-seeking behaviour is a subset of information behaviour. Research into information-seeking is concerned with individuals "*searching, acquiring, processing, organizing and presenting information*" (Brand-Gruwel et al., 2005, p.489). As illustrated in Figure 2-1, information search is a sub-set of information-seeking. Information search is concerned with understanding how individuals locate information resources, particularly online information resources (Brand-Gruwel et al., 2005).



Figure 2-1Nested Model of Information Behaviour(Source (Wilson, 1999, p.263))

This chapter presents a review of the information behaviour literature. The chapter examines examples of health information-seeking. Grounding information behaviour investigations in particular domains can provide valuable insight (Bawden and Robinson, 2012), particularly when supported by theory (Hjørland, 2002). The chapter highlights expectant and new mothers as a rich user group to study information behaviour (McKenzie, 2004). A review of the literature demonstrates that expectant and new mothers access a variety of information resources to locate both medical and general information for themselves and their families. Plantin and Daneback (2009) propose that more theoretically grounded investigations are required to understand the question such as how information resources can be created to meet the information needs of this demographic.

The chapter provides a discussion on the different ways that information resources have been categorised within information behaviour research, before presenting the categories used for this study. An important part of the discussion on information resources is an exploration of eHealth information resources. Included in the discussion is a review of eHealth definitions, which are used to produce the

definition of eHealth information resources, used in this study. In simple terms, eHealth information resources are online resources that are specifically designed to provide health information and services.

The next section in the chapter, explores the theoretical models within information behaviour. The models are analysed using the five categories proposed by Bawden and Robinson (2012). This provides the reader with an overview of theory within the discipline, prior to a discussion of Wilson's (1997) revised general model of information behaviour. The discussion of the revised model includes an overview of weaknesses that have been observed within the model.

The final section of this chapter describes the developed of the adapted health information behaviour model, the model which is used in this study. The model is a revised version of Wilson's (1997) revised general model. Wilson's model was used as a scaffold to investigate key information behaviour themes. The adapted health information behaviour model is a complex multi-directional model. One of the key objectives in developing the model was to provide more clarity to information processing and use, an area researchers have highlighted as being under researched (Tuominen and Savolainen, 1997; Niemelä et al., 2012).

2.2 Domains in Information Behaviour

This section provides an overview of domains within information behaviour before grounding the research study within a specific domain. A domain can be defined as "*the set of information systems, resources, services and processes associated with a group of users with common concerns*" (Bawden and Robinson, 2012, p.93). The main difficulty is identifying and bounding the user group. Individuals can be grouped by criteria such as profession, environment or discourse community (Hjørland and Albrechtsen, 1995). As part of domain analysis, researchers can also choose to identify a particular subject area common to the group (Bawden and Robinson, 2012).

The challenge with domain analysis is selecting the right user group and subject area combination. Individuals can fit into more than one user group, for example a user could be teacher by profession and patient by role (c.f Palmer, 1999). Multiple

user groups can be connected to each subject area, for example doctors and patients are both connected to health area (c.f. Bawden and Robinson, 2012).

The subject area chosen for this study was health. The next section discusses health information-seeking and the growing consumer demand for health information. The subsequent section examines the literature on the information-seeking of expectant and new mothers, the user group selected for the study. This groups has been identified as a rich context for studying information behaviour (McKenzie, 2004)

The final section under domains in information behaviour provides a review of information resources. Information resources are included as an aspect of domain analysis group (Bawden and Robinson, 2012). As part of the review a categorisation of information resources is created. The section also includes an exploration of eHealth and a definition of eHealth information resources. This was included because of the subjective area.

2.2.1 Health Information-Seeking

Health information-seeking involves searching for information to reduce uncertainty involving a health status and to build a personal sense of health (Cotten and Gupta, 2004). The growth in information-seeking by patients is often attributed to the increased availability of health information online (Case, 2012). However, health information-seekers have been shown also to access a variety of other information resources, including health professionals, printed materials, family and friends, and support groups (Ellins and Coulter, 2005).

As every person is likely to become a patient one day, healthcare is an issue for both the individual and the society, with each of us concerned with the effectiveness of the system (Payton et al. 2011). As the focus shifts towards prevention through lifestyle factors, people are becoming more active consumers of health information regardless of their current health status (Song and Chang, 2012).

From a policy point of view, there is an interest in making more health information available to the public in the hope of creating better educated, and more empowered patients (Carolan, 2007). It has been suggested that health information-seeking is a characteristics of individuals who are more proactive about their health and has been linked to positive changes in health behaviours (Shi et al., 2004). Health information-seeking has also been shown to lead to reduced level of anxiety for some patients (Fourie, 2008).

However, not all patients have demonstrated positive results. These differences may be explained by characteristics of the seeker such as stage of illness, or whether the information was acquired by the patient or through a proxy (Fourie, 2008). For example, a well-meaning family member could increase the anxiety of patients by providing them with information they uncovered which was unrelated to the patients specific condition (ibid). Cultural norms have also been shown to influence how individuals gather and act on health information (i.e. Sligo and Jameson, 2000)

2.2.2 Expectant and New Mothers

Pregnancy and parenting have been identified as "*extremely rich contexts in which to study information-seeking practices*" (McKenzie, 2004, p. 686). Mothers seek information for themselves and for the health and well-being of their families (O'Connor and Madge, 2004; Bernhardt and Felter, 2004). Expectant mothers fall into a unique category between being well and being ill (Cohen and Raymond, 2011). Although not all expectant mothers experience ailments as a result of their pregnancy, they still must continuously make health decisions which can impact themselves and their unborn child (Wennberg et al., 2013).

Research shows that expectant mothers combine a variety of information resources when making decisions (Sillence et al., 2007a). While health professionals are often rated as the preferred choice for medical decisions, internet use by expectant mothers is both common and frequent (Romano, 2007). Studies have found that online information resources allow women to access information between doctors' appointments (Lagan et al., 2011a; Kraschnewski et al., 2014). As Information-

seeking by new and expectant mothers is often used in conjunction with information from health professionals it is therefore not seen as a way to replace traditional sources of medical authority (Song et al., 2012).

It has been suggested that increased health information-seeking during pregnancy can lead to better self-care abilities, increased knowledge and potentially better pregnancy outcomes (Shieh et al., 2009). While becoming a new mother can sometimes be alienating (Drentea and Moren-Cross, 2005; Madge and O'Connor, 2006). Information-seeking can help to alleviate those feelings by providing a sense of empowerment (Madge and O'Connor, 2006; Lagan et al., 2011b).

As part of the investigation, review of the information-seeking topics reported by expectant and new mothers was conducted, see Table 2-1. Based on the review, expectant and new mothers seek information on a variety of both general and medical information topics. Some overlap in the topics was observed between the expectant mothers and the new mothers, see Table 2-1. For example, expectant mothers reported researching parenting topics during the antenatal period.

Type	Topic	Expectant Mothers	New Mothers	Reference
Medical	Antenatal Complications *(Alt term – Pregnancy Complications)*	X		(Larsson, 2009; Lagan et al., 2010; Das and Sarkar, 2014)
	Child health		X	(Bernhardt and Felter, 2004; Brady and Guerin, 2010)
	Cord Care		X	(Sink, 2009)
	Investigations and Screenings	X		(Lagan et al., 2010)
	Labour *(Includes: Stages, Complications, Pain relief)*	X		(Nys et al., 1998; Larsson, 2009; Brady and Guerin, 2010; Lagan et al., 2010; Ruzegea and Mansor, 2011; Das and Sarkar, 2014)
	Medical conditions during pregnancy	X		(Nys et al., 1998; Bernhardt and Felter, 2004; Lagan et al., 2010; Ruzegea and Mansor, 2011)
	Medications during pregnancy	X		(Lagan et al., 2010; Shieh et al., 2009)
	Pre-conception and Fertility Issues	X	X	(Brady and Guerin, 2010; Lagan et al., 2010)
	Premature Babies		X	(Brady and Guerin, 2010)
	Special Needs		X	(Brady and Guerin, 2010)
General	Antenatal schedule	X		(Lagan et al., 2010)
	Childcare & Education		X	(Brady and Guerin, 2010)
	Child Development *(Includes – foetal development).*	X	X	(Nys et al., 1998; Bernhardt and Felter, 2004; Larsson, 2009; Shieh et al., 2009; Lagan et al., 2010; Porter and Ispa, 2013)
	Diet – Child	X	X	(Sink, 2009; Larsson, 2009; Shieh et al., 2009; Brady and Guerin, 2010; Porter and Ispa, 2013)
	Diet and exercise - Maternal (Includes: Nutrition, weight gain, vitamins.)	X		(Larsson, 2009; Shieh et al., 2009; Das and Sarkar, 2014)
	Health promotion / lifestyle issues *(Includes: alcohol and substance abuse, smoking and stress).*	X		(Shieh et al., 2009; Lagan et al., 2010)
	Parenting Strategies *(Includes: setting routines, hints & tips)*	X	X	(Nys et al., 1998; Bernhardt and Felter, 2004; Sink, 2009; Brady and Guerin, 2010; Lagan et al., 2010; Porter and Ispa, 2013)
	Parental Benefit	X		(Larsson, 2009)
	Pregnancy Products *(Includes: Products for mother and baby)*	X		(Larsson, 2009; Lagan et al., 2010)
	Familial Relationships/Issues *(Includes: housework, organisation of household, division of attention and affection between children, etc.)*	X	X	(Nys et al., 1998; Brady and Guerin, 2010; Porter and Ispa, 2013; Das and Sarkar, 2014)
	Sexual Issues *(Includes: safe sex during pregnancy, sexual health and screening)*	X		(Shieh et al., 2009; Das and Sarkar, 2014)

Table 2-1 Information-Seeking Topics: Expectant and New Mothers

2.2.3 Information Resources

Information resources have been classified in a number of ways. Examples include subjective versus objective (Cooley and Madupu, 2009) and personal, impersonal, and the internet (Gray et al., 2005). Researchers have also considered the differences between traditional and non-traditional alternatives. Not only has there been a move from 'traditional' information resources to online alternatives but there has also been a shift in the types of online information resources that are available to information-seekers (Hemmer et al., 2012).

More traditional information resources include health professionals (Szwajcer et al., 2005), the social environment i.e. family and friends (Szwajcer et al., 2005) as well as print media, such as books and pamphlets (Basch et al., 2004), and mass media, such as television (Pálsdóttir, 2008). While online resources in the health domain are well established (Basch et al., 2004; Hardey, 1999; Szwajcer et al., 2005), they still fall under the non-traditional category (Hardey, 1999; Basch et al., 2004; Gray et al., 2005). One feature which makes them different from other health information resources, is their continued evolution. From static, one way communication (web 1.0) to interactive, social media enhanced web 2.0 (Tennant et al., 2015). Social media platforms such as Facebook,

After reviewing information resource classifications it was discovered that many of classifications contain commonalities with small differences. For example, experts such as health professional are sometimes given their own category (e.g. Pálsdóttir, 2008; Bronstein, 2010), while in other classifications they are placed in the same category as other people such as friends and family (e.g. Gray et al., 2005; Lee et al., 2012). Similarly printed media such as books are sometimes given their own category (e.g. Savolainen, 2010) and are sometimes combined with mass media such as television (e.g. Pálsdóttir, 2008).

Table 2-2 illustrates the classification developed for this study. Information resources are split into five categories (1) online, (2) expert, (3) personal, (4) print, and (5) mass media. The decision was made to keep expert and personal information resources and print and mass media information resources in separate

categories to allow for deeper discussion and analysis. For example, expert information resources are usually found to be information-seekers preferred source of health information (Cotten and Gupta, 2004). While information-seekers find personal information resources useful for providing social support (Szwajcer et al., 2005).

Information Resource	Examples	References
Online ***(alt term – Networked, Internet)***	Information Pages Forums Blogs Social Media Groups	(Lee et al., 2012; Bronstein, 2010; Savolainen, 2010; Rieh, 2007; Pálsdóttir, 2008; Gray et al., 2005)
Expert ***(alt term – Health Specialist, Personal, Human, Organisational)***	Health Professionals Subject Matter Experts	(Bronstein, 2010; Pálsdóttir, 2008; Gray et al., 2005; Lee et al., 2012; Savolainen, 2010)
Personal ***(alt term – Human, Interpersonal, Personal)***	Friends Family	(Lee et al., 2012; Bronstein, 2010; Savolainen, 2010; Rieh, 2007; Pálsdóttir, 2008; Gray et al., 2005)
Print ***(alt term – Media, Impersonal)***	Books Magazines Leaflets	(Lee et al., 2012; Bronstein, 2010; Savolainen, 2010; Rieh, 2007; Pálsdóttir, 2008; Gray et al., 2005)
Mass Media ***(alt term – Media, Impersonal)***	TV Radio	(Lee et al., 2012; Rieh, 2007; Pálsdóttir, 2008; Gray et al., 2005)

Table 2-2 Information Resource Classification

The information resources included in Table 2-2 are all external information resources. However, information-seekers can also draw on internal information gained as a result of previous information-seeking activities or personal experience (c.f. Krikelas, 1983).

Significantly there has been increased focus on the development of online health-related information or eHealth resources for users with a wide range of health information needs. Adolescents (Gray et al., 2005), cancer patients (Basch et al., 2004), mental health patients (Athanasopoulou et al., 2013) and pregnant women (Szwajcer et al., 2005) include some of the consumers of eHealth resources. In fact eHealth is seen as a method of creating more personalised healthcare, enabling patients to more actively participate in their own healthcare decisions and to improve communication with healthcare professionals (European Commission, 2012; Ricciardi et al., 2013).

2.2.3.1 *EHealth*

The concept of eHealth came into common use in year 2000 (Pagliari et al., 2005). The internet enabled eHealth by offering the possibility for easier "*information exchange, product acquisition, and service delivery*" (Hesse and Shneiderman, 2007, p. S98). EHealth has become a widely used term among individuals, professionals and academics, despite the lack of an agreed upon definition (Oh et al., 2005).

Some researchers suggest that eHealth was just a rebranding of telemedicine and medical informatics at a time when everyone was looking for the next 'e-thing' (c.f. Della Mea, 2001). Others suggest that eHealth offers an improvement, because it is more service oriented than its predecessors and that those service are not just focused on the needs of patients and health professionals but on all of society (Matusitz and Breen, 2007).

Several examinations of eHealth definitions have been undertaken (Oh et al., 2005; Pagliari et al., 2005). However, there is still no common definition which describes the scope and boundary of activities that can be included under the term eHealth (Showell and Nohr, 2012; Torrent-Sellens et al., 2016). From an analysis of eHealth definitions between 1999 and 2004 Oh et al. (2005) uncovered eight recurrent themes (health, technology, commerce, activities, stakeholders, outcomes, place, and perspectives), two of which were universal, health and technology. To date, Eysenbach's (2001) broad definition of eHealth appears to be one of the most cited and widely accepted definitions (Oh et al., 2005; Pagliari et al., 2005; Boogerd et al., 2015; Torrent-Sellens et al., 2016)

> *"EHealth is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology." (Eysenbach, 2001)*

From a technological standpoint, eHealth can cover a broad range, from communications and predictive analytics, to implantable devices (c.f. Meier et al., 2013). This thesis is interested in investigating information behaviour, as a result,

the discussion on eHealth will be restricted to eHealth information resources. After reviewing the existing definitions of eHealth, eHealth information resources are considered a subset of online information resources. EHealth information resources are defined in this study as follows:

EHealth information resources use the internet and related technologies to provide health and wellness information and services to users

Healthcare systems have a limited capacity, eHealth can help compliment and augment existing programs by offering "*the potential for enhanced reach, including traditionally underserved populations, at relatively low cost; scalability; time efficiency; and the capacity to provide tailoring and customization for individual patients and consumers*" (Ahern et al., 2006, p.2). EHealth information resources are not restricted to offering informational support, instead they can provide a variety of support to users, including emotional, instrumental and appraisal. Table 2-3 describes these supports in more detail, using examples.

Type of support	Conceptual definition	Examples
Emotional	Providing empathy (e.g., expressions of trust, love).	Supportive conversations in message boards or chats
Instrumental	Providing concrete and tangible assistance (e.g., money)	Provision of equipment (e.g., laptops, computers, monitors)
Informational	Providing information (e.g., nutritional value of food)	Educational information from peers and providers on physical activities, foods, and medications
Appraisal	Providing affirmational comments (e.g., praise for behaviours)	Advice from peers or providers on engagement in self-management behaviours

Table 2-3 Forms of Support Offered by eHealth Information Resources (from: (Vorderstrasse et al., 2016, p. 56)

The characteristics of different illness and patients groups are diverse, which produces challenges for the developers of eHealth solutions (Das and Svanæs, 2013). Ideally, eHealth tools should "*be designed to effectively communicate the right information needed by different audiences at the right time, in the right place, and in the best ways to guide health care and health promotion*" (Kreps and Neuhauser, 2010, p329). There is often a mismatch between what patients want and what providers think they want (Bechtel and Ness, 2010). With eHealth designers sometimes more focused on the technological capabilities of eHealth solutions, rather than the requirements of the users (Kreps and Neuhauser, 2010).

Das and Svanæs (2013) suggest that more guidance is needed to help developers produce patient-centred solutions.

2.3 Models in Information Behaviour

This section examines models in information behaviour using five categories proposed by Bawden and Robinson (2012). The categories are (1) descriptive, (2) process, (3) cognitive, (4) complex, and (5) individual perception theories. Using these categories allows for a discussion on the advantages and disadvantages of different theory types, while providing an overview of theory within the information behaviour field.

Within information behaviour research the terms model, theory and framework are often used interchangeably. This can be easily observed in reviews of information behaviour research (i.e. Johnson, 2009; Bawden and Robinson, 2012). Bawden and Robinson (2012) attempted to explain the interchangeable use of terminology by suggesting that it is more difficult to distinguish between theories and models within information behaviour than in it is in other disciplines. They attribute this to the descriptive, explanatory nature of many of the existing theories within the discipline (ibid). For the purpose of this research, the researcher will use the term used by the original author of work.

Descriptive Theories: Descriptive theories just state the factors and activities involved in the area of information behaviour being studied (Bawden and Robinson, 2012). These theories can be in the form of diagrams or in a list. One of the first examples of descriptive theory comes from Wilson (1981), see Figure 2-2. It is the second of three models provided by Wilson in the seminal paper. The model describes the context of information-seeking which is divided into three elements: (1) the users life world, otherwise known as the context of the seeker, (2) information systems, either controlled by the seeker or an intermediary, and (3) the information resource (Wilson, 2007). It is important to note that technology in the model does not necessarily refer to a computerised system, instead it refers to any techniques, tools or machines which aid in accessing the information resource (Wilson, 1981; Wilson, 2007).

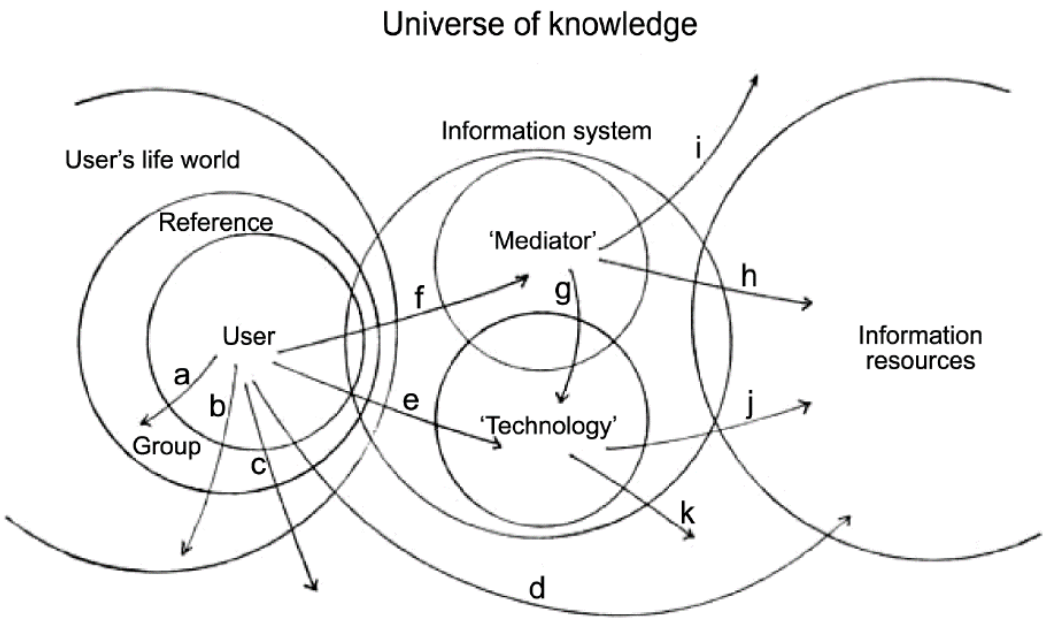


Figure 2-2 The context of information-seeking (source: (Wilson, 1981, p.4))

Another highly cited example of a descriptive theory is Ellis's Characteristics (Ellis, 1989; Ellis et al., 1993). Ellis created a list of characteristics involved in information-seeking. This theory is not traditionally depicted graphically, however, Wilson Wilson (1999) created a graphical representation as part of his review of information behaviour research, see Figure 2-3. Ellis was careful to point out that the list was not intended to be a fixed series of events, instead the steps can be enacted in any sequence and may be done iteratively (Case, 2012).While the theory has attracted criticism for its lack of investigation into causation factors (Järvelin and Wilson, 2003), it is still one of the most tested information behaviour models (Bawden and Robinson, 2012).

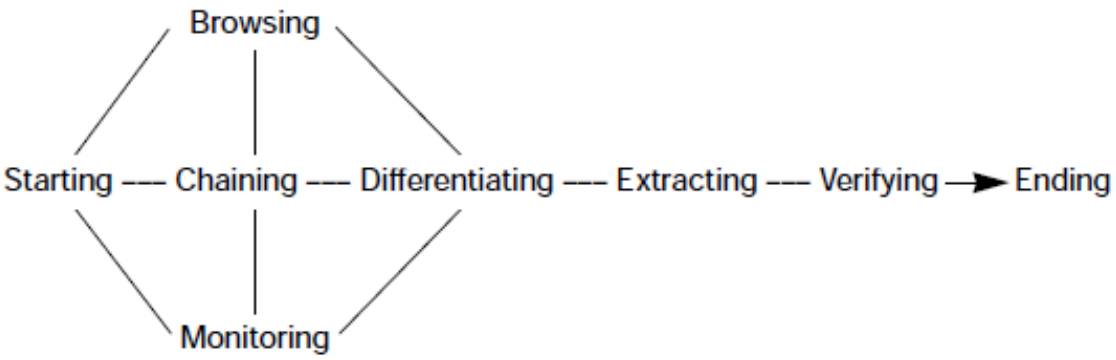


Figure 2-3 Ellis's Stages (source: (Wilson, 1999, p.255))

Process Models: Process models display the factors and activities involved in information behaviour, in the order that they occur (Bawden and Robinson, 2012).

They normally take the form of flow charts or process diagrams. Examples of process models in information behaviour include Krikelas's (1983) Information-Seeking Behaviour Model and Byström and Järvelin's (1995) Information-Seeking Model. The main limitation of process models is that they usually only show observable behaviours(Bawden and Robinson, 2012).

Wilson's (1981) model is considered an innovator here (Bawden and Robinson, 2012), see Figure 2-4. The model attempts "*to draw attention to the interrelationships among concepts used in the field*" (Wilson, 1981, p.2). The model has several interesting elements including highlighting the importance of information needs and separating information exchanges with people from other information sources and IT systems. However it does have its limitations, it has been criticised for being too descriptive and lacking of explanatory power (c.f Bawden and Robinson, 2012).

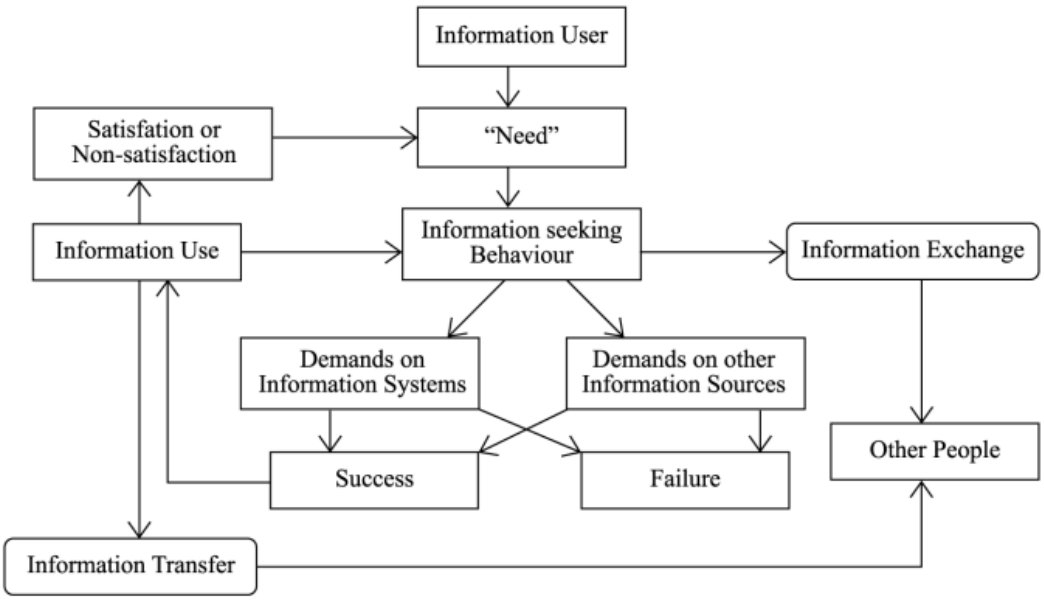


Figure 2-4 Wilson's First Model of Information Behaviour (source: (Wilson, 1981, p.3))

Cognitive Models: These models build on process models to add the thoughts and motivations of the individuals carrying out the actions (Bawden and Robinson, 2012). Although there are exceptions, one of which is discussed below, cognitive models tend to present information as a linear, ordered set of steps (ibid).

One of the most well-known and influential cognitive models is Wilson's (1997) model of information behaviour (Bawden and Robinson, 2012). Wilson combined research from both inside and outside the information behaviour literature in an attempt to create a global model of information behaviour (Wilson, 2000). The model examines the factors that motivate and influence a person's information behaviour, along with the information behaviour itself. This model is examined in more detail in the next section.

Another seminal example of a cognitive model is the Information Seeking Process (ISP), developed by Carol Kuhlthau. The model was developed using a series of longitudinal investigations (Kuhlthau, 1991). The model includes six stages of information-seeking, and for each stage Kuhlthau identified the interplay between affect, cognition and the physical. The final column in Table 2-4 highlights the tasks that need to be completed during each stage in order for the information-seeker to progress. Despite the seemingly neat division of stages the movement between stages is done in spirals and is caused by complex interactions between thoughts, feelings and actions (Hyldegård and Ingwersen, 2007).

Stages in the ISP	Feelings common to each stage (Affective)	Thoughts common to each stage (Cognitive)	Actions common to each stage (Physical)	Appropriate task according to Kuhlthau model
Initiation	Uncertainty	General/ Vague	Seeking background information	Recognise need
Selection	Optimism			Identify sources
Exploration	Confusion/ Frustration/ Doubt		Seeking relevant information	Investigate topic
Formulation	Clarity	Narrowed/ Clearer		Formulate a focus
Collection	Sense of direction/ Confidence	Increased interest	Seeking relevant or focused information	Gather information
Presentation	Relief/ Satisfaction or disappointment	Clearer or focused		Complete search

Table 2-4 Information Seeking Process (ISP) (source: (Kuhlthau, 1991))

Complex Models: These theories add a greater level of context than was available in cognitive models; these models are often non-linear and multi-directional in nature (Bawden and Robinson, 2012). Examples of complex models include Niedzwiedzka's (2003) adaptation of Wilson (Wilson, 1997) and Godbold's (2006) combination of Wilson (1981) with both Ellis's (1993) characteristics and Dervin's

(1992) Sense-Making. Complex models capture more of the real world complexity of information behaviour, however, this can also make them more difficult to operationalise than simpler models (Bawden and Robinson, 2012).

An example of a complex model is Fosters (2004) non-linear model of information-seeking behaviour, see Figure 2-5. Foster proposes that a non-linear model as more appropriate because it enables researchers develop an "*understanding of the inter-relationship of multiple individually complex variables form information behaviour*" (Foster, 2006, p.156). The model includes three information-seeking processes: (1) opening, (2) orientation, and (3) consolidation. The processes are considered interactive and non-sequential, with each one containing sub-processes and activities (Foster, 2006). Theses 'core processes' interact with different levels of context: (1) external (e.g. social/organisational), (2) internal (e.g. feelings/thoughts), and (3) cognitive (e.g. flexible/open).

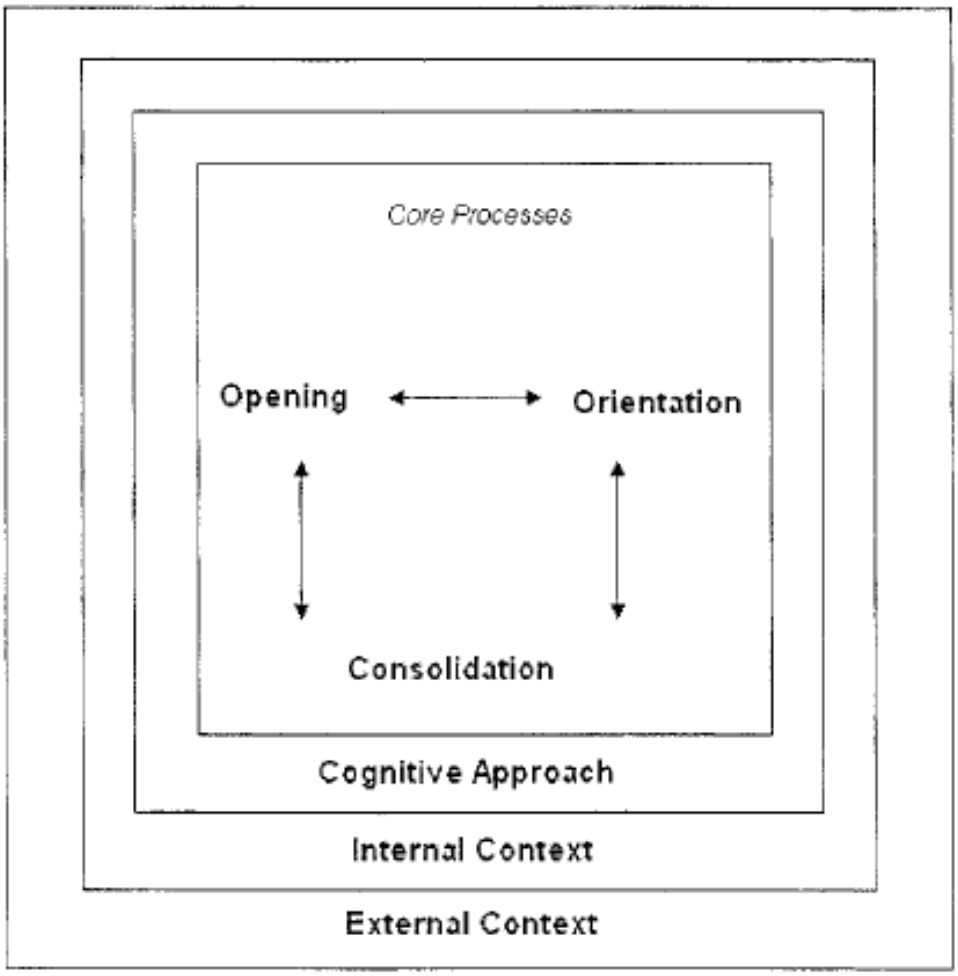


Figure 2-5 Foster's Non-Linear Model of Information-Seeking Behaviour (source: (Foster, 2004, p.232))

Another example of a complex model is Johnson et al., (2001), see Figure 2-6. The model aims to explain the information resource usage of information seekers (Johnson and Case, 2012). It is not intended to explain one information-seeking episode but to instead account for the continuous stream of health behaviour (ibid). The model, which uses elements of Dervin's sense-making, focuses more on the factors which influence information-seeking than the details of the information seeking process (Bawden and Robinson, 2012).

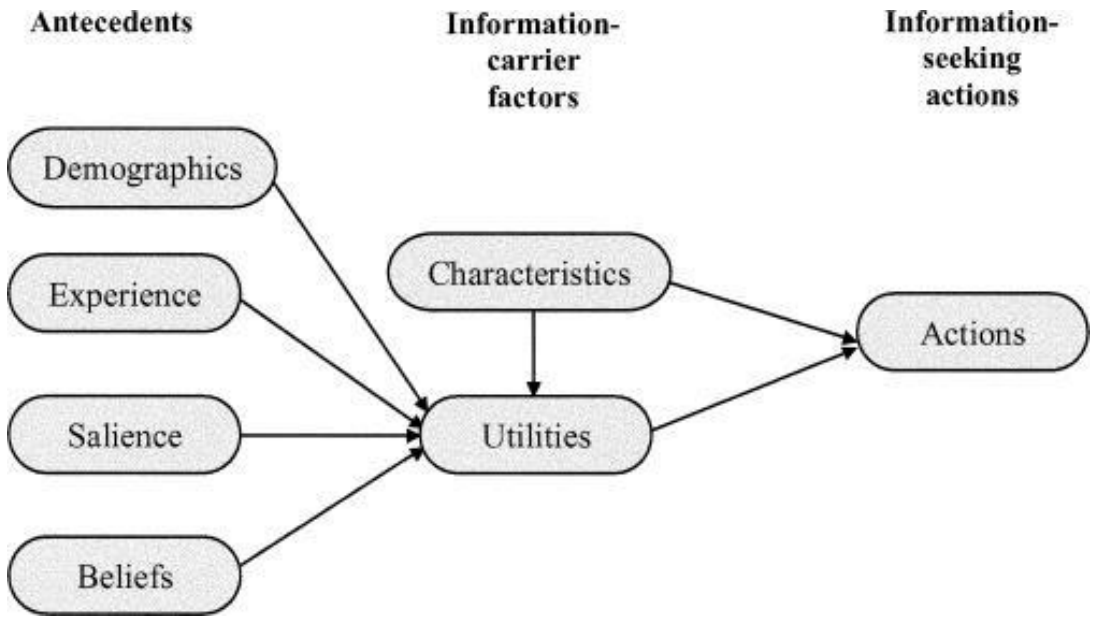


Figure 2-6 Johnson's Comprehensive Model of Information Seeking (CMIS) (source:(Johnson et al., 2001, p.340))

Individual Perception Theories: These theories are based on the constructivist approach, looking at the subjective views of individuals as they interact with information (Bawden and Robinson, 2012). In examples such as Fisher's Information Grounds (Fisher et al., 2004) and Chatman's Life in the Round (Chatman, 1999), understanding context is more important than the other elements of information behaviour.

The most well-known in this category is Dervin's sense-making (Dervin, 1998), see Figure 2-7. Dervin's sense-making is considered by some more of a methodology than a theory, although it has influenced several other theories including Wilson's (1997) model and Johnson et al (2001). Sense-making has been developed over several decades and fundamentally it is a "*set of metatheoretic assumptions and*

propositions about the nature of information, the nature of human use of information, and the nature of human communications" (Dervin, 1992, pp 61 - 62).

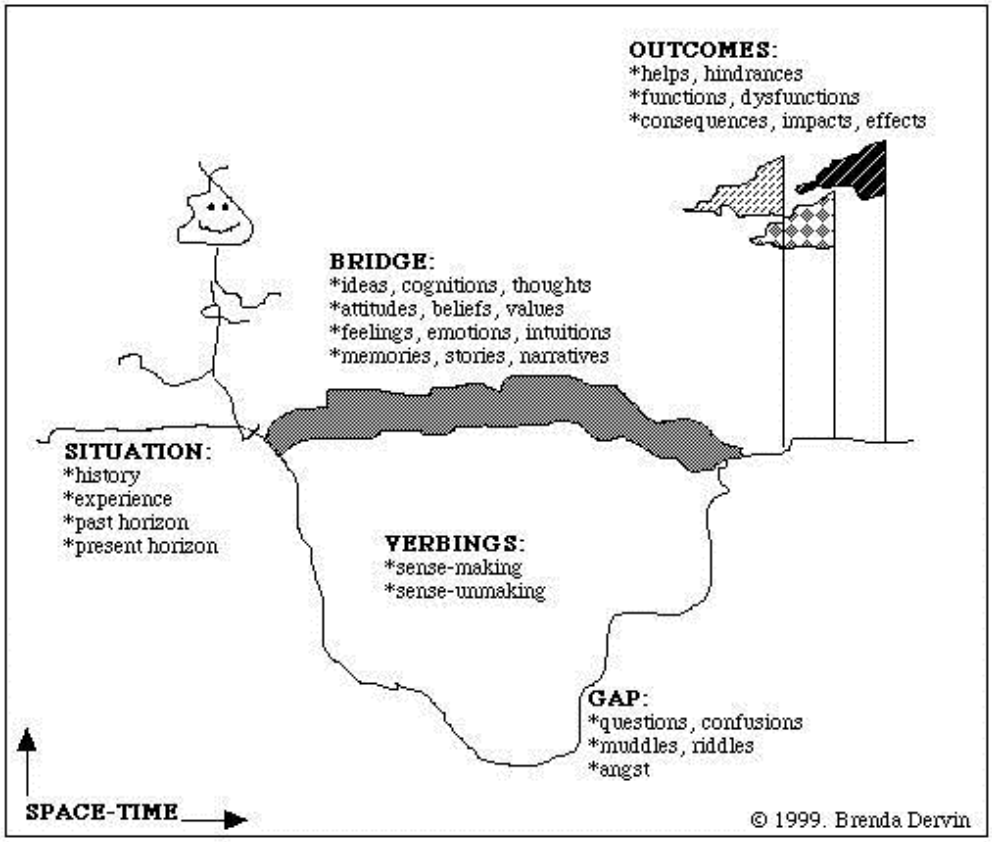


Figure 2-7 The Sense Making Metaphor (source: (Dervin, 1992, p.68))

2.3.1 Wilson's Revised General Model of Information Behaviour

Tom Wilson is considered an influential author within information behaviour. This is because his (1981) paper is highly cited and among one of the seminal works credited with placing the placement of the user at the centre of information behaviour research (McKechnie et al., 2006). Wilson's (1997; 1999) revised general model of information behaviour is also highly cited, see Figure 2-8. It is probably the most well-known cognitive model in information behaviour (Bawden and Robinson, 2012).

Wilson' revised model is an adaption of his earlier work, specifically his (1981) Information needs and seeking model. The fact that the models from his (1981) paper were frequently cited but had not been further developed by other researchers was part of Wilson's motivation to further his research in the area (Wilson, 2005). The revised model includes influences from other seminal authors

in the field including, Ellis's Characteristics, Dervin's Sense-Making and Kuhlthau's ISP. Wilson also decided to integrate relevant theory from outside the information behaviour discipline into the model to try and explain the motivators behind information-seeking (Wilson, 2007; Case, 2012), for example stress and coping theory. When taken together, the evolution of Wilson's models are considered reflective of the trends in information behaviour research (Case, 2012).

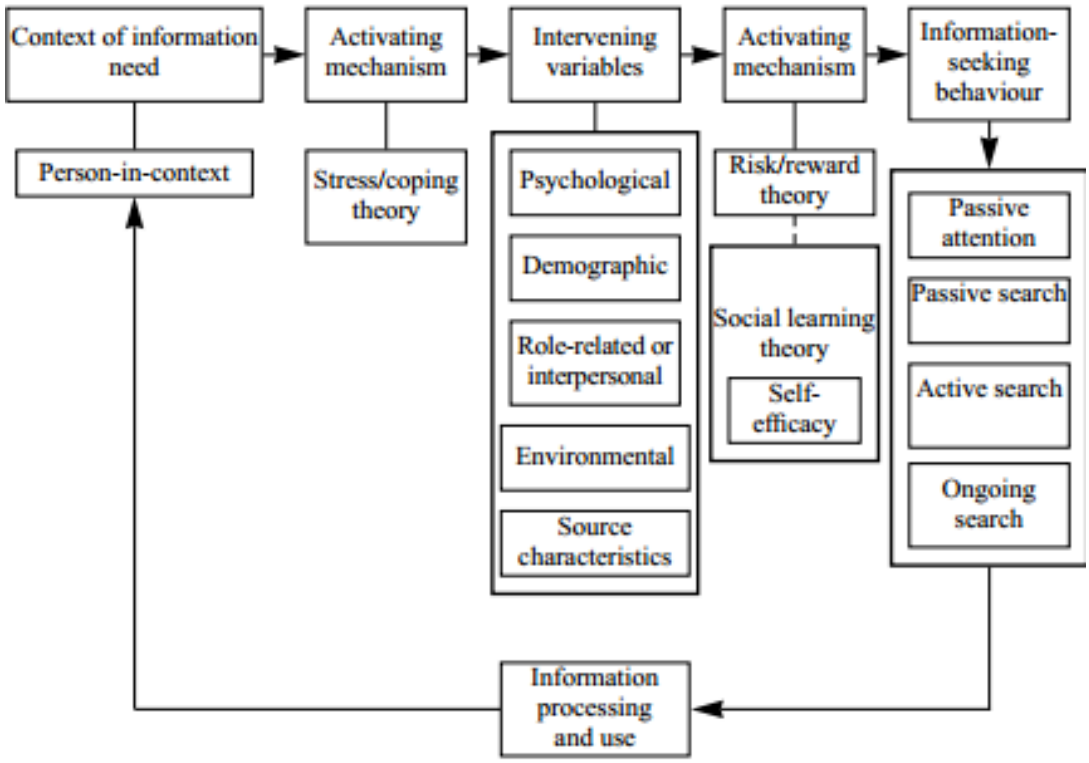


Figure 2-8 A Revised General Model of Information Behaviour (source:(Wilson, 1997, p.569))

It is more complicated than his previous models because it includes factors which the first models ignored (Case, 2012). The model places activating mechanisms and intervening variables between the information need and the information-seeking behaviour. These variables are intended to add context to the model (Bawden and Robinson, 2012). Wilson added information processing and use as a stage after information-seeking which created a feedback loop if the initial search did not resolve the seekers information needs, see Figure 2-8.

Despite being highly cited, Wilson's (1997; 1999) revised general model of information behaviour also has several weaknesses. For examples, other researchers have criticised the model for being too systematic (McKenzie, 2003)

and for how context is represented (Niedzwiedzka, 2003). The weaknesses of the model are explored in detail below.

Missing details: The Wilson models are not intended to be taken individually. Each iteration builds on earlier versions, certain key concepts may be condensed or missing entirely in particular versions (Wilson, 2007). This may be considered a strength by some researchers (i.e. Robson and Robinson, 2013), however, it is also a weakness. For example, Niedzwiedzka (2003) proposed the introduction of an intermediary as a modification to Wilson's (1997) model. However, Wilson discounted this as it is included in the second of his 1981 models (Wilson, 2007).

Linear: Researchers have suggested that information-behaviour is more iterative and non-linear in nature (Foster, 2004). For example, in her investigation into information seeking by pregnant women McKenzie (2003) found that their information behaviour did not always match the systematic search process identified in models such as Wilson (1997). Wilson's (1997) model does include a feedback loop but the model is unidirectional.

Context: Wilson's (1997) model has received criticism for separating the person-in-context from the other context variables, activating mechanisms and intervening variables (Niedzwiedzka, 2003). According to Wilson (2005) the person-in-context box from the revised model is a condensed version of the context box displayed in his (1981) information-needs and seeking model. As a result, Wilson has placed personal, role and environmental variables in two locations in the model.

The reasoning for the separation is not clear. Wilson (1997) states that there was a need to expand the (1981) model to elaborate on the concept of variables that encourage information-seeking and those that act as a barrier. However, by combining all the context variables together it would allow for the possibility to observe variables that have different effects on different individuals, or interact to have different effects on the same individual. The revised model has also faced criticism for its inclusion theory's such as stress and coping and risk and reward (Niedzwiedzka, 2003). Too much focus on stress can limit the focus of information-seeking studies (Lambert and Loiselle, 2007).

Information Processing and Use: Information processing and use is an area that lacks conceptual clarity (Niemelä et al., 2012; Bawden and Robinson, 2012; Savolainen, 2009a) and empirical investigation within information behaviour (Niemelä et al., 2012; Tuominen and Savolainen, 1997). Wilson follows this tradition by leaving the concept under developed, see Figure 2-8**.** Wilson highlights some of the factors that may influence information processing and use. Otherwise information processing and use is used as method of creating a feedback loop between information-seeking and person-in-context, to signify continued information-seeking when information needs are not met.

2.4 A Health Information Behaviour Model

This section describes the development of the adapted health information behaviour model. The model is an adapted version of Wilson's model (1997). Despite the weaknesses listed in the previous section, Wilson's model (1997) effectively demonstrates the scope of information behaviour. The model successfully highlights connections between relevant research inside and outside the information behaviour discipline (Wilson, 2007).

As the Wilson model details the different areas of information behaviour, it was used as a scaffold to investigate the information behaviour literature. This facilitated investigations into context, information-seeking and information processing and use. Adaptions were made to the original Wilson model based on a combination of the limitations previously discussed and the review described over the coming sections. The discussion is framed based on the sections of Wilson's model (1997). With the adapted health information behaviour model presented after the review. Where the main differences between it and Wilson's model (1997) are highlighted.

The first area to be explored is the context of search. For this study context of search takes a similar perspective to Wilson's person-in-context. This means that context is explored from the perspective of the information-seeker (Courtright, 2007). Context of the search includes three sub-sections (1) characteristics of the seeker, (2) nature of the task, and (3) information needs.

The second section to be discussed is information-seeking. Information-seeking is a subset of information behaviour (Wilson, 1999). This section explored the different search strategies that can be employed by information-seekers when obtaining information. While Wilson's model (1997) is problem focused. This section also examines passive forms of information gathering.

The third section included in the review is information processing and use. This is an area that lacks empirical investigation and conceptual clarity (Tuominen and Savolainen, 1997; Niemelä et al., 2012). The aim here is to help bring clarity by dividing information processing into two concepts, information processing and information use outcomes. Each concept is provided with its own definition based on a review of the literature.

2.4.1 Context of Search

Information-seeking occurs within a particular context (Agarwal et al., 2011). It occurs in conjunction with "*life's activities, problems, tasks, and social and technological structures*" (Solomon, 2002, p.229). This makes context a central concept in information behaviour research (c.f.Johnson, 2003). From Wilson's perspective in order for information behaviour to be able to produce innovative and useful contributions, it needed to be "*firmly founded upon an understanding of information users in the context of their work or social life*" (Wilson, 1981, p.12). Alternative terms used for context within information behaviour include setting, environment, information-world and information-ground (Courtright, 2007).

It can be more difficult to bound context outside of an organisational setting (Courtright, 2007), as it is possible for a variety of user characteristics and external variables to influence information behaviour (Fidel and Pejtersen, 2004). It is also possible for contextual variables to interact with each other, making it difficult for the researcher to identify which variable was the dominant influence (Sonnenwald, 1999). Researchers have suggested that qualitative studies are better equipped to understand the influence of different contextual factors at different points in time (Courtright, 2007).

The complexity has resulted in the use of context often being restricted to factors believed to constrain information-seeking (Johnson, 2003). However, contextual variables do not constrain information-seeking, instead there is an interactive relationship with the information behaviour process (c.f. Pettigrew, 1987; Sonnenwald, 1999). For example, information needs can resolve or change as a result of information found during information-seeking.

Context in this study is viewed from a person-in-context perspective (Wilson, 1981; Wilson, 1997). This perspective considers context in terms of factors "*perceived and constructed by the information actor*" (Courtright, 2007, p.287). As discussed previously, Wilson split context, separating activating mechanisms and intervening variables from person-in-context. As part of this study all relevant context variables will be kept together under context of search. The variables are grouped under three headings, (1) characteristics of the seeker, (2) nature of the task and (3) information need. Each of these factors is explored in more detail below.

2.4.1.1 *Characteristics of the Seeker*

This section includes all relevant contextual variables other than task and information needs. Variables were grouped into either personal or environmental characteristics. A review of the literature was conducted with an aim to present context variables relevant to the study domain, expectant and new mothers. Personal characteristics include three factors, (1) demographics, (2) health, and (3) experience. These factors displayed in Table 2-5.

Variable	Definition	Reference
Demographics	Factors such as age and education	(Wilson, 1997; Bowen et al., 2003; Cotten and Gupta, 2004)
Health	Current health status	(Bowen et al., 2003; Cotten and Gupta, 2004)
Experience	Experience of the topic	(Kuhlthau, 1991; Johnson et al., 2001; Papen, 2013)

Table 2-5 Personal Variables

Dervin and Nilan (1986) criticised the use of socio-demographic variables in information-behaviour studies. However, other studies suggest that demographic factors such as age and education can influence information-seekers selection of information resources (Cotten and Gupta, 2004). Carolan (2007) found that

expectant mothers over 35 displayed a preference for detailed medical information written by experts. It was also found that health professionals often adjusted the information they provided based on the demands of this user group (ibid).

Experience with the topic area can influence the type of tasks and the degree of information-seeking, see Table 2-5. Papen (2013) found that pregnant women who already had children conducted more targeted information-seeking than first-time mothers. First-time mothers had a wide range of information needs, wishing to know as much information as possible about pregnancy and preparing for motherhood (Carolan, 2007; Papen, 2013).

The environmental characteristics are displayed in Table 2-6. Environmental characteristics are divided into time and accessibility. The accessibility of an information resource includes the time, effort and perceived difficultly the information-seeker must engage in to access the resource (c.f. Wilson, 1997; Agarwal et al., 2011). The accessibility of information resources has been shown to influence how frequently they are accessed (O'Reilly, 1982). The lack of easily accessible information resources can inhibit information-seeking (Wilson, 1997). Depending on the nature of the task, individuals may be willing to select a lower quality information resource that is easier to access (Leckie et al., 1996)

Variable	Description	Reference
Accessibility	The time, effort and perceived difficultly in accessing information from a particular information resource.	(Wilson, 1997; Agarwal et al., 2011)
Time	The amount time the information-seeker has to conduct a search.	(Byström and Järvelin, 1995; Heinström, 2003)

Table 2-6 Environmental Variables

Accessibility includes the amount of time an information resource is available to the information-seeker. The rise in popularity of eHealth information resources has been partly attributed to the short time patients get to spend asking doctors questions (Cline and Haynes, 2001). This lack of question time can result in information-seekers having to look for additional information elsewhere (Papen, 2013). Expectant mothers have listed this as one of the key drivers for online information-seeking (c.f. Lagan et al., 2010; Song et al., 2012).

The available time of information-seekers was also shown to have a mediating effect on information behaviour, see Table 2-6. Time can influence the interpretation of information needs which can then impact the successful completion of tasks (Byström and Järvelin, 1995). If information needs are not correctly formulated to begin with then the correct information will not be found (Savolainen, 2012). Time pressures can function as a barrier to information-seeking, influencing the quantity of information-seeking and how information resources are evaluated (Heinström, 2003).

2.4.1.2 *Nature of the Task*

This section examines the nature of the task. Sometimes referred to a situation or problem, tasks are considered a primary contextual influencer (Courtright, 2007). Tasks are undertaken by an individual in order to achieve a goal (Vakkari, 2003), the aim may be to move their life or work forward in some way (Liu and Li, 2012). Some researchers refer to tasks as work tasks to avoid confusion with the concept of search tasks (c.f. Vakkari, 2003; Ingwersen et al., 2012). Search tasks occur when an individual is faced with a problem completing a task and an information need is generated (Ingwersen et al., 2012). Individuals may opt to use a mix of both internal and external resources in an attempt to resolve those needs (c.f. Courtright, 2007). The aim of information-seeking is then to satisfy information needs that have been identified by the individual during the attempted execution of the task (Vakkari, 2003).

Researchers have identified several features of tasks that can influence information behaviour (Agarwal et al., 2011). These include (1) task complexity, (2) task importance, and (3) task urgency. These features are described in Table 2-7. This section considers each task feature and the impact it can have on the information behaviour process.

The first task feature in Table 2-7 is task complexity. Tasks that are non-routine, lack predictability and do not have clearly defined information resources are said to be more complex (c.f. O'Reilly, 1982; Anderson et al., 2001; Byström, 2002). Increased task complexity leads to increased feelings of uncertainty (Kuhlthau, 1997). It can

also result in people feeling overwhelmed and anxious (Kuhlthau, 1999). Task complexity has been shown to increase the complexity of the information needs and to impact on the choice of information resources (Byström and Järvelin, 1995; Byström, 2002).

Term	Description	Reference
Task complexity	The level of complexity is related to the prior-determinability of process, information requirements and outcome	(Byström and Järvelin, 1995; Byström, 2002)
Task importance	The importance of the task to the well-being of the information-seeker	(Xu et al., 2006)
Task urgency	Task that need to be completed in limited time frame	(Agarwal et al., 2011; Kuhlthau, 1991)

Table 2-7 Features of Task

Another task feature detailed in Table 2-7 is the task importance. Defined as the importance of the task outcomes to the user (Xu et al., 2006). Task importance has been shown to effect information processing, with people usually applying more effort when tasks are more important to them (c.f. Petty and Cacioppo, 1986). Information-seekers may be more conscious of information resources quality when a task is important to them (Agarwal, 2011).

The final task feature in Table 2-7 is task urgency. Urgent tasks need to be completed within a limited time-frame (Agarwal et al., 2011; Kuhlthau, 1991). Research suggests that information-seekers may be more tolerant of problems with the information resource during urgent tasks (c.f. Agarwal et al., 2011). This is as long as the information resource is still able to supply high quality, relevant information (ibid).

2.4.1.3 *Information Needs*

This section examines the concept of information needs. The concept of information needs is somewhat controversial (Bawden and Robinson, 2012). It was one of a number of areas with information behaviour that lacks an agreed upon definition (Case, 2012). Some researchers suggest that information needs are not a unique concept, but are instead an expression of something else, for example problem state (c.f. Bawden and Robinson, 2012).

Some researchers have framed information needs simply as the driver of information-seeking (Ikoja-Odongo and Mostert, 2006). However, this is insufficient as individuals sometimes avoid information, even when they have a gap in their knowledge base (c.f. Wilson, 1997). This is particularly true in the health space, where patients may wish to avoid information in an attempt to manage their feelings of uncertainty (Barbour et al., 2012; Brashers et al., 2002)

Belkin (1982) proposed that information needs emerge when individuals recognise an 'anomalous state of knowledge'. Once users recognise the existence of information needs the next stage is usually information-seeking (Belkin, 1993). Wilson (1981) identified three basic human needs (1) physiological, (2) cognitive, and (3) affective. With cognitive and affective information needs driving information-seeking (Wilson, 1997).

Cognitive and affective information needs are important influencers in both general and health information behaviour models (e.g. Kuhlthau, 1991; Johnson and Meischke, 1991). Cognitive needs are considered rational (Lavidge and Steiner, 1961). Cognitive needs are focused on information and knowledge (Kuhlthau, 1991; Park et al., 2008). Affective information needs involve emotions (Lavidge and Steiner, 1961), moods and feelings (Lavidge and Steiner, 1961; Kuhlthau, 1991; Park et al., 2008).

Health information-seeking can be caused by a combination of information needs (Wilson, 1997). For example, an individual could be looking for factual information about treatments and they could also be looking for information to help them cope emotionally (ibid). Affective information needs have been shown to be a driver of information-seeking for expectant mothers. Studies found that first-time mothers sought information during the antenatal period because they were nervous and did not know what to expect (Bernhardt and Felter, 2004).

As information needs are subjective and occur within the mind of the individual, they are not directly observable to the researcher or information provider (Wilson, 1997). Patients sometimes have difficultly articulating information needs. This can be because there are not conscious of the need, they find it difficult to verbalise

their requirements or because they feel uncomfortable discussing their information needs with others (Fourie, 2008).

An individual's emotional state can have a powerful influence on their information behaviour. Individuals can feel driven to search for information to resolve feelings of uncertainty or can feel compelled to avoid information for the same reason (Brashers et al., 2002). Affect has been shown to influence an individual's choice of information resources (Griffin et al., 2008). Affect has also been demonstrated to impact on how users interact with information systems (Deng and Poole, 2010).

2.4.2 Information-Seeking

This section explores Information-seeking. Information-seeking is a subset of information behaviour (Wilson, 1999). Information-seeking describes how individuals search for information. It has traditionally been viewed as purposively and goal directed (Pálsdóttir, 2010). Models such as Wilson's general model (1997) are problem based and implicitly assume that the principle method of searching is active. However, others argue that information-seeking should be viewed in the context of all the information that individuals encounter throughout their lives and not just the times when they actively seek it (Bates, 2002). Information gained serendipitously can trigger pre-existing information needs or spark new ones (Case, 2012).

In order to determine the types of searches to include in this study, a review of information-seeking literature was conducted, see Table 2-8. Four search categories were identified. The first category is passive search, see Table 2-8. Passive search is an amalgamation of both of Wilson's (1997) passive search categories. It covers situations where information was discovered serendipitously or where information was gathered with a semi-defined goal (Chang and Rice, 1993).

The second category in Table 2-8 is the traditional active search, associated with problem based information-seeking. For active searches information-seekers have well-defined goals (Chang and Rice, 1993). Information-seekers may have pre-planned questions and seek out information resources they are familiar with (McKenzie, 2003).

The third category in Table 2-8 is on-going search. It was taken directly from Wilson (1997). Ongoing search describes situations where individuals go through multiple rounds of information-seeking continuously reviewing their information needs as new information is discovered.

Term - Current Study	(Niederdeppe et al., 2007)	(McKenzie, 2003)	(Wilson, 1997)	(Chang and Rice, 1993)	Definitions
Passive search	Information scanning	Non-directed Monitoring	Passive attention	Ill-defined goal	Where information is acquired without actively seeking particular information (reading a newspaper, watching TV) or when not looking for information at all (walking down the street)
		Active Scanning	Passive search	Semi-defined goal	Where one type of search or behaviour leads to the acquisition of information that happens to be useful. Includes looking in likely places for information or semi-directed browsing.
Active search	Information-Seeking	Active Seeking	Active search	Well-defined goal	Where the individual actively seeks out the information. This is a direct form of searching, where the questions and the source are pre-planned.
Ongoing search		_____	Ongoing search	_____	Where the individual continuously updates or expands the framework created in active search
By Proxy		By Proxy	_____	_____	When the individual connects with information source because or through the actions of another agent, (either an intermediary/gatekeeper or the information source itself). These interactions vary and can follow any of the other search types.

Table 2-8 Information Search Definitions

The final category in Table 2-8 is proxy search. This is an addition to the search categories proposed by Wilson (1997). Proxy searches involve individuals interacting with an information resource through a gatekeeper or intermediary (McKenzie, 2003). For example a mother conducting an information search on behalf of a family member.

Information-seeking can also be categorised by the immediacy of information needs. When information needs have to be addressed urgently then information-seekers undertake an active search (c.f. Krikelas, 1983). However, information-seekers can also have less urgent needs which result in passive search. These needs are held in reserve until they are recalled by a stimulus (ibid).

2.4.3 Information Processing and Use

This section evaluates the definitions of information processing and use within the boundaries of information behaviour. Researchers have repeatedly highlighted the ambiguity surrounding information processing and use (Niemelä et al., 2012; Bawden and Robinson, 2012; Case and O'Connor, 2015). It is an area that has been frequently referenced but is rarely explicated (Savolainen, 2009b). Instead, it is left as an ambiguous appendix to information-seeking (ibid). It is perhaps unsurprising then that researchers have also highlighted the lack of empirical investigation into information processing and use (Tuominen and Savolainen, 1997; Niemelä et al., 2012), particularly when compared to other areas within information behaviour, such as information needs and seeking (Case and O'Connor, 2015). This can be illustrated through a review of researchers who have used or adapted Wilson's (1997) model. Many of whom have chosen not to examine the full model, choosing instead to leave out information processing and use (e.g. Heinström, 2003; Ford et al., 2005; Shieh et al., 2009).

One of the difficulties for researchers lies in the inconsistent and interchangeable use of terminology (Savolainen, 2009a; Kari, 2010). Some terms identified include, information use, information processing, knowledge utilisation, information utilisation, information use behaviour and information use outcome (Todd, 1999; Spink and Currier, 2006; Choo et al., 2008).

In an attempt to develop a clearer understanding of information processing and use, a review of current definitions was undertaken. The review confirmed the issues highlighted by other researchers, in terms of inconsistent terminology and scope. Table 2-9 reviews information processing and use definitions ordered by term.

The simplest definition included in Table 2-9 is Wilson (1981) definition. In it he links information use to evaluating the relevance of information found during information-seeking to satisfying information needs. In contrast, Hughes (2006) goes for a broad definition, including information-seeking within the definition in an attempt to create a combined information use and learning model.

Term	Reference	Definition
Information Use	(Wilson, 1981, p.2)	*"Whatever the source of the information it will at some point be "used", if only in the sense of being evaluated to discover its relationship to the user's need."*
	(Bouazza, 1989, p.146)	*"Information use is that seeking behaviour that leads to the use of information in order to meet an individual's needs"*
	(Dervin, 1992, p.65)	*"[Sense-making] assumes that the important things that can be learned about human use of information and information systems must be conceptualized as behaviours: the step-takings that human beings undertake to construct sense of their worlds. These step-takings, or communicatings, involve both internal behaviours (e.g.comparings, categorising's, likings, dislikings, polarisings, stereotypings, etc.) and external behaviours (e.g. shoutings, ignorings, agreeings, disagreeings, attendings, listenings, etc.)."*
	(Hughes, 2006)	*"the experience of engaging with online information, as a multifaceted experience which encapsulates learners' information needs and context, their information seeking and use of information and their learning outcomes."*
	(Kari, 2007)	*"The consequent measures that are taken on the basis of the made meanings."*
Information Use Behaviour	(Wilson, 2000, p.50)	*"Consists of the physical and mental acts involved in incorporating the information found into the person's existing knowledge base. It may involve, therefore, physical acts such as marking sections in a text to note their importance or significance, as well as mental acts that involve, for example, comparison of new information with existing knowledge."*
Information Processing and Use	(Wilson, 1997, p.567)	*".....information will be "processed" (i.e. incorporated into the users' framework of knowledge, beliefs or values) or used (i.e. lead to changes in the user's state of knowledge, behaviour, values or beliefs)."*
information utilization	(Todd, 1999, p.853)	*"Information utilization is conceptualized more holistically as a complex interactive change process, with attention given to the process of `thinking' – a cognitive `doing - as well as `acting' the behavioral outcomes and end-states."*
internalising information	(Kari, 2007)	*"The mental process of interpreting messages"*
information outcome	(Kari, 2007)	*"Information outcome are information use and effect of information, and their most prominent common dimensions [are] mental vs. physical outcomes."*
Enactment	(Niemelä et al., 2012, p.215)	*"Enactment is defined as information use or media use referring to concrete, visible, and observable actions and activities."*
Media Use	(Niemelä et al., 2012, p.213)	*"It is not only the information content that activates people, but also mere simultaneous interaction with media channels. Hence, handling copies of newspapers or walking to a library is defined as media use."*

Table 2-9 Information Processing and Use Definitions

Several attempts at categorising information processing and use definitions currently exist, (i.e. Kirk, 2002; Kari, 2010). However, Savolainen (2006) provides the most concise during his discussion on sense-making. Savolainen suggests that there are basically "*two major viewpoints: (a) information use as a process, and (b) the various outcomes of this process*" (2006, p.1120).

In an attempt to improve the confusion over inconsistent terminology, the researcher proposes that information processing and use be divided into two separate concepts based on Savolainen's categorisation (2006). The first concept would be information processing and the second would be information use outcomes. This is illustrated in Figure 2-9.



Figure 2-9 Information Processing and Use (source: (Mahony et al., 2016, p.330))

Information processing involves examining the quality of information resources and assessing their ability to satisfy information needs (c.f. Wilson, 1981). Information use outcomes includes both internal and behavioural outcomes of information processing (Kari, 2007). Both information processing and information use are discussed in more detail in the following sections.

2.4.3.1 *Information Processing*

For the purpose of this research study, information processing is defined as examining the quality of information resources and assessing their ability to satisfy information needs. Information process is divided into two phases, evaluation and comparison. Evaluation is where information-seeking determine the quality of information resources using assessment criteria (Ellis et al., 1993; Foster, 2004; Watson, 2014).

During the comparison stage of information processing, information-seekers may compare information from multiple information resources as a method of verification (Ellis et al., 1993; Watson, 2014). Information-seekers may also choose

to combine the information into one 'information product' (Foster, 2004; Watson, 2014). This stage can involve both external information resources and internal cues, such as relevant prior beliefs or past experiences (Wood et al., 1985).

The internet has led to an increase in the availability of health information for consumers (Case, 2012). Information-seekers have an ever increasing variety of information resources to choose from. it is therefore important to understand, not only which information resources they choose but the criteria they use to select the information resources (Pálsdóttir, 2008). Studies have suggested that the requirements of information-seekers evolve as they search for and process information (c.f.Kuhlthau, 1991). New information found by the information-seeker can result in changes to their information needs which influence their assessment criteria (ibid).

In order to understand the phases of information processing it is therefore important to understand the assessment criteria used by information-seekers to evaluate and compare information resources. Information processing is subjective and occurs within the mind of the information-seeker (Wilson, 1997). This can make information processing difficult to analyse (Wilson, 1997; Bawden and Robinson, 2012). However, by understanding the subjective assessment criteria utilised by information-seekers it may be possible to produce information resources that better meet their requirements (Mahony et al., 2016).

A review into the assessment criteria used by health information-seekers, found that the majority of the studies were survey based and not connected to other aspects of information behaviour, such as information needs (Zhang, 2014). The majority of the studies focused only on the information-seekers assessment criteria for online information resources, which limited the studies understanding of information resource selection from multiple options (ibid). This demonstrates the need to research information-seekers perception of all potential information resources.

In order to identify a list of potential assessment criteria to use as seed categories for assessment criteria, a review of information behaviour and information systems

literature was undertaken. The assessment criteria were divided by information resource (Table 2-10) and information content (Table 2-11). This is because it is possible for users to access certain information from multiple different information resources (Xu et al., 2006). Previous research has also proposed that characteristics of the information resource can influence information-seekers perception of the information content (Rains and Karmikel, 2009).

Information resources have a unique place within information behaviour. They act as "*both a shaper of information practices and the object of shaping by other contextual factors and by users themselves*" (Courtright, 2007, p.285). A study by Rains (2007) found that information-seekers that distrusted their doctors, were more likely to search online but were also more likely to distrust the information they found themselves. Studies have suggested that regularly using information resource can influence a user's future perceptions (Gray et al., 2005).

Code	Definition	References
Convenience ***(alt terms – Convenience of Access)***	The perceived ease with which the user may use/access the information resource.	(Bailey and Pearson, 1983; Connaway et al., 2011; Watson, 2014)
Credibility ***(alt terms – Cognitive Authority, Believable)***	The believability of the information resource *Includes: Trust, Expertise*	(Wilson, 1991; Strong et al., 1997; Fogg and Tseng, 1999; Rieh, 2002; Rieh and Danielson, 2007; Savolainen, 2007; Rowlands et al., 2008; Nurse et al., 2011; Oh and Worrall, 2013; Metzger and Flanagin, 2013; Lederman et al., 2014; Johnson et al., 2015)
Flexibility	The capacity of the information resource to change or to adjust in response to new conditions, demands, or circumstances *Includes: Customisation, Personalisation*	(Bailey and Pearson, 1983; Wixom and Todd, 2005; Gable et al., 2008; Walraven et al., 2009)
Format ***(alt terms – Appearance, Mode of presentation, Format of output, Aesthetics)***	The look and feel of the information resource, including the method of presenting information.	(Bailey and Pearson, 1983; Srinivasan, 1985; Doll and Torkzadeh, 1988; Wixom and Todd, 2005; Sillence et al., 2007b; Gable et al., 2008; Walraven et al., 2009; Nurse et al., 2011; Zhang et al., 2015)
Integration	The ability of the resource to communicate/transmit data between different resources.	(Bailey and Pearson, 1983; Gable et al., 2008; Yim and Shin, 2013)
Perceived utility	This is a balance between how useful an information resource is considered and the perceived cost (effort, opportunity cost and monetary cost)	(Bailey and Pearson, 1983)
Rank on search list	The position the information resource has on a search listing	(Walraven et al., 2009; Pan et al., 2007)
Responsive ***(alt terms – Response Time, Speed, Timeliness)***	The amount of time it takes for an information resource to satisfy a user's request.	(Bailey and Pearson, 1983; Srinivasan, 1985; DeLone and McLean, 1992; Wixom and Todd, 2005; Walraven et al., 2009)
Security ***(alt terms – Privacy and data protection)***	Confidence that the resources will protect user data from misappropriation or unauthorised alteration or loss.	(Bailey and Pearson, 1983; DeLone and McLean, 1992; Strong et al., 1997; Nurse et al., 2011; Zhang et al., 2015)
Usability (alt terms – Ease of Use)	The level of ease the user experiences interacting with the information resource and navigating through it. *Includes: Navigation*	(Doll and Torkzadeh, 1988; DeLone and McLean, 1992; Eysenbach et al., 2002; Webster and Williams, 2005; Sillence et al., 2007b; Savolainen, 2007; Gable et al., 2008; Head and Eisenberg, 2010; Nurse et al., 2011; Yim and Shin, 2013; Zhang et al., 2015; Johnson et al., 2015)

Table 2-10 Information Resource Assessment Criteria

Code	Definition	References
Accuracy ***(alt terms – veracity)***	The correctness of the information	(Bailey and Pearson, 1983; Srinivasan, 1985; Doll and Torkzadeh, 1988; Strong et al., 1997; Eysenbach et al., 2002; Wixom and Todd, 2005; Nicolaou and McKnight, 2006; Gable et al., 2008; Rowlands et al., 2008; Nurse et al., 2011; Arazy and Kopak, 2011; Metzger and Flanagin, 2013; Johnson et al., 2015)
Complete ***(alt terms – Sufficient, Amount, Coverage)***	The comprehensiveness and depth of the information	(Bailey and Pearson, 1983; Doll and Torkzadeh, 1988; DeLone and McLean, 1992; Strong et al., 1997; Eysenbach et al., 2002; Wixom and Todd, 2005; Nicolaou and McKnight, 2006; Walraven et al., 2009; Nurse et al., 2011; Arazy and Kopak, 2011; Metzger and Flanagin, 2013)
Concise	The information is succinct, lacking in superfluous detail.	(Strong et al., 1997; Gable et al., 2008; Yim and Shin, 2013)
Currency ***(alt terms – Timeliness, Topicality)***	The age of the information	(Bailey and Pearson, 1983; Srinivasan, 1985; Doll and Torkzadeh, 1988; Strong et al., 1997; McKinney et al., 2002; Wixom and Todd, 2005; Webster and Williams, 2005; Nicolaou and McKnight, 2006; Gable et al., 2008; Walraven et al., 2009; Head and Eisenberg, 2010; Zheng et al., 2013; Yim and Shin, 2013; Metzger and Flanagin, 2013; Zhang et al., 2015)
Use of Language ***(alt terms – Readability, Language, Easy to Understand)***	The information is easy to read and understandable.	(Srinivasan, 1985; DeLone and McLean, 1992; Eysenbach et al., 2002; Webster and Williams, 2005; Gable et al., 2008; Walraven et al., 2009; Head and Eisenberg, 2010; Nurse et al., 2011; Yim and Shin, 2013; Zhang et al., 2015; Johnson et al., 2015)
Freedom from Bias ***(alt terms – objectivity)***	The information is not influenced by a particular point of view or agenda.	(DeLone and McLean, 1992; Strong et al., 1997; Sillence et al., 2007b; Walraven et al., 2009; Arazy and Kopak, 2011; Nurse et al., 2011; Zheng et al., 2013; Oh and Worrall, 2013; Metzger and Flanagin, 2013)
References	Citations for used material or recommendations for additional sources of information *Includes: Citations and Recommendations*	(Eysenbach et al., 2002; Walraven et al., 2009; Head and Eisenberg, 2010; Nurse et al., 2011)
Relevance ***(alt terms – Connection to task)***	The applicability of the information to the user's needs.	(Webster and Williams, 2005; Sillence et al., 2007b; Rowlands et al., 2008; Walraven et al., 2009; Pan et al., 2007; Johnson et al., 2015; Watson, 2014; Nurse et al., 2011; Srinivasan, 1985; Strong et al., 1997; Nicolaou and McKnight, 2006; Gable et al., 2008; Yim and Shin, 2013)
Reliability	The consistency and dependability of the information	(Bailey and Pearson, 1983; Nicolaou and McKnight, 2006; Zheng et al., 2013; Watson, 2014)

Table 2-11 Information Content Assessment Criteria

Table 2-10 and Table 2-11 provide a concept centric analysis of information resource and information content assessment criteria. Concepts with similar definitions are grouped together with alternative terms highlighted. The tables also highlight when a concept is included under another heading. For example trust which sometimes had its own category and was sometimes included under credibility as it is in this study.

2.4.3.2 *Information Use Outcomes*

This section examines information use outcomes. Information use outcomes can be internal or behavioural (Kari, 2007). Behavioural information use involves observable physical actions such as a change in the information-seeker's behaviour or the sharing of information. Behavioural use is similar to what Niemelä et al. (2012) terms enactment.

Internal information use includes any cognitive or affective changes within the information-seeker (Dervin, 1999). Information-seeking can result in both positive or negative impacts to the information-seekers emotional state (White and Horvitz, 2009). For example, although health information-seeking can increase feelings of empowerment (Madge and O'Connor, 2006; Lagan et al., 2011b), expectant mothers have also reported feeling overwhelmed by having too much information (Carolan, 2007).

As internal use outcomes occur within the information-seeker's mind they are not directly observable (Spink and Cole, 2006). This means that researchers face a similar problem to information needs and information processing when trying to document internal information use outcomes (c.f. Wilson, 1997). Spink and Cole (2006) proposed that instead of relying solely on information-seekers articulating their internal states, researchers could infer changes based on observable inputs, such as information resources accessed and outputs, such as behavioural information use. These inputs and outputs may allow the researcher to make inferences into the cognitive and affective changes that have occurred (ibid).

2.4.4 Adapted Model of Health Information Behaviour

This section presents the adapted model of health information behaviour, see Figure 2-10. The section also highlights the differences between the model and Wilson (1997). Wilson's model is a linear, cognitive model (Bawden and Robinson, 2012). The adapted health information behaviour model is a complex, multidirectional model. The model includes an additional feedback loop between information-seeking and information processing and use, in an attempt to demonstrate the iterative nature of information behaviour (Foster, 2004). Stop search is also included to further illustrate the difference between information-seeking that continues and information-seeking that is concluded.

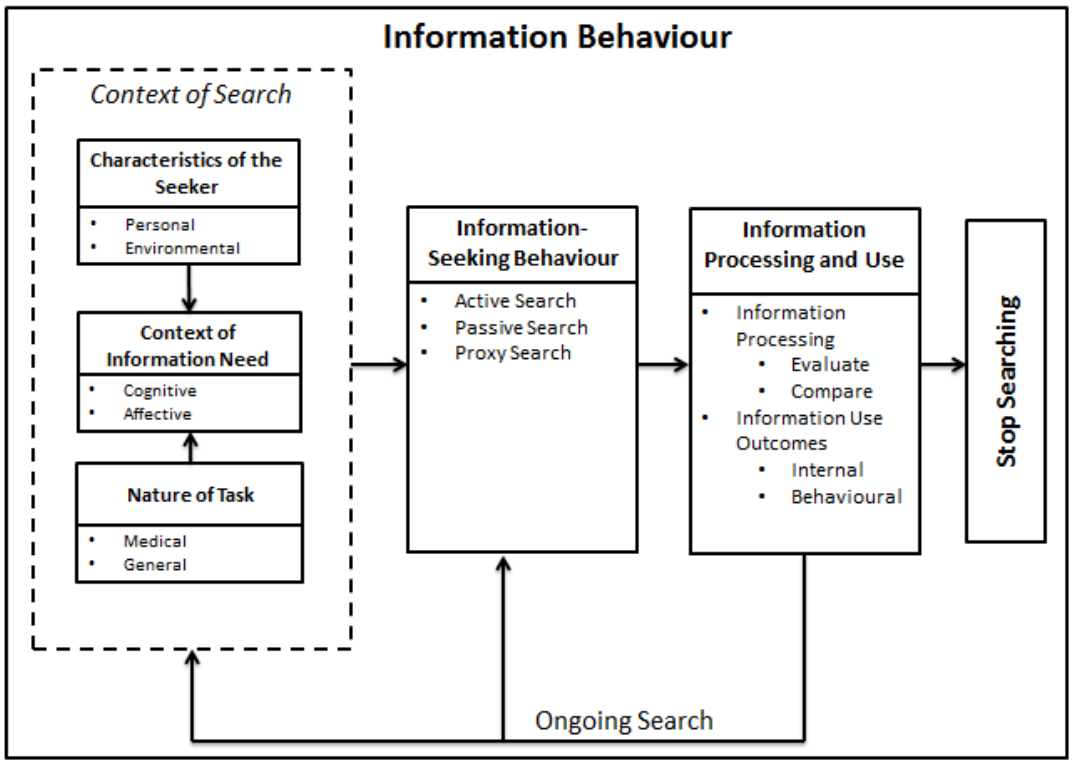


Figure 2-10 The Adapted Model of Health Information Behaviour

All context variables, including characteristics of the seeker, information needs and the nature of task are included under context of search, see Figure 2-10. This resolves the criticism Wilson (1997) received for separating person-in-context from the other context variables, activating mechanisms and intervening variables (Niedzwiedzka, 2003). The Wilson model was criticised for explicating stating particular theories as part of his model (Niedzwiedzka, 2003; Case, 2012). The reference to particular theories are removed the context of the search.

Task was included as a main component of context of the search based on the findings of the literature review, see Figure 2-10. Research has illustrated how task variables impact information needs (Byström and Järvelin, 1995), information-seeking (Vakkari, 2003) and information processing (Agarwal, 2011).

As discussed previously, changes were made to the information search categories included in Wilson (1997). For simplification, both of the passive search categories are combined. An additional category is included, proxy search. Proxy searches involve individuals interacting with an information resource through a gatekeeper or intermediary (McKenzie, 2003). The last change to the categories, involve moving ongoing search to the bottom of the diagram on top of the feedback arrows, see Figure 2-10. This placement better illustrates meaning behind the category.

The last major change to the model involves explicating information processing and use. An exploration of the literature resulted in the concept of information processing and use being separated into information processing and information use outcomes. Information processing involves assessing the quality of information resources and comparing them against information needs (c.f. Wilson, 1981). Information use outcomes includes both internal and behavioural use outcomes of information processing (Kari, 2007).

2.5 Conclusions

This chapter described the development of the adapted health information behaviour model, the model used in this study. The model is a revised version of Wilson's (1997) revised general model. Wilson's model was used as a scaffold to investigate key information behaviour themes. The adapted health information behaviour model is a complex multi-directional model. A primary aim in creating the adapted health information behaviour model was to further explicate the concept of information processing and use, an area researchers have highlighted as being ambiguous and under researched (Tuominen and Savolainen, 1997; Niemelä et al., 2012). In attempt to achieve this, information processing and use was divided into concepts, information processing and information use outcomes.

It is proposed that a combination of health as a subject area and expectant and new mothers as user group would make a suitable domain for the study. Health information-seeking has witnessed an increase often attributed to the increased availability of online information (Case, 2012). While expectant and new mothers are viewed a context rich user group for information behaviour investigations (McKenzie, 2004). Expectant and new mothers are a user group who seek information not just for themselves but also for the well-being of their families (O'Connor and Madge, 2004; Bernhardt and Felter, 2004). Researchers have called for more theoretically grounded investigations involving this user group to understand question such as how information resources can be created to meet their information needs (c.f. Plantin and Daneback, 2009).

The research objective of this study can be stated as follows:

To propose design guidelines for eHealth information resources based on the information behaviour of expectant and new mothers.

Previous studies suggest that a more in-depth understanding of health information behaviour could improve the design of eHealth information resources (Eysenbach and Köhler, 2002; Zhang et al., 2012). It is proposed that this research should test the assertion by using the adapted health information behaviour model to explore the health information behaviour of expectant and new mothers. The model attempts to offer a greater degree of analysis for information processing and use, this may be able to help address the gap in information processing and use identified in the literature (c.f. Niemelä et al., 2012; Bawden and Robinson, 2012; Case and O'Connor, 2015). The next chapter is the methodology chapter, which presents the research design considered the most appropriate for achieving the research objective.

Chapter 3: A Longitudinal Research Design

3.1 Introduction

A research methodology is the procedural framework a researcher uses to conduct their research (Remenyi & Williams 1995). This methodology chapter involves a journey from the theoretical underpinnings of the study, through a discussion of the methodology and data sampling considerations, through to analysis. The chapter first examines the research objective and the three research questions which were formulated to answer the objective. Following this, the fit between a longitudinal case study design and the research objective is explained. Next, the chapter discusses the data collection techniques used over the course of the longitudinal study. The chapter concludes with a discussion of the coding and analysis techniques used to analyse the data.

3.2 Exploratory Qualitative Research Informed by Social Constructivism

It was determined that an exploratory qualitative approach would be best equipped to meet the research objective. Qualitative research employs a variety of techniques, such as interviews, observations, and cultural texts, to study phenomena in their natural setting in order to understand the meaning that individuals attribute to them (Denzin and Lincoln, 2008). Qualitative research provides rich descriptions that can allow researchers to uncover the underlying complexity in a given situation (Miles and Huberman, 1994). Allowing researchers an enhanced capacity to understand how phenomena function and interact in particular contexts (Mason, 2002).

The qualitative research design in this study is informed by social constructivism. Social constructivism espouses that IS are embedded in social contexts (Orlikowski and Baroudi, 1991). They are both influenced and are influenced by aspects of their environment, for example, user groups (Latour, 1990). There is a close link between cognitive and social constructivism. Cognitive constructivism believes that individuals create mental models through experience which are then used to create knowledge (Talja et al., 2005). Whereas social constructivists believe that there is

also an additional socio-cultural element (ibid). Similar to Mason's (2002) discussion on the value of producing cross-sectional generalisation in qualitative research, social constructivists advocate generalisation through testing their applicability of their findings in other contexts (Avenier and Thomas, 2015). The findings from this research are specific to expectant and new mothers. However, the theoretical framework and analysis tools developed and refined over the course of the longitudinal study could be applied to other domains and tested there.

Domain analysis situates information behaviour studies within particular communities, advocating the examination of social and contextual factors (Hjørland and Albrechtsen, 1995). Although it has been noted that there is no firm definition of a domain, which can make it difficult to identify and frame (Palmer, 1999). This has not stopped information behaviour researchers situating their studies in particular domains/contexts, for example, is French et al.'s (2016) study involving the information practices of welfare workers. As per the research objective, the domain for this study is expectant and new mothers, see Table 3-1.

Concept	Description	Current Study
Domain Analysis	A group such as a speciality, discipline, trade, or discourse community (Hjørland and Albrechtsen, 1995; Palmer, 1999)	The domain is expectant and new mothers

User groups	Communicate through shared rules of language, social patterns, common interests and assumptions (Kim, 2001).	• Initial user groups categories are:
		  ○ <35/>35
		  ○ First-time mother/ Mother with children
		• Scope to make additional commentary or extend categories based on findings.

Interpretive flexibility	Different user groups can have different opinions on an artefact and how it should be used (Bijker et al., 1987; Paccagnella, 1997)	Any differences in the perceptions between the user groups will be highlighted in the analysis and in the creation of the design guidelines.

Table 3-1 Research Concepts

User groups are a similar concept to domains, as they are a group with a level of shared rules of language, social patterns, common interests and assumptions (Kim, 2001). In this study, there are four user groups are at a lower level of analysis than domains, see Table 3-1. These user groups are leveraged as part of the cross-participant analysis.

Interpretive flexibility is an important concept for the creation of the design guidelines. It states that different user groups can have different perceptions and different uses for the same technology (Bijker et al., 1987; Paccagnella, 1997). Online resources are highly configurable, this means that they can be easily adapted even by the user (Kling and McKim, 2000). This also means that they have the potential to meet the needs of multiple user groups simultaneously (ibid).

3.3 Research Objective and Questions

Information behaviour is a complex process of information-seeking, processing and use that is influenced by environmental and personal variables such as information needs and access to resources. The objective of this research proposes that by studying the information behaviour of a domain, information resources can be created that better meet the information needs of the group.

When refining the objective for this study two factors were considered. Firstly, that the objective must be clear and unambiguous to allow for the selection of an appropriate methodology (Jenkins, 1985). Secondly, the importance of grounding the objective in a relevant domain (Hjørland and Albrechtsen, 1995). For these reasons, the objective of this study is:

The objective of this research is to propose design guidelines for eHealth information resources based on the information behaviour of expectant and new mothers.

This research is grounded in the domain of expectant and new mothers. Chapter Two articulated that expectant and new mothers were a rich domain for studying information behaviour (c.f. McKenzie, 2004)**.** Previous studies have shown that they tend to access a variety of different information resources to satisfy their information needs, they search for health information not just for themselves but also for their families and during pregnancies they exist in a unique position between being ill and being well. In this study, the researcher decided not to restrict the data collection to observing expectant and new mothers accessing eHealth resources as this would have would have restricted the range of

information behaviour, for example, task types that would have been observed. Therefore limiting the richness of the design guidelines

For empirical research to be considered strong, the research questions should address a gap in the literature (Eisenhardt and Graebner, 2007). Combined together, the research questions should address the research objective (Nissen, 1985). Considering those requirements, three research questions are formulated to meet the objective for this study. Figure 3-1 illustrates how the three questions work together to fulfil the objective. The three questions are discussed in further detail below.

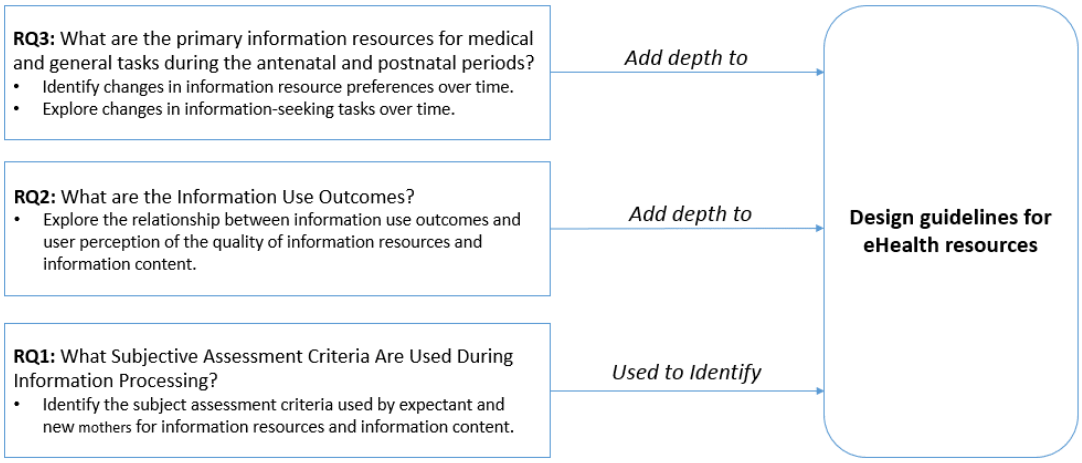


Figure 3-1 Research Questions

The following sections discuss the three research question in further detail including their connection to the research objective.

3.3.1 RQ1: What Subjective Assessment Criteria Are Used During Information Processing?

Information processing and use is an area that lacks both conceptual clarity and empirical clarity. This study divides information processing and use into two steps (1) information processing and (2) information use outcomes, with a research question devoted to each area. The aim is to explore the elements of information processing and use both conceptually and empirically in order to help address the deficit that currently exists in the research.

RQ1 is focused on information processing. Within our conceptualisation of information processing, there are two stages, (1) evaluation, and (2) comparison.

Evaluation examines individual information resources and the information that they contain, whereas comparison looks at groups of information resources. The aim of this phase is to discover if the information found satisfies the seeker's information need (c.f. Wilson, 1981).

This question focuses on the subjective assessment criteria that the information-seeker uses to evaluate and compare different information resources, and the information they contain. Although many instruments exist for rating the quality of eHealth resources, it has been suggested that they may not be practical for information-seekers to use. A review by Bernstam et al.(2005) found 273 different quality instruments, with only 29% of them disclosing their criteria and 65% operating as a type of award or seal of approval. Using subjective measures provides insight into the actual opinions and preferences of the study population. This is more useful for producing design guidelines than objective measures of quality; this is because two populations could have different perceptions of what a particular measure means. For example, health professionals and expectant mothers may have different perceptions on what constitutes credible information.

During the within-participant analyse, criteria that were identified in the literature are used as seed categories to identify the subjective assessment criteria used by the participants when evaluating and comparing information resources. The cross-participant analysis for this question seeks to identify patterns in the subjective assessment criteria used across the participants. Any difference or similarities in different user groups are highlighted in order to identify and refine design guidelines for eHealth resources.

3.3.2 RQ2: What are the Information Use Outcomes?

Information use is the second phase of information processing and use. Information use covers the internal and behavioural outcomes of information processing. As with RQ1, the objective of this research question is to explore an area which, thus far, has lacked both conceptual and empirical investigation.

Behavioural information use involves observable physical actions such as taking medication. Internal information use includes cognitive or affective changes.

Internal information use is considered a bit of a black box (Spink and Cole, 2006). As these changes occur within the information-seeker's mind they are not directly observable (ibid); therefore, researchers rely on information-seekers to explicitly state any cognitive or affective changes they experience. However, inputs, such as information resources accessed and outputs, such as behavioural information use are observable (Spink and Cole, 2006).

At the within-participant level, this research question is answered using data displays and illustrative quotes. The data displays are a mix of summary tables and diagrams that are utilised to illustrate the pattern of information use outcomes, an explanation of how they are created and an example is provided in section 3.5. At a cross-participant level, the data is combined and analysed to provide an overview of the patterns of information use across different user groups. Drawing a connection between information resources, the assessment criteria identified in RQ1 and information use outcomes are used to add additional context to the design guidelines for eHealth resources.

3.3.3 RQ3: What are the Primary Information Resources for Medical and General Tasks during the Antenatal and Postnatal Periods?

Tasks are an important variable within context of the search, particularly in purposeful information-seeking, which is the central focus of this study. In purposeful information-seeking, tasks are often the initial driver of information-seeking, influencing the development of information needs (Vakkari, 1999).

Tasks represent the goal of the information-seeking episode. Information-seeking episodes are bounded by the tasks that the information-seeker is trying to solve (Belkin, 1993). Information-seekers may interact with multiple information resources during an information-seeking episode. This interaction can cause an evolution of the seekers information needs and tasks (Xie, 2000).

At a within-participant level, this research question divides the tasks of expectant and new mothers into two broad categories i.e. medical and general. Thematic analysis was then used to (1) determine the frequency of medical and general of information-seeking across the antenatal and postnatal time periods, and (2)

analyse the popularity of different information resources in relation to each task type across the different periods. This longitudinal analysis allows the researcher to determine the evolution of each individual's information-seeking throughout the course of the study. It also provides insight into changes in information resource preferences for different task types.

The cross-participant analysis focuses on examining potential similarities and differences in information-seeking behaviour in the different user groups. User groups are compared at both the task and information resource level. To allow for a further level of analysis, medical and general tasks are further broken down into subcategories. This provides another level of detail which is useful when comparing information-seeking and resources preference across multiple participants in different. As with other research questions, visuals are utilised in the cross-participants as they are a useful means of demonstrating patterns.

Both the within and cross-participant analysis include a discussion on how other aspects of information behaviour, such as personal and environmental variables can influence the frequency of information-seeking and the selection of information resources. This is utilised, along with the other findings from this question to further enrich the design guidelines identified for the different user groups in RQ1 and RQ2 respectively.

3.4 An Exploratory Longitudinal Case Study

The IS field investigates the dynamic and complex interplay between technology, human systems, and processes (Venkatesh and Vitalari, 1991). As longitudinal studies are effective at studying the interaction between variables and how their relationships change over time (Jurison, 1996), it has long been proposed that longitudinal research may be a useful method to provide greater insight into this dynamic and how the different components interact, change and evolve (Orlikowski and Iacono, 2001). However, longitudinal research represents only a small percentage of Information Systems research when compared to cross-sectional investigations (Chen and Hirschheim, 2004). There is a similar lack of longitudinal research within information behaviour research (Vakkari, 2003). As with IS, there is

a call for more longitudinal research within information behaviour, particular concerning health information-seeking (Anker et al., 2011). This is because longitudinal studies have the potential to provide a more detailed analysis of health information-seeking behaviour (ibid).

As with many concepts, there are a number of definitions for longitudinal research. In order to get an overview, a review of the literature was conducted and a selection of definitions from some highly cited works was included in Table 3-2. Although there is no consistent, overall definition for longitudinal research, a review of definitions in Table 3-2 reveals some commonality. For instance, this is agreement that longitudinal research involves repeated measures at different points in time (Diggle et al., 2013; Ployhart and Vandenberg, 2010; Menard, 1991).

However, this is a disagreement over the minimum number of data collection periods, a point which is discussed in further detail later in the chapter. Notably, it must be collected more than once otherwise it would be classified as a cross-sectional study rather than a longitudinal study. In order for a study to be characterised as a longitudinal study, the repeated measures must be the same or comparable across the different time periods. Examples of comparable measures are behavioural intention and behaviour.

Definition	Reference
"The defining characteristic of longitudinal studies is that individuals are measured repeatedly through time."	(Diggle et al., 2013, p. 1)
"Research emphasising the study of change and containing at minimum three repeated observations (although more than three is better) on at least one of the substantive constructs of interest."	(Ployhart and Vandenberg, 2010, p. 97)
"Research that evolves over an uninterrupted period of time and focuses on process"	(Chen and Hirschheim, 2004, p.206)
"Continuous studies, where the researcher engages with the phenomenon over an uninterrupted period of time, such as a few months or years."	(Orlikowski and Baroudi, 1991, p.4)
"Longitudinal research is research in which (a) data are collected for each item or variable for two or more distinct time periods; (b) the subjects or cases analysed are the same or at least comparable from one period to the next; and (c) the analysis involves some comparison of data between or among periods"	(Menard, 1991, p. 4)

Table 3-2 Defining Longitudinal Research

Along with repeated measures, there is a requirement to have the same or comparable subjects or cases across the different periods (Menard, 1991). This

choice depends on the unit of analysis and the type of longitudinal study that is chosen. Prospective studies utilise the same sample whereas repeated cross-sectional studies tend to use comparable samples (de Vaus, 2001). The types of longitudinal studies are discussed in the next section.

3.4.1 Selecting a Longitudinal Exploratory Comparative Case Study Approach

For the purpose of this research, an exploratory case study approach was chosen. It is usually agreed that case studies involve an in-depth investigation of a limited number of entities in their natural environment where no variables are controlled for (Boudreau et al., 2001; Yin, 2003). Case studies are a popular method for studying the use of information systems the real world (Orlikowski and Baroudi, 1991). Case studies differ from some other methodologies such as lab experiments that seek to study phenomena independent of context (Gibbert et al., 2008). They are particularly useful in situations where it is difficult to separate phenomena under investigation from the context in which it is found (Yin, 2003). As discussed in Chapter 2, context plays a significant role in information behaviour, for example, tasks can produce information needs which are then considered a driver of information-seeking (c.f. Vakkari, 1999).

Case studies value depth over coverage, wishing to understand a specific group rather than generalising to a larger population (Stark and Torrance, 2005). Case studies are typified by their use of and multiple data collection methods (Benbasat et al., 1987). This enables researchers to create rich descriptions (Stark and Torrance, 2005) so that multiple facets of the phenomenon can be uncovered and understood (Baxter and Jack, 2008).

Case studies can employed for "a variety of purposes including: description, exploration, prescription, theory building" (Gable, 1994, p.112). Exploratory case studies are used are useful in situations where concepts under investigation are not well defined in the literature (c.f. Yin, 2003). As discussed in Chapter Two, information processing and use currently suffers from a lack of conceptual clarity and a lack of empirical investigation. As a result, an exploratory case study

approach was deemed to be most appropriate for investigating the phenomena (c.f. Creswell, 2003).

Case studies can follow a single case or multi-case design, however multi-case designs are often considered more compelling and rigorous (Miles and Huberman, 1994; Yin, 2003). This research employs a longitudinal multi-case design, specifically a longitudinal comparative case study design as advocated by Pettigrew (1997).Longitudinal comparative case studies seek to reveal recurrent patterns within and across cases (Pettigrew, 1997). They also seek to provide a comprehensive analysis of the factors which influence those patterns (ibid). This suits the objective of this study as it enables the researcher to identify differences in information behaviour in different time periods and across different user groups. A more detail discussion of the aspects of longitudinal studies is provided in the next section.

The unit of analysis for case study research is the same as the definition of the case (Yin, 2003). When conducting a multiple case study approach it is important that each case can stand on its own as an analytic unit (Eisenhardt and Graebner, 2007). The objective of the study centres on the information behaviour of expectant and new mothers. As a result, the unit of analysis for this study is at the participant level.

3.4.2 Choosing a Prospective Longitudinal Design

There are three main types of longitudinal research, see Table 3-3, (1) repeated cross-sectional, (2) prospective, and (3) retrospective. (de Vaus, 2001). A prospective design was chosen for this study because they are suited to detecting individual change (Ruspini, 1999). Prospective studies involve collecting data from the same individuals or cases at multiple points in time tracking forward This differs from repeated cross-sectional studies, which cannot be used to comment on individual level change because the sample is constantly changing (Ruspini, 1999; Menard, 1991). Instead, they are used to draw inferences on aggregate change, for example, attitude change in different population groups (Rafferty et al., 2015). This study is interested in studying the evolution of information behaviour of a specific

population, with the ability to comment on specific individuals within the sample. Therefore a repeated cross-sectional study was not deemed suitable.

Type	Definition	Reference
Repeated cross-sectional studies	When data is collected from a new or largely new sample at multiple points in time.	(Rafferty et al., 2015; de Vaus, 2001; Ruspini, 1999; Taris, 2000)
Prospective studies	Information is gathered from the same individuals or cases at multiple points in time (waves). This type of design can make it possible to detect and observe the nature of individual change.	(Rafferty et al., 2015; Menard, 1991; de Vaus, 2001; Ruspini, 1999; Taris, 2000)
Retrospective studies	The focus of the study occurred before data collection. Data is therefore collected by asking respondents to remember past events (e.g. interviews or surveys), or through the collection of documents (e.g. company documents or census records).	(Rafferty et al., 2015; Pettigrew, 1990; Kleinbaum et al., 1982; de Vaus, 2001; Ruspini, 1999; Taris, 2000)

Table 3-3 Types of Longitudinal Studies

Although Retrospective studies are cheaper than prospective studies the design was not was not chosen for this study because they are not considered appropriate for studies which wish to observe subjective measures such as attitude, motivation, or affect (Ruspini, 1999). This is because it was found that the reliability of past accounts is lower on subjective measures (Golden, 1992; Anstey and Hofer, 2004). This research study is very much concerned with subjective measures. The first research question in this study is focused on subjective assessment criteria and the second question examines information use outcomes. As such a retrospective study was deemed inappropriate.

Prospective studies do involve a degree of retrospective recall; where participants are asked discuss events previous to data collection or to recall events in-between data collection periods (waves). Two methods can be used to improve the reliability of retrospective recall. One is to shorten the recall period to shorten the likelihood memory failure (Menard, 1991). As such, this was an important consideration when determining the spacing between data collection periods. The second method to improve reliability is through triangulation (Golden, 1992). This was achieved through two methods of data collection, semi-structured interviews and activity diaries.

3.4.3 The Importance of Time

This section will consider the factors that influence the overall length of longitudinal research. Some disciplines advocate a minimum length for longitudinal research, for example, nine months in education (Saldaña, 2003). However, Pettigrew (1990) advocates that researchers consider a mix of theoretical and practical factors when determining the length of their study. These factors are listed in Table 3-4, along with a summary of how they were addressed in this study.

Type of Factor	Description	Current Study
Theoretical	Must consider theoretical lens and what events must be observed to meet the objective.	• The objective encompasses both expectant and new mothers; this means that both the antenatal and postnatal periods must be covered. • It was decided that the study would be approximately eighteen months per participant
	Level of Analysis	• Individual level
Practical	Time restrictions in the empirical setting	• The aim was to recruit participants into the study when they were between three and six months pregnant. Due to these criteria and the difficulty recruiting to such a long study, flexibility was added to the recruitment period. Participants were recruited for wave one from May 2012 until December 2012.

Table 3-4 Factors Influencing the Length of Longitudinal Research (adapted from: (Pettigrew, 1990))

The key factor in deciding the length of the data collection period per participant was the research objective, which specifies the information behaviour of expectant and new mothers. For practical reasons, it was decided to recruit women in the second trimester as many women are nervous to talk about their pregnancies before this point. In order to observe the information behaviour of new mothers, it was decided to collect data for a minimum of twelve months after childbirth. This is because although there is no universal accepted definition for the term 'new mother' (c.f. Davis, 2015), researchers in the medical field have studied maternal role attainment (MRA). MRA examines the experiences of mothers in the first year after childbirth (c.f. Barkin et al., 2010). This appeared to be a suitable substitute for determining the length of data collection. Combining this with the expectant mother phase, the length of data collection per participant was approximately eighteen months.

As previously mentioned, there is some disagreement over the minimum number of waves required for longitudinal research. In longitudinal studies, waves represent the number of times that data is collected during the study, see Figure 3-2. While some researchers argue that a longitudinal study requires a minimum of three waves (c.f. Singer and Willett, 2003), others suggest that two may be sufficient (c.f. Menard, 1991). However, two waves cannot provide insight into the shape of the change or when it occurred (incremental or all at once) (Singer and Willett, 2003). This can result in a false pattern (c.f. Ployhart and Vandenberg, 2010; Anstey and Hofer, 2004; Singer and Willett, 2003). As illustrated in Figure 3-2, this study involves seven waves, therefore this should not be a concern.

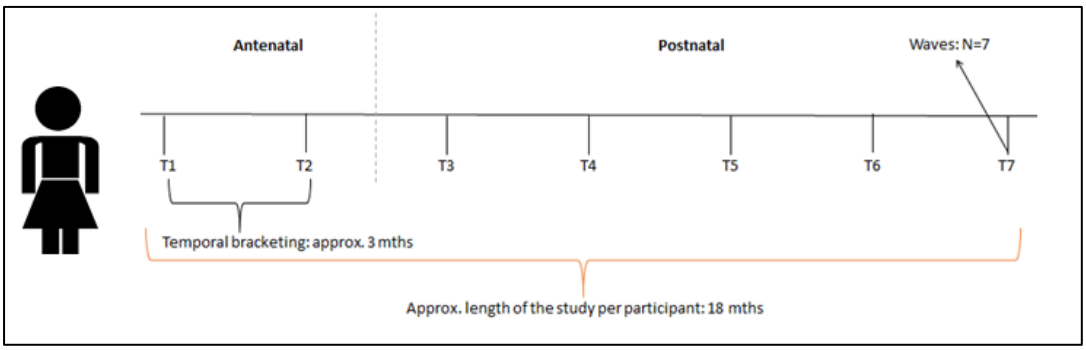


Figure 3-2 Longitudinal Study Design per Participant

The space between waves is termed temporal bracketing (Langley, 1999), see Figure 3-2. The aim is to choose an appropriate unit of time that is the right size to capture changes in your key variables (Street and Ward, 2012). A trade-off may be required between the breadth and the depth of the study (Bizzi and Langley, 2012). A wider study with a greater number of participants or cases can make the study more generalizable (Patton, 2014). However, a thinner, longer study can 'produce a rich understanding of specific contexts' (Bizzi and Langley, 2012, p. 228).

The objective of this study called for a rich understanding of a specific context; as such it was decided to have seven waves scheduled approximately three months apart. This provided two waves in the antenatal and five in the postnatal. The three-month spacing was chosen as it seemed large enough to detect change but not too large to risk recall error. The spacing sometimes had to be adjusted to accommodate life events such as a family holiday or sick children. Figure 3-2 illustrates both the longitudinal study design per individual. While Figure 3-3

demonstrates what the study looked like incorporating all participants. Extending the recruitment period in wave one, resulted in overlap for all subsequent waves.

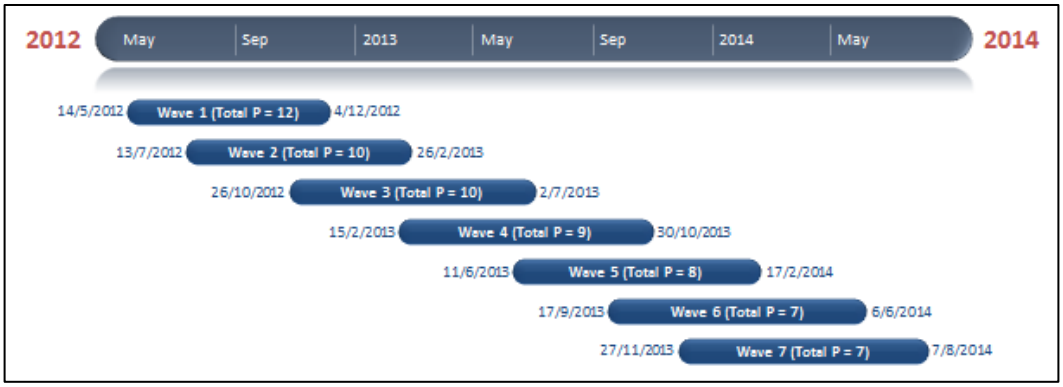


Figure 3-3 Longitudinal Research Design

3.5 Data Collection

This section discusses how data was collected for the research study. The section starts with a discussion on the study sample, including how the sample was recruited. The discussion also involves an analysis of the difficulty retaining participants in an eighteen-month longitudinal prospective study.

The section next explores the methods used to collect data. Data was collected using semi-structured interviews and activity diaries. The section discusses how these were used to complement each other. Finally the section examines the ethical approval process for this study.

3.5.1 The Sample

In order to recruit participants for this study, advertisements were placed in a variety of locations, both online and offline, see Table 3-5. This was for two reasons: (1) by placing the advertisement both online and offline it was hoped that we may get a more diverse group of participants, and (2) because of the length of the study there was always going to be a difficulty recruiting participants, so the wider the net the better.

Although all studies are open to selection or 'volunteer bias', it is known that studies advertised online can also be open to technological bias (Evans and Mathur, 2005; Eysenbach and Wyatt, 2002). While the aim of this study is to produce design guidelines for online resources, it is hoped that by studying how participants select,

process and use a variety of information resources, better guidelines can be created.

On/Off-line	Description	Location
Online	Forums	Eumom.ie
		Rollercoaster.ie
	Facebook Groups	IMBA - Irish Multiple Births Association (Closed Group)
		Cork Baby and Children's Stuff for Sale or Swap (Closed Group)
	Facebook Page	The Baby Market Ireland
	Email	Sent to all staff in University College Cork
Offline	Pregnancy Yoga Classes	Cork Movement Centre
		Esther Wall
	Magazine	Oh Baby! Maternity and Infant

Table 3-5 The Variety of Locations That the Study was Advertised

The sampling strategy developed into a snowball strategy or chain sampling a method where the sample size is increased through referrals from individuals who have or know others who have characteristics which are of interest to the research (Biernacki and Waldorf, 1981). It is one of the most widely used sampling techniques in qualitative research (Noy, 2008) and is especially useful for sensitive issues (Biernacki and Waldorf, 1981) and for populations which may be difficult to reach or hidden (Atkinson and Flint, 2001). From the email enquiries I received about the study I found that information on the study had been shared through email and Facebook.

Twelve expectant mothers signed up for the initial wave between May and December 2012, see Table 3-6. Not all participants completed the full study. This was expected, as attrition is a common problem with prospective longitudinal studies (c.f Ployhart and Vandenberg, 2010). Two participants decided after the first interview not to continue with the study, their data was not included in the final analysis, see Table 3-6. Also not included in the final analysis was P16 who dropped out after three interviews because she relocated to another county, see Table 3-6. She was asked if she wanted to continue the study through phone or skype, but she felt that the move, combined with a new job was going to take up too much of her time. P1 and P12 both left the study because they returned to education, see Table 3-6. It was decided to include their material in the study because they had both

done four or more interviews, which the researcher deemed sufficient to contrast with the other participants as part of the cross-participant comparative analysis.

PNum	Interview Number							Length in Study	
	Antenatal		**Postnatal**					Days	Weeks
	1	2	3	4	5	6	7		
P14	X	X	X	X	X	X	X	661	94
P7	X	X	X	X	X	X	X	638	91
P4	X	X	X	X	X	X	X	617	88
P18	X	X	X	X	X	X	X	596	85
P5	X	X	X	X	X	X	X	583	83
P8	X	X	X	X	X	X	X	562	80
P10	X	X	X	X	X	X	X	518	74
P12	X	X	X	X	X	-	-	471	67
P1	X	X	X	X	-	-	-	265	38
P16	X	X	X	-	-	-	-	112	16
P11	X	-	-	-	-	-	-	-	-
P19	X	-	-	-	-	-	-	-	-

Table 3-6 Data Collection across Each Participant

From Table 3-6 it is evident that there was some variation in the length of time each participant spent in the study, even for the participants that completed the full seven waves. This variation, while relatively minimal while compared to the total length of the study can be explained by the flexibility that was built in order to accommodate the needs of the participants. For example, some interviews needed to be delayed or brought forward slightly to accommodate scheduled events such as family holidays, national holidays or mothers returning to work. Interviews were also cancelled and rescheduled due to unforeseen circumstances, such as sick children. One participant, P1 forgot about the interviews twice, it was only through moving from a face-to-face interview to phone interview that she decided to stay in the study for another two waves because she felt less guilty forgetting the if researcher was not left outside her house.

3.5.2 Methods

As part of our case study approach, data was collected use semi-structured interviews and activity diaries. Interviews are considered one of the most important qualitative research methods (Qu and Dumay, 2011). Interviews are an efficient method of gathering rich, empirical data (Eisenhardt and Graebner, 2007). This is particularly true if the aim is to gather information on episodic phenomena (ibid).

This makes interviews particularly suited to gathering information on information behaviour, which involves information-seeking episodes.

Semi-structured interviews use open-ended questions based on the research topic. The researcher has an incomplete script and therefore must engage in improvisation (Myers and Newman, 2007). The aim is to collect specific information and enable cross-participant analysis (Knox and Burkard, 2009). Semi-structured interviews allow the researcher to "*delve deeply into social and personal matters*" (DiCicco-Bloom and Crabtree, 2006, p.315), making them useful for studying the contextual elements of information behaviour. Interviews can be used to produce thick descriptions that examines behaviour in a particular context while considering the intentions of the participants (Schultze and Avital, 2011).

The Appendix includes a sample of the interview guide used for this study. The guide acted as a set of topics to cover, rather than an explicit set of questions. This opened the door for natural conversation and relationship building. Relationship building was an important part of data collection for this study, considering the sensitive topics that participants were discussing. The longitudinal design was another element which helped as trust was increased through each subsequent wave. For example, one participant (P12) made an alteration to one of her information-seeking episodes later in the study. P12 initially told the researcher that her midwife had advocated eating the child's placenta. However, later in the study P12 admitted it was something she had always wanted to do and that she had done the information-seeking herself.

As part of each interview, participants were asked to recount examples of information-seeking, which are termed information-seeking episodes in this study. If participants had difficulty coming up with examples then they were asked about information-seeking that may have resulted in a behaviour change or a time when they encountered conflicting information. Pettigrew (1990) advocates collecting sequences of social dramas. Together the dramas can be analysed to detect the evolution of a process or behaviour over time. Individually, each drama can be used for in-depth analysis which can provide additional insight into the case. The

information-seeking episodes are used in this manner in this study. Each episode provides insight into the information behaviour of a participant at a given time and in a given context. Taken together, they can be used to detect changes in the information behaviour of a participant over the course of the study.

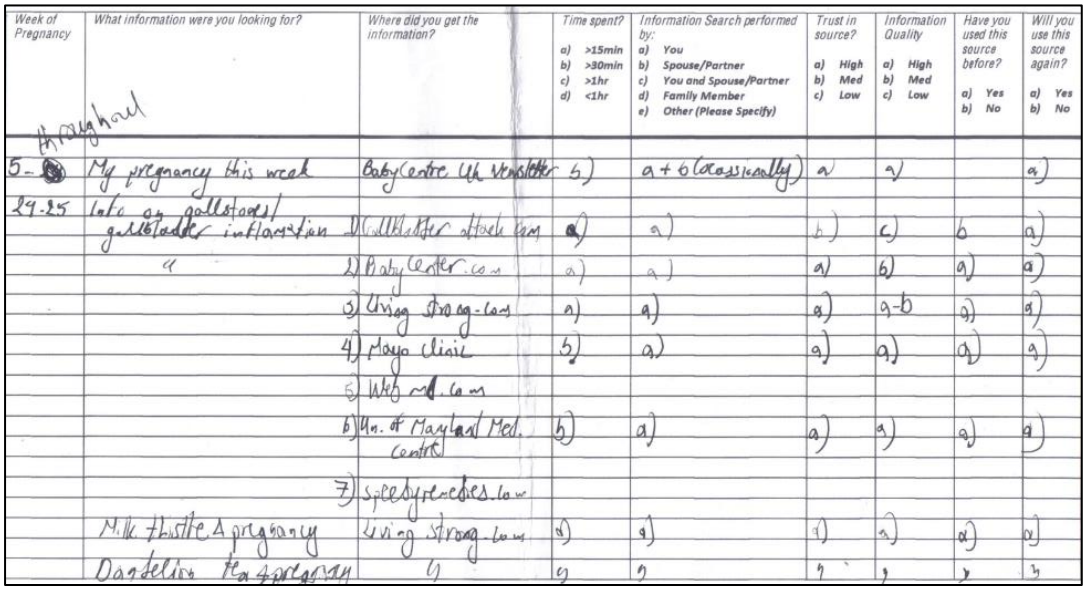
Along with the advantages, there are a number of challenges to conducting interviews. Myers and Newman (2007) highlighted what they concerned to be the main challenges when conducting qualitative forms of interviews. These are listed in Table 3-7 along with the steps that were undertaken in this study to mitigate these challenges. The steps include:

1. Being flexible on the time and location of interviews: Interviews were conducted in a variety of locations (coffee shops, participants, and restaurants). They were also conducted at any time of day or night (the latest one started at 9.30pm). There was no restriction on the day of the week.
2. Longitudinal design: Multiple waves allowed for rapport and trust to be built. This can allow participants to more openly discuss sensitive topics.
   Pilot interviews: Two pilot interviews were conducted to refine the interview guide and interview technique.

Issue	Explanation	Current Study
Artificiality of the interview	Participant is asked to provide opinions to a complete stranger under time pressure	• Interviews were conducted in any location the participant wished, including their own home. • Interviews were conducted at any time day or night that suited the participant • No time limit was placed on the interview.
Lack of trust	The interviewer is a complete stranger. A participant may feel uncomfortable sharing sensitive information.	• All participants were assured of confidentiality at the start of the study, and all their data was anonymised. • The advantaged of a longitudinal designed is that multiple waves facilitate relationship building.
Lack of time	Interviews conducted under time pressure can lead to incomplete data or unreliable data because participants are rushed into answers.	• Interviews were conducted at any time day or night that suited the participant. • No time limit was placed on the interview. • Interviews were rearranged if the time no longer suited the participant – for example if their child was ill.
Level of Entry	Traditionally refers to the level of an organisation where a researcher enters as this can influence future mobility with the organisation. However, also refers to gatekeepers restricting access to a population.	• The researcher did encounter a gatekeeper when looking for places to advertise the study. The gatekeeper was particularly interested in the funding model. Had the study been funded by baby formula companies then the gatekeeper would have actively attempted to restrict the places that the researcher could advertise.
Elite bias	A researcher may restrict their study population to people of high status and therefore gain an understanding of the wider situation	• The study was advertised in a wide selection of places, both offline and online to try and attract a broad range of participants.
Hawthorne effects	Interviews are intrusive and can have an influence the situation they are attempting to document.	• The researcher attempted not to influence the information behaviour of the study participants. However, it is possible that by engaging in a study on information behaviour it made the participants more aware of their information-seeking and this may have led to changes.
Constructing knowledge	Within an interview, there is a level of co-construction of knowledge as participants reflect on issues in response to questions, which they may not have previously considered.	• This is necessary *"in order to help participants delve deeper in order to generate informative, novel accounts of the phenomenon of interest"* (Schultze and Avital, 2011, p.3). However, in an attempt not to lead or bias the participant, where possible the researcher tried to allow participants to recount stories uninterrupted, coming in at the end for clarification and extra detail. In this way, the researcher hoped to limit the researchers influence on the participant.
Ambiguity of language	The meaning of a researcher's words can be ambiguous and unclear to a participant. This can result in them not understanding the question.	• The researcher conducted two pilot interviews before going out into the field. This helped to refine the interview guide and to practice the interview technique.
Interviews can go wrong	Interviews are plagued with a number of problems and pitfalls that can result in them ultimately being abandoned.	• The researcher conducted two pilot interviews before going out into the field. This helped to refine the interview guide and to practice the interview technique. • Several interviews were rescheduled during the study because the participant was unable to attend or because they forgot.

Table 3-7 Problems with qualitative interviews and how they were addressed in this study (after: (Myers and Newman, 2007))

The second method used to collect data was an activity diary. Diaries can act as a source of information on participants day-to-day behaviour experiences to augment the interviews (Corti, 1993). The original purpose of the activity diaries in this study was to act like a log where participants were asked to record information-seeking that occurred in-between interview sessions. In the diary, participants were asked to record what information they were looking for, where they looked, and approximately how long they looked. Also included in the diary where simplified measures of information resource quality including trust, information quality, and would the participant use the resource again. Figure 3-4 provides an example of an activity diary completed by P8 during the antenatal period.



Week of Pregnancy	What information were you looking for?	Where did you get the information?	Time spent? a) >15min b) >30min c) >1hr d) <1hr	Information Search performed by: a) You b) Spouse/Partner c) You and Spouse/Partner d) Family Member e) Other (Please Specify)	Trust in source? a) High b) Med c) Low	Information Quality a) High b) Med c) Low	Have you used this source before? a) Yes b) No	Will you use this source again? a) Yes b) No
5-	My pregnancy this week	BabyCentre UK Newsletter	b)	a + b (occassionally)	a)	a)		a)
24-25	info on gallstones/ gallbladder inflamation	1) Gallbladder attack.com	a)	a)	b)	c)	b	a)
"		2) BabyCenter.com	a)	a)	a)	b)	a)	a)
		3) Living Strong.com	a)	a)	a)	a-b	a)	a)
		4) Mayo clinic	b)	a)	a)	a)	a)	a)
		5) Web md.com						
		6) Un. of Maryland Med. Center	b)	a)	a)	a)	a)	a)
		7) speedymedics.com						
	Milk Thistle & pregnancy	Living Strong.com	a)	a)	a)	a)	a)	a)
	Dandelion Tea & pregnancy	4	4	4	4	4	4	4

Figure 3-4 Sample Activity Diary P8

Unfortunately there were inconsistencies with how the activity diaries were completed from the beginning. The second wave was the only point were all participants completed the diaries prior to the interview, see Table 3-6. Although it should be noted that participants were not expected to complete the diaries prior to the first interview, some participants were just pro-active.

During the postnatal period, the majority of participants forgot to fill out the diaries between interviews. Participants listed time constraints as a result of a new baby as the cause. The diaries that were completed were often done during the interview or sent to the research electronically after the interview.

There was also differences in the level of detail provided in the activity diaries. Most participants included less detail as the study progressed, while P7 provided more information in the diaries than she did in the interviews. In an attempt to provide some consistency to the reporting, during analysis some browsing tasks were combined in more detailed diaries. For example, the majority of participants discussed investigating developmental milestones. Some participants only referred to it in interviews, some only placed it in diaries sporadically, and others applied a copy and paste approach so it appeared weekly or monthly. In the analysis it is included for each participant who reported it, once per time period, unless the search became more involved.

Despite the problems, when the participants remembered to complete the interview diaries in-between waves, part of the interview was used to discuss elements of the diary. Completed diaries were also a useful method of triangulation with the interview transcripts. Issues raised in the diaries but not in the interview, could be raised in the next wave.

Period	Wave	Number of Participants	Total Hours of Interviews	Average Length of Interview	Number of Diaries
Antenatal	1	12	11hrs 5min	55min	3
	2	10	7hrs 55min	48min	10
Postnatal	3	10	7hrs 5min	43min	8
	4	9	8hrs 20min	56min	6
	5	8	5hrs 5min	38min	3
	6	7	5hrs 30min	47min	3
	7	7	5hrs 20min	46min	3
Total			**50hrs 20min**	**47min**	**36**

Table 3-8 Quantity of Data Collected Across Each Wave

Table 3-8 lists the quantity of data collected across each wave. This includes both interviews hours and diaries. The reduction in interview hours as the study progressed reflects the decline in participants as a result of attrition. The average length of interview remained fairly consistent over the study, dropping slightly at interview five before recovering, see Table 3-8. The decline in activity diaries reflects the compliance issues that have been associated with this data collection method (Freer, 1980).

3.5.3 Ethics

This study received ethical approval from the Social Research Ethics Committee (SREC) in University College Cork. In order to receive ethical approval the follow procedures had to be undertaken:

- **Informed Consent:** All participants had to be informed as to the nature of the study, including procedures and duration. Participants had to sign a copy of the consent form, giving permission for their interview to be recorded and their quotes to be used in the study. A copy is included in Appendix B.
- **Confidentiality:** Participant information was anonymised. Each participant was given a randomly selected number, with only the researcher knowing the link between the number and the name.
- **Right to withdraw**: All participants were informed of their right to withdraw from the study at any stage.
- **Counsellor**: Pregnant women are considered one of the vulnerable groups for research. It was therefore requested that the researcher engage a counsellor. This was a precaution in case anything went wrong over the course of the study or any topics were brought up which upset the participants and led them to wish to speak to somebody. Luckily the counsellor was never required. The counsellor that agreed to facilitate the study was Daniel Nuzum a healthcare chaplain and perinatal bereavement counsellor.

3.6 Coding and Analysis

This section discusses the coding and analysis that was conducted as part of the study. Figure 3-5 provides a high-level overview of the analysis strategy. The two main steps of the analysis process were (1) data reduction and (2) data display. Data reduction and display are important steps in making sense of the complexity in comparative longitudinal research (Pettigrew, 1990). However, coding and analysis is an iterative process, particularly in a longitudinal study with multiple waves. Data is repeatedly coded, reduced and placed in analysis tables. This can lead to the production of preliminary conclusions and/or the refinement of analysis tools

(Miles and Huberman, 1994). A discussion of the iterative refinement of the Information Behaviour Analysis Tool (IBAT) over the course of this study is included later in this section.

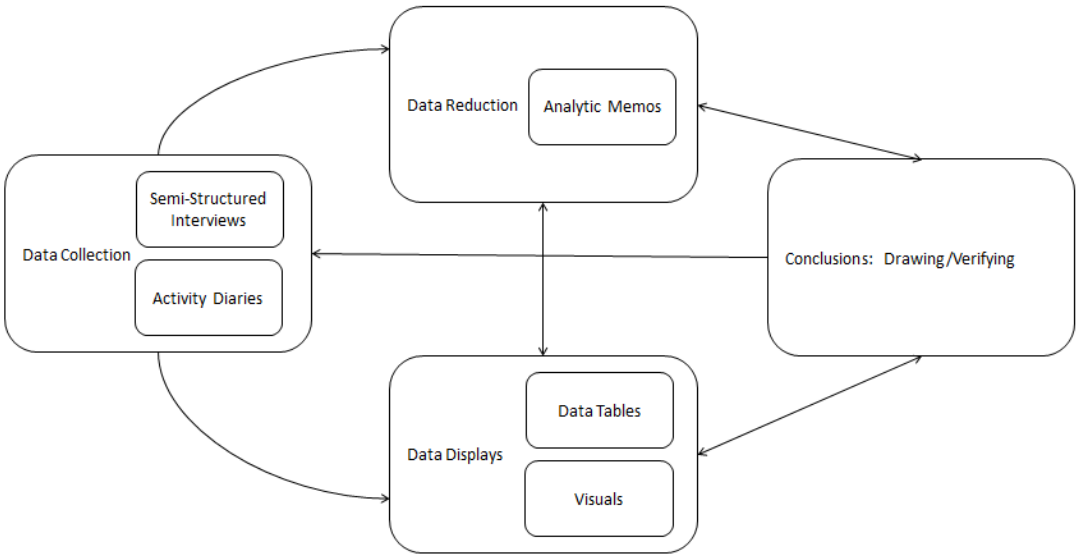


Figure 3-5 Data Analysis (after: (Miles and Huberman, 1994))

The first step of analysis was data reduction. It is a useful method for managing transcription data that would otherwise be spread over many different files (Miles et al., 2013). However, data reduction is not a step separate from data analysis, simply concerned with data management. Data reduction is a process is a "*form of analysis that sharpens sorts, focuses, discards, and organises data in such a way that "final" conclusions can be drawn and verified"* (Miles and Huberman, 1994, p.11). As is evident from Figure 3-5 the method of data reduction used in this study was analytic memos. They are discussed in more detail in the next section.

The next step of analysis was data displays. A display is "*an organised, compressed assembly of information that permits conclusion drawing and action*" (Miles and Huberman, 1994, p.11). Two types of displays are used in this study, data tables and visuals, see Figure 3-5. The data tables and visual aids are used to answer the three research questions and to demonstrate the rigour that was used during the analyse phase and the depth of the empirical data (c.f Eisenhardt and Graebner, 2007).

Deductive analysis was conducted initially in the analysis phase. The aim of deductive analysis is to validate or extend an existing framework or theory (Hsieh

and Shannon, 2005). Key concepts are thus identified from the literature and are used to form seed categories (Potter and Levine-Donnerstein, 1999). The seed categories in this study were identified from the Revised Information Behaviour Model from Chapter 3, as this is the model that was being explored. During the initial coding, it was important to highlight any data that could not be coded or any category that appeared too broad. Data that cannot be coded is a sign that a new category or sub-category is required (Hsieh and Shannon, 2005). Similarly, categories that are too board provide an opportunity for breaking the category into more meaningful sub-categories (Hsieh and Shannon, 2005).

Numbers are not a traditional component of qualitative research (Miles et al., 2013). However, they can be used to alleviate one of the criticisms of qualitative research; that it is too anecdotal, that it does not emphasise the prevalence of the phenomena that the anecdote represents (Bryman and Bell, 2003). Counting is a useful method of (1) seeing what you have, (2) verifying a hypothesis, and (3) keeping yourself analytically honest. Thematic analysis involves coding data based on a set of codes or themes and then comparing the frequency of those themes in the data set (Namey et al., 2008). The counting of themes formed an important part of the analysis during this study, particularly during the cross-participant analysis. The thematic analysis was used slightly differently for each question. However, the main purpose as to identify important themes and to highlight any differences between the user groups.

The remainder of this section is organised as follows, the next section will discuss within participant analysis and how data reduction and data displays were utilised to answer the three research questions. The following section focuses on cross-participant analysis and examines how data displays were utilised.

3.6.1 Within-participant Analysis

The within-case analysis involved a mix of data reduction and data displays. Analytic memos were used for data reduction. While a number of differed summary data tables and visuals were used as displays. This section is divided into data reduction

and data displays and discusses each of the different analysis types and how they were utilised to answer the different research questions.

3.6.1.1 *Data Reduction - Analytic Memos*

Unreduced texts in the form of transcribed interviews are cumbersome because they are dispersed over many pages, making it difficult to see all the information (Miles et al., 2013). This is particularly problematic in longitudinal studies where the quantity of data from multiple waves can lead to researchers feeling overwhelmed (Pettigrew, 1990). It was, therefore, important to find an effective method of data reduction to aid the analysis process. Analytic memos were chosen because they allow researchers to "*move easily from empirical data to a conceptual data, refining and expanding codes*" (Miles and Huberman, 1994, p.74).

The analytic memos were created from transcripts of the semi-structured interviews. The seed categories for the memos were developed from the literature and reflect the research model depicted in Chapter 3. An overview of the seed categories is provided in Table 3-9. Initial coding deductive based on the seed categories. Once this was completed any remaining data that was reviewed to determine if it was relevant and if so it was coded inductively.

The purpose of the analytic memos in this study was to aid in the creation of the summary data tables and to provide rich descriptions that could be added to each of the research questions. Research question three is the only question specifically focused on longitudinal change, however, the rich descriptions from the memos allow for longitudinal detail to be added to both RQ1 and RQ2. For example, P8 began to view forums as a credible information resource in the postnatal period when used in combination with other fact-based resources (i.e. medical journals). An example of an analytic memo for P8 can be seen in Figure 3-6.

Participant: P8

Interview: 3

Date: 18/06/2013

Overview:

The main points in this interview were:

1) A reduction in the frequency of information-seeking cause by a **lack of time** and **maternal illness** (P8 had to recover from a C-section and then suffered from 3 bouts of mastitis).
2) P8 relied more on personal resources for **general tasks** because they were more available then they had been in the antenatal period, calling out to the house to see the baby.
3) **Proxy search** featured again in this period, with P8 relying on her partner when she was unwell. Her partner also managed to convince P8 of the value of forums – when combined with fact based sources.
4) As P8 recovered from the mastitis, the frequency of her information-seeking started to increase. As a new mother everything was new. However, there was browsing then the antenatal period. Information-seeking remained very specific and task focused.

Characteristics of the seeker:

Personal - First-time Mother:

When her baby was teething, she found herself information-seeking a lot because of the novelty

"Loads of information seeking everything, everything is new."

Environmental - Time

The lack of time impacted the type of information-seeking and the resources used.

"I have so little time so practically speaking there is always information seeking but it is completely different. It is mostly talking to people and the last couple of weeks I have started looking [online] again. Very little myself but also Brian did a lot of information seeking. Especially when I had the mastitis. Often I am sitting down feeding her and I ask Brian if he can google something for me."

When she recovered from her recurring mastitis she returned to using online resources.

"Yes exactly although in the past few weeks, because I am not sick and she is a healthy baby from the beginning but because I was so sick and I could not do anything like that, I have started looking again."

However she still didn't have as much time as before, because she had more visitors coming over to see the baby.

"Yes, time is definitely the biggest thing, because I have a lot more time now that I am feeling better and I am stronger obviously because I happen to recover the caesarean and all of that. But nowadays I have a lot more visitors as well. People love coming down here and I love them to come down here. So, yeah even though it's not time related to the baby directly, but yeah still it is there is lack of time."

Figure 3-6 Snippet from a Sample Analytical Memo - P8 Interview 3

Code			Description
Context of Search			Factors that influence information behaviour
	Characteristics of the Seeker		Factors linked to the seeker
		Personal	Examples of personal factors include demographic, role related, and educational factors.
		Environmental	Examples of environmental factors can include time, cultural, or accessibility.
	Context of Information Need		Cognitive and affective information needs. Looking to see how they change throughout information-seeking episodes.
		Cognitive Need	Viewed as a knowledge gap that the information-seeker is attempting to fill.
		Affective Need	Covers emotions both positive and negative, an example is a desire for reassurance.
	Nature of Task		Tasks are activities that people execute in an attempt to achieve a specific goal, often generating information-needs. Divided into either general or medical tasks.
		Medical Tasks	Examples of medical tasks include illness, labour or surgery related tasks
		General Tasks	Examples of general tasks include developmental, diet or childcare related tasks.
Information -Seeking			Searching for information resources either actively or passively.
	Active		A direct form of searching, with a specific task and questions in mind.
	Passive		When information is acquired without actively searching for it. Can include serendipitous encounters when chatting with friends or watching TV. Can also include semi-directed browsing.
	Proxy		An active form of information-seeking, where the information-seeker accesses an information resource through an intermediary. Example, asking somebody else to conduct a search and to relay back the information.
Information Processing			The process of evaluating and comparing information resources and the information they contain.
	Evaluation		Where the information-seeker assess individual information resources and the information they contain.
	Comparison		Where information the information-seeker compare/combine multiple information resources. Information-seekers can also compare resource against prior beliefs and experiences.
Information Use Outcome			The outcome of information processing, either internal or behavioural.
	Cognitive Use		A new opinion or belief, or a confirmation or contradiction of an existing opinion of belief.
	Affective Use		Alterations to the information-seekers emotional state as a result of information-processing: positive/ negative.
	Behavioural Use		Observable physical actions such as taking medication

Table 3-9 Seed Categories for Analytic Memos

3.6.1.2 *Data Displays*

Data displays condense the data and analysis into one place, making it easier to compare data sets and improving the credibility of the conclusions (Miles and Huberman, 1994). This section examines the different types of data displays that were used during within-participant analysis. The first data display that is discussed is the Information Behaviour Analysis Tool (IBAT). This analysis tool is a visual that was developed iteratively over the course of the study. Its purpose is to provide a visual representation of the information-seeking examples (episodes), collected as part of the interview processes. The IBAT was not tied to any particular research question; examples could be used to enrich any of them.

The other data displays discussed are divided into sections based on the research question they were targeted to answer. The displays are a mixture of summary tables and visuals and are explained in further detail below.

3.6.1.2.1 Data Display – Information Behaviour Analysis Tool

The IBAT diagrams were developed based on the research model presented in Chapter 3. The aim of the tool was to provide a diagrammatic analysis of key information-seeking episodes from each interview, thus providing a pattern of information-seeking behaviour. Over the course of the study the layout of the IBAT diagrams changed three times, this process is detailed in Table 3-10 through to Table 3-12 using an example information-seeking episode from P8. Each version of the IBAT is based on research model, however, the advantage of a longitudinal research design is the ability to test and refine the tool during each data collection wave. The key changes between the first version and the third version are:

- Uncertainty was initially separated from other aspects of internal information use because can be a cause of information-seeking (Kuhlthau, 1991; Belkin et al., 1982) and can influence an individual's assessment of information resources (Attfield and Dowell, 2003). As uncertainty is often not completely mitigated by information resources the aim was to demonstrate how it changed throughout the search process (Mahony et al.,

2013) This column was removed from the second version onwards Table 3-11. Uncertainty was included with the other aspects of information use. Attempting to demonstrate the change in uncertainty levels for each episode was deemed too subjective because there was insufficient data be consistent.

- Characteristics of the seeker were removed going into the third version Table 3-12 because they added unnecessary repetition to each diagram.
- Information needs were removed going into the third version Table 3-12, there was not always sufficient information to determine how needs evolved during the search. They were instead included in the attached discussion.
- For the third version Table 3-12, the text was removed from the diagram and codes were included instead, with a key provided at the bottom. This allowed for easier comparison of different diagrams. Further detail for each diagram is available in the accompanying summary.
- Moving from text to codes allowed for two columns to be split in two to make the information-seeking process clearer. The information-seeking behaviour column was split into search type and information resource. Also, information processing and use were split into information process and information use.

During each interview, participants were asked to provide information-seeking examples. When deciding which episodes to illustrate, particular attention was paid to those which provided examples of multiple tasks, conflicting information and internal and behavioural use outcomes. The aim was to provide a comprehensive picture of each individual's information behaviour for both medical and general tasks. Like the analytic memos, the IBATs provide rich descriptions and examples that can be utilised when answering any of the research questions.

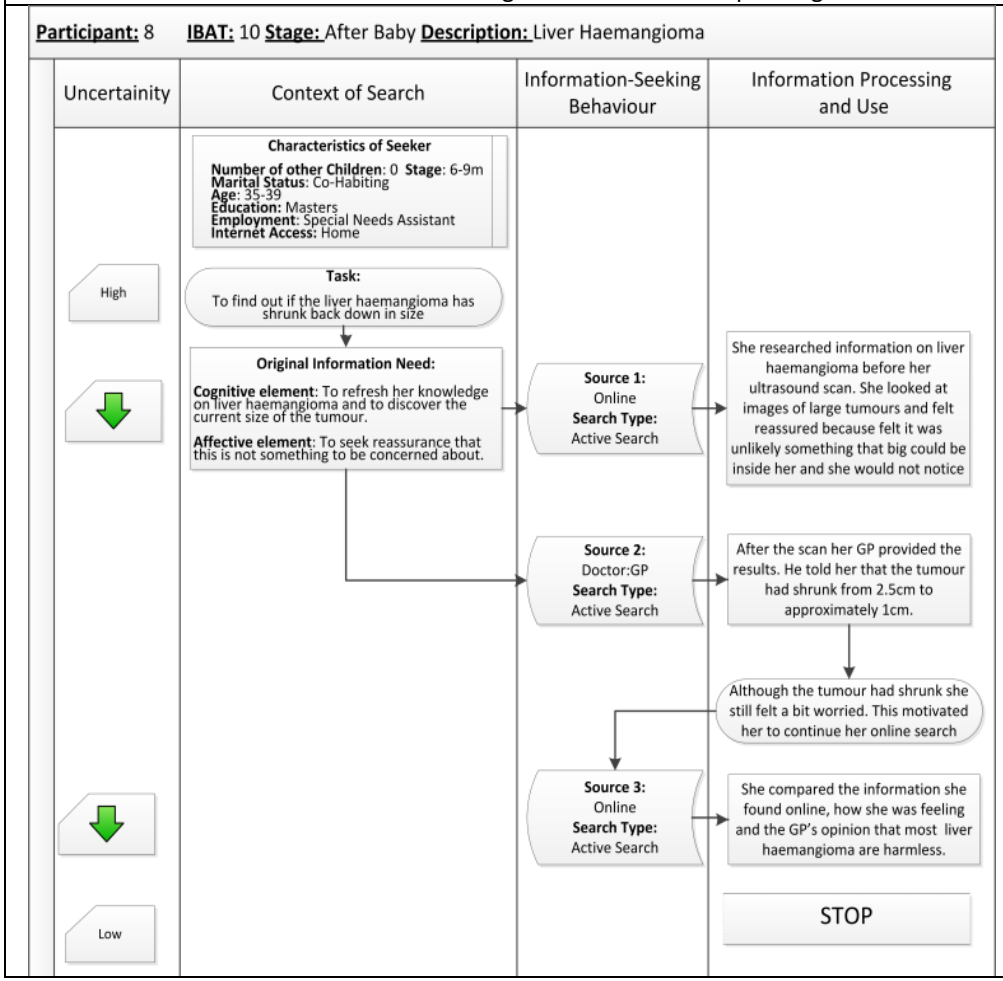
Versions of the Liver Haemangioma IBAT for Participant Eight	Discussion
	**IBAT Version 1** **Aim:** To follow an individual's information-seeking journey for a particular episode • **Uncertainty:** Illustrates the changes in the participant's uncertainty level as the episode progresses • **The context of Search:** Provides background information on the participant. Also provides information specific to the episode, include the search task and the information need. • **Information-seeking behaviour:** Includes information on the search types and the information resource. • **Information processing and use:** Details information on how the information found is evaluated and then utilised.

Table 3-10 Evolution of the IBAT - Information Behaviour Analysis Tool: Version 1

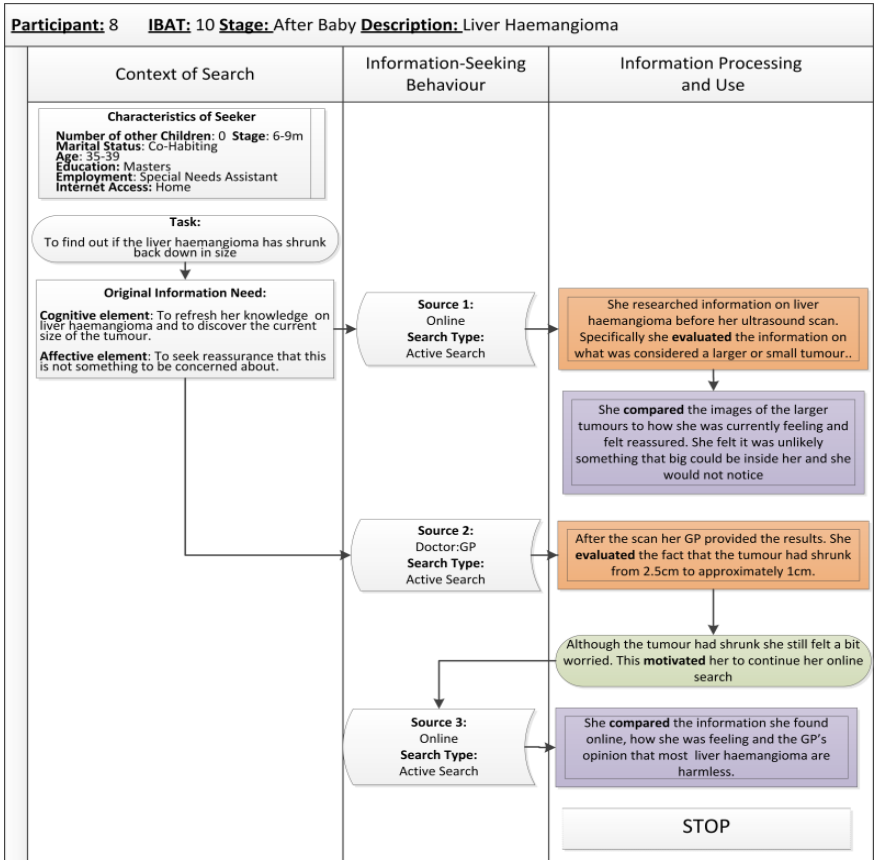
Versions of the Liver Haemangioma IBAT for Participant Eight	Discussion
	**IBAT Version 2** **Aim:** Easier to follow, less subjective (removal of uncertainty level) Changes to the design: • The removal of uncertainty as a separate section • The addition of colour coding and keywords.

Table 3-11 Evolution of the IBAT - Information Behaviour Analysis Tool: Version 2

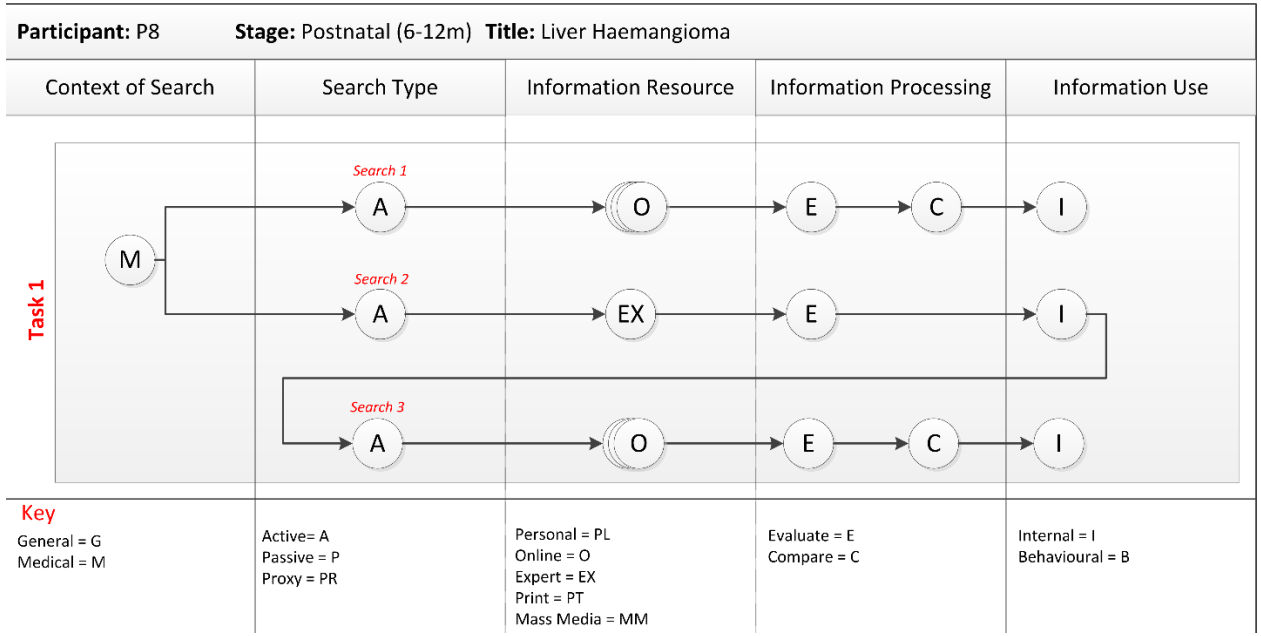
Versions of the Liver Haemangioma IBAT for Participant Eight	Discussion
	**IBAT Version 2** **Aim:** Easier to follow, easier to see the patterns. Changes to the design: • Removal of characteristics of seeker • Removal of information need • Separation of information processing and information use into separate sections • Separation of search type and information resource. • Swap text for letters and key at the bottom • Highlight the number of tasks and search

Table 3-12 Evolution of the IBAT - Information Behaviour Analysis Tool: Version 3

3.6.1.2.2 Data Display – RQ1: What Subjective Assessment Criteria Are Used During Information Processing?

The purpose of RQ1 was to determine the subjective assessment criteria that the participants use when evaluating and comparing information resources. To achieve this data was coded using seed codes that were developed from the literature representing assessment criteria for information and information resources, see Table 3-13**.**

These seed codes were used as a sensitising device for coding the participant's subjective assessment criteria (c.f. Klein and Myers, 1999). It was decided at the beginning of the study that the objective was to determine what the participant's opinions of information resources, not to determine objective measures of quality. This is because there may be differences in how one of the participants measures credibility or reliability and how an expert would measure the same criteria. The objective of this study is to propose design guidelines for expectant and new mothers; therefore it is their perception that is important.

Summary data tables were produced for each participant, based on the seed categories. Table 3-14 is an example of a summary data table for subjective assessment criteria for information resources. While Table 3-15 is an example of a summary data table for subjective assessment criteria for information. Each summary table includes assessment criteria, illustrative quotes, and the information resources that the quote refers to. As is evident from a comparison of the tables, not every seed category was evident in each participant. In fact, upon competition of analysis some seed categories never emerged, for example, Flexibility.

	Category	Description
Information Resource Criteria	Convenience *(alt terms – Convenience of Access)*	The perceived ease with which the user may use/access the information resource.
	Credibility *(alt terms – Cognitive Authority, Believable)*	The believability of the information resource **Includes: Trust, Expertise**
	Flexibility	The capacity of the information resources to change or to adjust in response to new conditions, demands, or circumstances **Includes: Customisation, Personalisation**
	Format *(alt terms – Appearance, Mode of presentation, Format of output, Aesthetics)*	The look and feel of the information resource, including the method of presenting information.
	Integration	The ability of the resource to communicate/transmit data between different resources.
	Perceived utility	This is a balance between how useful an information resource is considered and the perceived cost (effort, opportunity and monetary cost)
	Rank on search list	The position the information resource has on a search listing
	Responsive (alt terms – Response Time, Speed, Timeliness)	The amount of time it takes for an information resource to satisfy a user's request.
	Security *(alt terms – Privacy and data protection)*	Confidence that the resources will protect user data from misappropriation or unauthorised alteration or loss.
	Usability *(alt terms – Ease of Use)*	The level of ease the user experiences interacting with the information resource and navigating through it. **Includes: Navigation**
Information Criteria	Accuracy (alt terms – veracity)	The correctness of the information
	Complete (alt terms – Sufficient, Amount, Coverage)	The comprehensiveness and depth of the information
	Concise	The information is succinct, lacking in superfluous detail.
	Currency (alt terms – Timeliness, Topicality)	The age of the information
	Use of Language *(alt terms – Readability, Language, Understandability)*	The information is easy to read and understandable.
	Freedom from Bias *(alt terms – objectivity)*	The information is not influenced by a particular point of view or agenda.
	References	Citations for used material or recommendations for additional sources of information Includes: Citations and Recommendations
	Relevance (alt terms – connection to task)	The applicability of the information to the user's needs.
	Reliability	The consistency and dependability of the information

Table 3-13 Seed Categories for Subjective assessment Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Convenience			X			"Yeah, [the newsletter] comes and I always look at it. I find it actually very convenient."
			X			"Since I went back to work which was before she turned one, I wasn't always reading the weekly newsletters….. because again, lack of time."
			X			"For the health stuff, I would look a lot at the internet because it's easier. It's just accessible anytime."
	X					"I suppose I would talk to people more about general information because it comes up in conversation as well."
Credibility			X			"I highly recommend it for parents; it's called the Alpha Parent. It's written by a woman, a mother who has a lot of qualifications in childcare as well."
	X					"I spoke to friends first, people who had experience."
	X					"I would listen to my sister if she told me something. But that's the thing; I would listen to my sister because I trust my sister."
			X	X		"Obviously, I prefer if I recognise who wrote it, I would even Google the name of the author though I don't tend to do that with websites that much. It's mostly with books that I would Google the authors."
			X			"People write anything in forums you can't really trust them."
Format			X			"Some websites look like really bad websites. Now having said that there might be good articles in sites like that, but overall I think aesthetically when a site is full of ads or flashing ads or things like that it can be a bit dodgy."

Table 3-14 Summary Data Table - Subjective Assessment Criteria: Information Resources (P8)

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Complete		X	X	X		"I believe in covering the worst case scenario as thoroughly as you can when you give information"
				X		"But they were not actually telling you what to do, and you didn't realise this until you had read the book until the very end."
Use of Language		X				"They communicated all this information very clearly. I found them in the labour ward amazing."
			X			"Well for me it depends on how it is written, and what they say because people tend to exaggerate sometimes."
			X	X		"The language is definitely important, I mean how well written something is."
Freedom from Bias		X				"We found them not massively but definitely a bit biased towards about medical interventions during the antenatal class….. It's not that they are telling you go and have them, but they keep repeating how they are now available"
References			X			"The Alpha Parent Blog has a lot of links to articles because [the author] is doing the research in a scientific way."
			X			"I suppose a good site for me is a site that has links to the references where they get their own information from. So, you can then deepen the research more and more yourself."
Relevance			X			"There was nothing about Ireland obviously and what happens here."
			X			"They are very relevant because [my child] seems to be like a textbook baby in terms of the age that she seems to be doing things."
Reliability			X			"The first page usually of results you get the basic sites that would maybe be a bit more reliable."
			X			'I suppose usually the place I always start and I still do, is Babycentre. I think it is an amazing site, a very reliable site and a general site. I just Google the search words plus Babycentre UK.'

Table 3-15 Summary Data Table - Subjective Assessment Criteria: Information Content (P8)

3.6.1.2.3 Data Display – RQ2: What are the Information Use Outcomes?

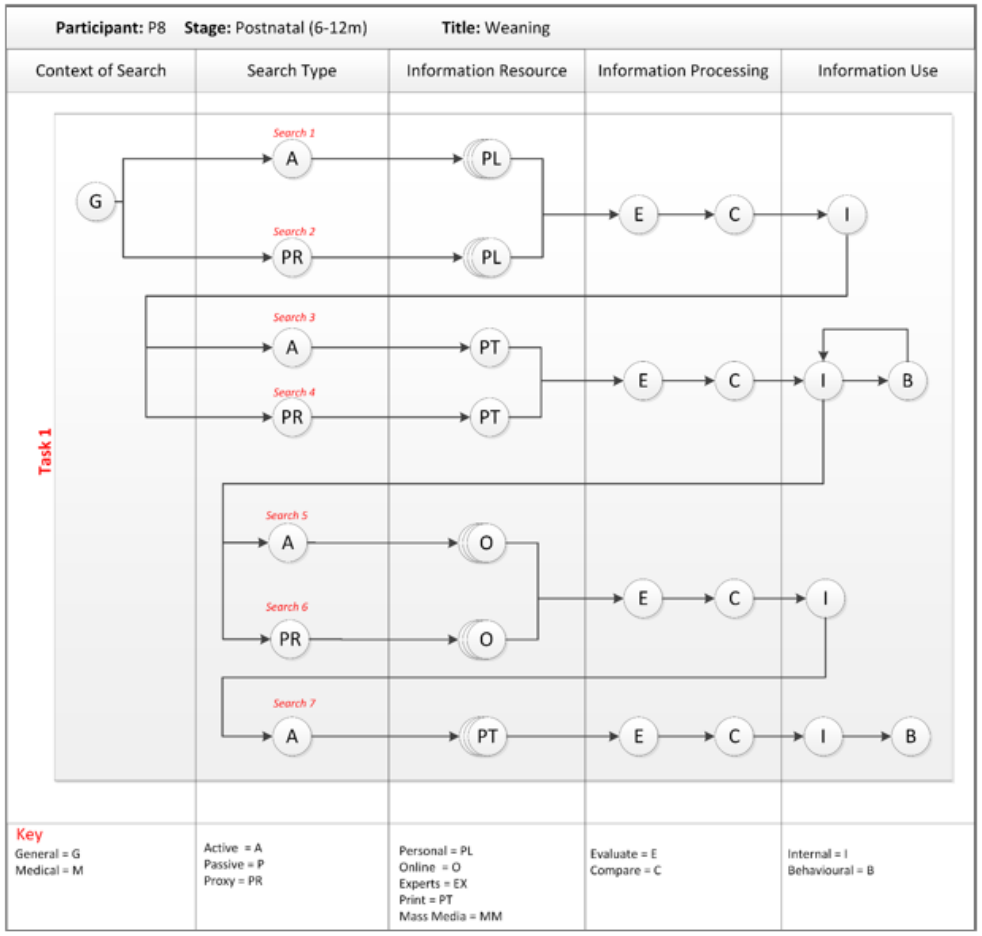
The purpose of RQ2 was to identify the outcomes of information use. Within information use, there is both internal use and behavioural use. Internal use occurs within the mind of the individual, while behavioural use involves observable physical actions. Internal use can be further broken down into cognitive use and affective use.

In order to determine the outcomes of information use the Information Use Outcome Pattern Diagram (IUOPD) was developed. There are two parts to the IUOPD; there is a summary data table and a visual. The visual offers an overview of the pattern of information use outcomes for each participant, based on an analysis of the IBATs. To create the IUOPD all the IBATs for each participant are reanalysed, including the accompanying narrative. For the IUOPD the area of interest starts at cognitive use, because based on this studies operational definition that is where information use begins. The IBATs are recoded using the seed categories listed in Table 3-16.

Code	Description	Example
A1	Cognitive use resulting in information-seeking.	Discovering that there is a new type of car seat that is being recommended by experts and deciding to research further.
A2	Cognitive use resulting in behavioural use.	Deciding to purchase a new car seat because of the information they evaluated convinced them it was the best option.
A3	Cognitive use resulting in positive affect.	Feeling reassured after comparing eHealth information to what the experts said and finding they matched.
A4	Cognitive use resulting in negative affect.	Feeling confused after evaluating a conversation with a health professional.
A5	Negative affective resulting in behavioural use.	Feeling confused by conflicting advice and deciding to go with your friend's weaning advice because she has children, which makes her a credible resource to you.
A6	Positive affect resulting in behavioural use.	Feeling confident that this is the best crèche and deciding to enrol your child.
A7	Positive affect resulting in information-seeking.	Getting enjoyment from planning birthday present ideas which lead to further information-seeking.
A8	Negative affect resulting in information-seeking.	Feeling dissatisfied with the level information provided by a health professional and deciding to search for more information.
A9	Behavioural use cognitive use.	Deciding that the new car seat does not meet their needs after it was bought it and tested.

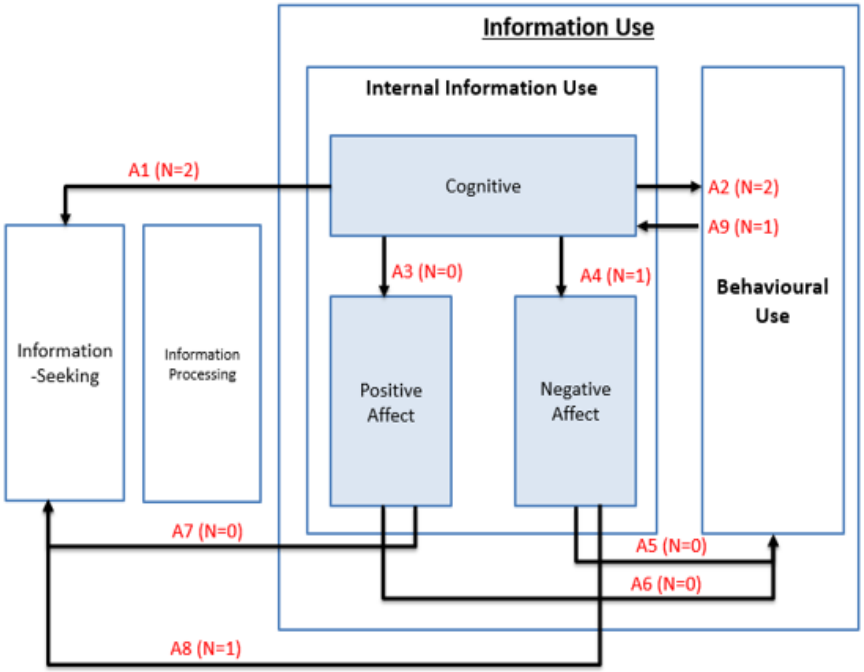
Table 3-16 Seed Categories for Information Use Outcome Pattern Diagrams

Figure 3-7 provides an example of an IBAT with a summary narrative. Figure 3-8 then demonstrates the IBAT recoded as an IUOPD. Real insight from the IUOPD comes from multiple episodes analysed together, as this is where patterns can be observed. However, from the IUOPD in Figure 3-8 we can observe that P8 returned to information-seeking as a result of both cognitive use and negative affect. We can also observe that P8 changed her behaviour as a result of cognitive use twice. Finally, Figure 3-8 illustrates that behaviour change influenced P8's cognitive use once. There was no evidence of positive affect in the episode.



- **Search 1&2:** P8 and her partner spoke to friends about weaning. A number of friends lent her books. One of the friends gave them a book on baby-led weaning. P8's partner was interested in the concept and wished to try it, so they decided to read the book.
- **Search 3 & 4:** While on holiday in Greece, both P8 and her partner read the book on baby-led weaning while trying the out the practice. They found the book badly written. They also found the concept impractical for them because P8 needed to wean the child off breastmilk before she returned to work.
- **Search 5 & 6**: Temporarily turned off of books, both P8 and her partner turned to the internet to search for weaning strategies. P8 found the amount of conflicting advice on weaning to be confusing. She stated that there were a lot of fanatics, particularly in the forums and blogs.
- **Search 7**: P8 decided to review some of the other books that friends and given her. She decided to create her own weaning strategy based on a combination of resources. Including a Gina Ford book. This surprised her, as she usually disagreed with the author's philosophy, but the found the layout her weaning book to be particularly useful.

Figure 3-7 Example IBAT - P8 Weaning



Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking	Weaning	1	1&2
		Weaning	1	3&4
A2	Cognitive use resulting in behaviour change	Weaning	1	3&4
		Weaning	1	7
A3	Cognitive use resulting in positive affect			
A4	Cognitive use resulting in negative affect	Weaning	1	5&6
A5	Negative affective resulting in behaviour change			
A6	Positive affect resulting in behaviour change			
A7	Positive affect resulting in information-seeking			
A8	Negative affect resulting in information-seeking	Weaning	1	5&6
A9	Behavioural change cognitive use	Weaning	1	3&4

Figure 3-8 Information Use Pattern Diagram for Weaning Information-Seeking Episode

3.6.1.2.4 Data Display – RQ3: What are the primary information resources for medical and general tasks during the antenatal and postnatal periods?

The purpose of RQ3 was to identify the information resources accessed by the participants for medical and general tasks over the different periods of the study. This was the research question with the most significant longitudinal element. This research question involved deductive coding for the information resources and inductive coding for the task types.

The information resources were divided into five categories based on a review of the literature in Chapter 3. Table 3-17 provides the seed categories for the information resources, along with examples. These were the categories that were used to code information resource for all of the data analysis.

Resource	Code	Examples	
Online	O	• Information pages • Forums	• Blogs • Social media groups
Expert	EX	• Health professionals • Subject matter expert	
Personal	PL	• Friends • Family	• Work colleague
Print	PT	• Magazines • Books	• Leaflets • Books
Mass Media	MM	• Television • Radio	

Table 3-17 Seed Categories for Information Resources

Chapter Two reviews the literature on eHealth for pregnancy and parenting and divides it into either medical or general tasks. A similar process was undertaken with the information-seeking episodes for each participant. Once they were separated they were reviewed again and coded into smaller categories to facilitate further analysis. The coding of the sub-categories was an iterative process that involved cross-participant comparison to ensure consistent codes. Table 3-18 provides an example of the summary table for medical information-seeking episodes. While Table 3-19 is an example summary table for general information-seeking episodes. The data for these tables came from both the analytic memos and the activity diaries. They include all the information-seeking episodes mentioned by the participant, not just those that became IBATs.

Information-Seeking Episodes	P	Period	Information Resource					Code
			PL	EX	O	PT	MM	
Diagnosing abdominal Pain*	P8	A	X	X	X			Medical conditions (Mother)
Labour Fears*	P8	A	X	X		X		Medical conditions (Mother)
Homebirths	P8	A	X					Medical conditions (Mother)
Asthma in Pregnancy	P8	A		X				Medical conditions (Mother)
Back Pain – Bra Support during Pregnancy	P8	A		X				Medical conditions (Mother)
Cold & Flu in Pregnancy, natural remedies	P8	A		X	X	X		Medical conditions (Mother)
Pelvic Girdle Pain	P8	A				X		Medical conditions (Mother)
Cholestasis in pregnancy	P8	A		X				Medical conditions (Mother)
Strep B during Pregnancy	P8	A	X	X	X			Medical conditions (Mother)
Labour research	P8	A	X	X	X	X		Medical conditions (Mother)
Infection factors in infants	P8	P(0-6)	X	X				Medical conditions (Baby)
Ways to relieve colic in infants	P8	P(0-6)		X				Medical conditions (Baby)
Mastitis (1)*	P8	P(0-6)	X	X				Medical conditions (Mother)
Mastitis (2)*	P8	P(0-6)	X	X	X			Medical conditions (Mother)
Mastitis (3)*	P8	P(0-6)		X				Medical conditions (Mother)
Haemorrhoids*	P8	P(0-6)	X		X			Medical conditions (Mother)
Hyperlactation	P8	P(0-6)		X	X			Medical conditions (Mother)
Suspected Mastitis	P8	P(0-6)		X				Medical conditions (Mother)
Vaccinations	P8	P(0-6)		X	X			Medical conditions (Baby)
Liver haemangioma	P8	P(6-12)		X	X			Medical conditions (Mother)
Calpol Alternative	P8	P(6-12)	X		X			Medical conditions (Baby)
Nurofen Alternative	P8	P(6-12)		X	X			Medical conditions (Baby)
Baby Cough	P8	P(6-12)			X			Medical conditions (Baby)
Trying to get pregnant	P8	P(6-12)		X	X			Medical conditions (Mother)
What is Calamine Lotion	P8	P(12+)			X			Medical conditions (Baby)
Possible second bout of Chicken Pox	P8	P(12+)			X			Medical conditions (Baby)
Treatments for Diarrhoea in children.	P8	P(12+)			X			Medical conditions (Baby)

Table 3-18 Medical Information-Seeking Episodes (P8)

Information-Seeking Episodes	**P**	**Period**	**Information Resource**					**Code**
			PL	EX	O	PT	MM	
Pregnancy this week	P8	A			X			Developmental Information
What to bring to hospital	P8	A				X		Pregnancy & labour prep
Labour Preparation	P8	A			X			Pregnancy & labour prep
Create Birth Plan	P8	A			X	X	X	Pregnancy & labour prep
Nesting*	P8	A	X		X	X		Parenting strategies
Sex After Childbirth*	P8	P(0-6)	X		X			Fertility issues
Travel Tips*	P8	P(0-6)	X		X			Parenting strategies
Sleep Problems*	P8	P(0-6)			X			Parenting strategies
Weaning*	P8	P(0-6)	X		X	X		Diet and exercise (Baby)
Developmental Milestones	P8	P(0-6)	X		X	X		Developmental Information
Weaning*	P8	P(6-12)	X		X	X		Diet and exercise (Baby)
Looking for Childcare	P8	P(6-12)	X		X			Childcare & Education
Aistear: the Early Childhood Framework	P8	P(6-12)			X			Childcare & Education
Separation Anxiety	P8	P(6-12)			X			Parenting strategies
Getting back in shape for getting pregnancy	P8	P(6-12)		X	X	X		Fertility issues
Developmental Milestones	P8	P(6-12)			X	X		Developmental Information
Ways to avoid Spoiling your child	P8	P(12+)			X			Parenting strategies
Childhood Emotions	P8	P(12+)			X	X		Parenting strategies
Saying No*	P8	P(12+)			X			Parenting strategies
Developmental Milestones	P8	P(12+)			X	X		Developmental Information

Table 3-19 General Information-Seeking Episodes (P8)

Along with the summary data tables, a visual was included as part of RQ3. The purpose of the visual was to demonstrate the evolution in the participants information-seeking over the course of the study. The information for the visual was taken from the two summary tables created for the question. Figure 3-9 provides an example of the visual for P8. The visual demonstrates the frequency of medical and general information-seeking episodes that were reported by the participant, divided across four periods. Combined with rich descriptions from the analytic memos this can be utilised to better understand P8's information behaviour.

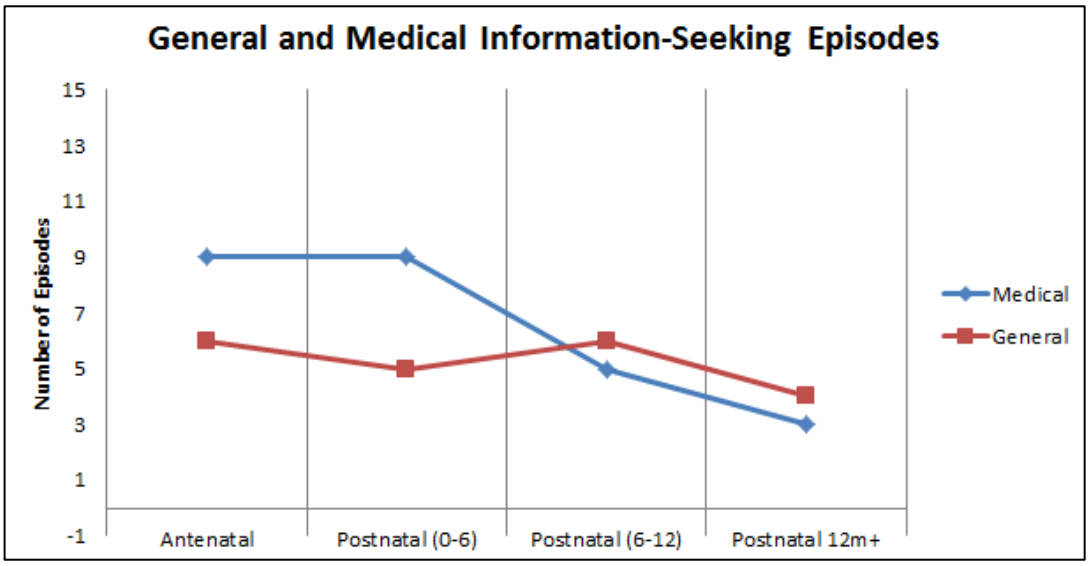


Figure 3-9 Visual for RQ3 - Evolution of Information-Seeking (P8)

3.6.2 Cross Participant

The aim of the cross-participant is to identify patterns in the information behaviour of the participants, focusing difference and similarities across the different user groups. Cross-participant analysis has the potential to blind the researcher to potential leanings available from each separate case, so researchers much first ensure that they conduct adequate within case, or within-participant analysis to mitigate this risk (Stake, 2005).

The cross-participant analysis focused on the use of data displays. There was less use of summary tables with more of a focus on visuals. When summary tables were used they were at a higher level of abstraction, meaning that they did not use illustrative quotes. However, there was a chain of evidence that always

demonstrated the flow from one visual or summary back down to the original point of data collection.

Thematic analysis was utilised during the cross-participant analysis and then combined with visuals, in order to easily demonstrate the most frequently discussed themes. For example, Figure 3-10 uses a bubble diagram to illustrate the subjective assessment criteria for the >35 mothers with children user group. The size of the bubbles were determined by comparing the number of quotes for each subjective assessment criterion, against the total number of quotes for all information resource criteria for that group. From the size of the bubble, we can see that credibility was the most subjective assessment criteria for information resources. The diagram is based on an analysis of subjective assessment summary tables for each participant that was conducted as part of the within-participant analysis.



Figure 3-10 Bubble Diagram - Subjective assessment Criteria Information Resources (>35 Group)

A second example of a visual used during cross-participant analysis is Figure 3-11. This stacked column chart demonstrates the information resources accessed during general information-seeking episodes, by the >35 mothers with children user group. From a cursory look at the chart, it is clear to see that online information resources were the primary sources of information for this user group. It is also evident that

the overall frequency of information declined as the participants move through the four study periods. With no general information-seeking reported by this group in the final postnatal period.

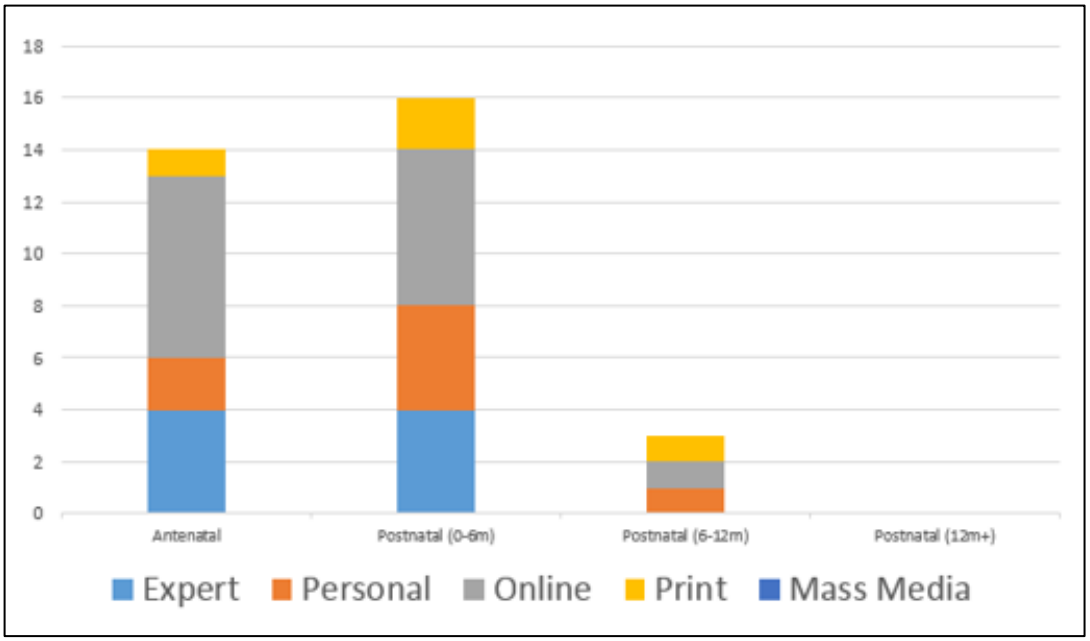


Figure 3-11 Stacked Column Chart - Information Resources Accessed by >35 Mothers with Children for General Tasks.

3.6.3 Validity Procedures of Qualitative Research

Validation in qualitative research is fundamentally about assessing the degree to which the findings accurately represent the phenomena that the researcher is investigating (Hair Jr. et al. 2007). While quantitative research relies on statistical formulae to ensure validity (Straub et al. 2004), assessing validity in qualitative research is more diverse as it depends on the type of qualitative research undertaken (Hair Jr. et al. 2007).

Creswell and Miller (2000) propose a framework to guide researchers in selecting validity procedures. The framework is divided into three sections: (1) lens of the researcher, (2) lens of study participant and (3) lens of people external to the study. Table 3-20 demonstrates the framework applied to this study.

Two validity procedures were selected for each lens. For the lens of the researcher triangulation and disconfirming evidence were used, see Table 3-20. Data was collected using both semi-structured interviews and activities diaries. This allowed them to be compared against each other as a form of validation. The cross-

participant analysis also acted as a form of triangulation, when similar patterns were observed across participants this reinforced the importance of particular design guidelines.

Lens	*Procedure*	Example from this study
Lens of the Researcher	*Triangulation*	• Use of both interviews and activity diaries • Use of cross-participant analysis
	Disconfirming evidence	• As this is a prospective longitudinal study there was room for the analysis to evolve and categories to change through the different waves.
Lens of Study Participants	*Member checking*	• Three participants were asked to review their own single case analysis. • Participants made themselves available and two were contacted during analysis to confirm questions.
	Prolonged engagement in the field	• As this is a longitudinal study, a significant time was spent with each participant.
Lens of the People External to the Study	*Thick rich description*	• This is achieved through the IBATs – analysis of information seeking examples.
	Chain of Evidence	• Chains of evidence allow readers understand how conclusions were derived from the evidence

Table 3-20 Validity Procedures (from: (Creswell and Miller, 2000)

The process of disconfirming evidence occurs during coding and analysis and involves searching for negative evidence, evidence which disproves your theory or framework (Miles and Huberman, 1994). This is a difficult process but it is also a useful tool to ensure that the disconfirming evidence does not outweigh the confirming evidence (Creswell and Miller, 2000).

The lens of the study participants is concerned with ensuring that the participants' realities have been represented accurately in the final analysis (Creswell and Miller, 2000). To ensure that this was the case the researcher conducted member checking. As part of the results four participants are given long write-ups, including IBATs and individual discussions of the research questions. Three of the four participants were selected, based on availability and asked to read through the analysis to provide feedback. The feedback that was received was positive overall, with no criticism of the narrative. One participant was unhappy with some of the quotes that were used as she felt that they were too informal and one was used twice which she felt gave it too much emphasis. Another participant did express her

surprise that she had not been more forthcoming during some of the more stressful information-seeking episodes. However, on reflection, she thought that she may not have provided much information during those times because of the stress.

The second element for ensuring the accurate representation of participants' reality is the longitudinal study design. As previously discussed, the longitudinal design allowed for the building of trust, which was important when participants were discussing potentially sensitive topics. A longitudinal design also acts as a form of triangulation, as topics are often revisited and discussed during multiple waves. Research suggests that increasing the number of waves provides additional information and increases the reliability of research studies (Willett, 1989).

The final lens is the lens of the people external to the study. This lens is concerned with the credibility of the study to those external to it (Creswell and Miller, 2000). In order to achieve a mix of thick descriptions and a chain of evidence was used. Thick descriptions involve describing and interpreting action within a particular context (Ponterotto, 2006). Thick descriptions should capture thoughts, emotions, motivations and intentions relation to the particular action (ibid). This is achieved in the study, particularly in the IBATs which chart the individual information-seeking examples.

A chain of evidence provides a link back from the analysis to the data collection. For each research question, at the within participant or cross-participant level, it is possible to easily chart your way back from the information presented to the information collected.

3.7 Summary of the Research Approach

This chapter presented the research objective of proposing design guidelines for eHealth information resources based on the information behaviour of expectant and new mothers. Three research questions were formulated to answer the objective, and a longitudinal case study approach was proposed as the most appropriate research methodology. Figure 3-12 summarises the research design that was undertaken to answer the research questions and achieve the objective.

Step 1: involved identifying the study sample. The first step was identifying the inclusion and exclusion criteria. The researcher decided to recruit women in their second trimester of pregnancy for the first wave. Pregnancies in their second trimester are more established than in the first trimester, expectant mothers usually do not openly discuss their pregnancies outside the family until after the first trimester of pregnancy. The second trimester also allowed enough time for two interviews during the antenatal period.

Recruitment for the study was conducted through advertising the study in a variety of offline and online locations, including magazines, forums and Facebook groups. For the first wave of the study twelve women were recruited.

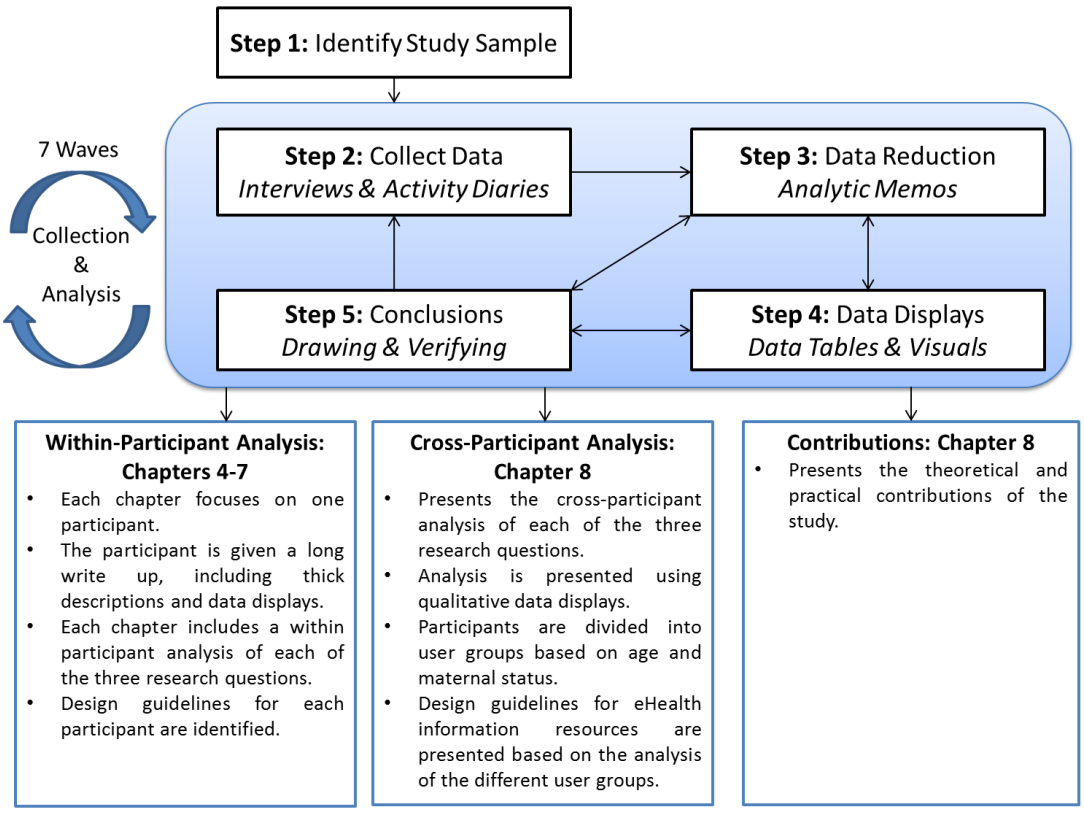


Figure 3-12 Summary of Research Design

Step 2: Involved data collection through a combination of semi-structured interviews and activity diaries, see Figure 3-12. There were seven waves of data collection with each participant. As with all prospective longitudinal studies there was a degree of attrition. Twelve participants started the study in wave one and seven completed all waves. However, a further two participants were included in

the final analysis because they complete four or more interviews, two antenatal and two postnatal.

Step 3: Is an important step in qualitative data collection where unreduced texts can become cumbersome (Miles et al., 2013). This is particularly true for longitudinal studies due to the volume of data (Pettigrew, 1990). Data reduction was conducted on interviews transcribed after each wave. Transcriptions were synthesised to create analytic memos which are a useful tool to help researchers to refine and expand codes (Miles and Huberman, 1994).

Step 4: Involved data analysis, see Figure 3-12. Initial analysis was conducted in-between waves were data was coded against seed categories. Examples of information-seeking episodes were identified from interviews and a diagrammatic analysis was created using the IBAT diagrams. When data collection was complete cross-participant analysis was conducted using summary tables and data displays. The results of data analysis are presented in chapters 4-7 through within participant analysis and in chapter 8 as cross-participant analysis.

Step 5: Conclusions evolved over the course of the research study, as data was collected and analysed over the seven waves. The final results are presented in chapter 8 as the theoretical and practical contributions of this research study.

The next four chapters present the results of the within-participant analysis. Each of the chapters focuses on a different participant. The participants were chosen because their accounts were particularly rich. Each of the participants chosen for the within-participant analysis also represent one of the four user groups discussed on the cross-participant analysis. These groups are divided based on age (greater than and less than thirty-five) and maternal status (first-time mother versus mothers with children).

Chapter 4: Analysis of Participant Eight

At the start of the study P8 was a first-time mother, over the age of 35, see Figure 4-1. Both these factors influenced P8's information-seeking during the course of the study. As a first-time mother, many of the tasks involved new information. Sometimes the novelty was exciting for P8, while other times it was stressful. During the antenatal period, P8 avoided labour information because she was anxious about the process. P8's age influenced the tasks in the postnatal period. This was because P8 had fertility issues prior to becoming pregnant and wanted a second child.

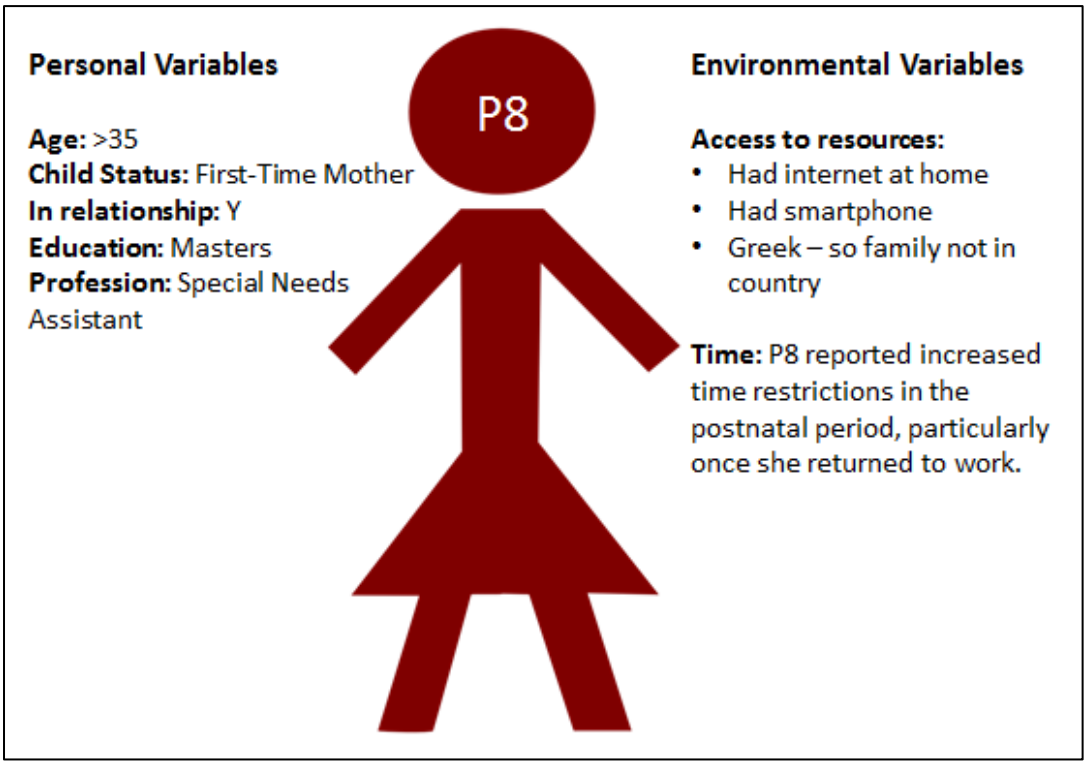


Figure 4-1 Characteristics P8

P8 had a long-term partner during the study. He participated as proxy search during several of the information-seeking episodes. P8 valued his opinion and utilised him to discuss ideas, as a sounding board. P8 also used him to search for information when she did not have the time, particularly at the start of the postnatal period, just after the baby was born.

P8 stated that she utilised the skills that she had developed during her research masters when searching for pregnancy and parenting information. She was

interested in understanding the reasons behind things, why she was being advised to do something. She also preferred when information resources listed references for articles. That way she could check their resources and delve deeper if she wished. During the study P8 had a habit of researching the credentials of authors. Knowing the background of the authors made the information more credible for P8.

Figure 4-2 illustrates P8's medical and general information-seeking. The majority of P8's information-seeking was conducted in the antenatal and the postnatal (0-6m) period. Medical information-seeking was dominant in both those periods. This was because P8 experienced several stressful medical conditions over that time. P8's medical information-seeking declined from the second postnatal period as her health improved.

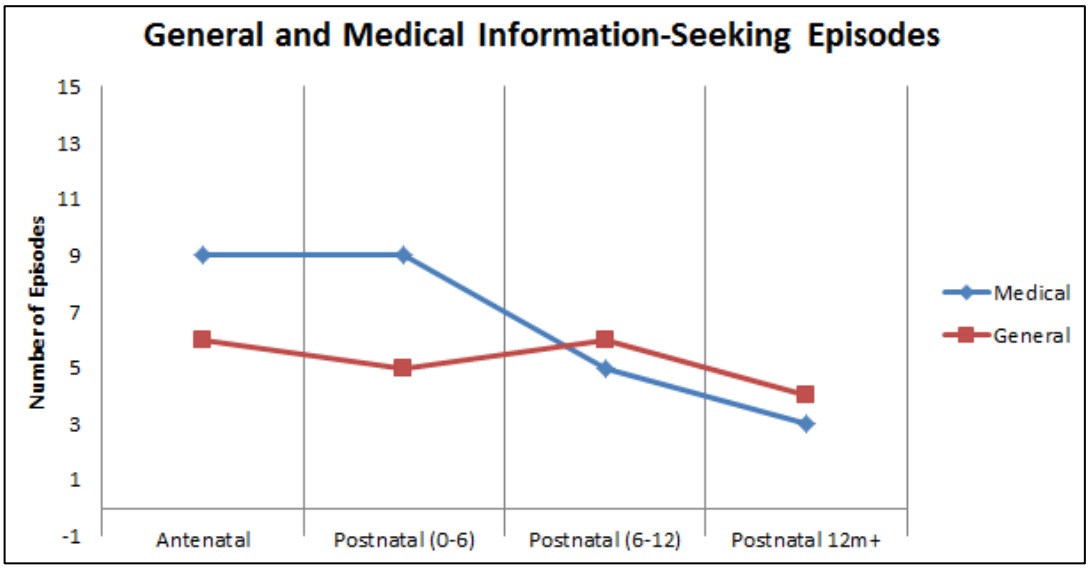


Figure 4-2 P8's General and Medical Information-Seeking

From the third postnatal period, P8 reported a reduction in information-seeking caused by a reduction in free time. This was the period she returned to work. Previous to this point, P8 reported more browsing or searching for general interest. However, once P8 returned to work her information-seeking became very specific.

4.1 Information-Seeking Episodes (P8)

This section analyses information-seeking examples to provide insight into P8's information behaviour. The section includes an analysis of eight medical and six general information-seeking episodes. The medical information-seeking episode mainly discusses conditions effecting P8; this is because her daughter was rarely ill.

P8 on the other hand experienced several illnesses during the study. The general information-seeking episodes reflect P8's interest active information-seeking into parenting topics. This is likely reflective of her status as a first-time mother and her role as a special needs assistant.

Figure 4-3 is a timeline which illustrates all the information-seeking episodes analysed in this section. By selecting episodes from each of the four time periods, the researcher can comment on any changes observed in P8's information-behaviour over time. Any episodes connected using arrows in Figure 4-3 are directly related to each other, for example diagnosing abdominal pain and liver haemangioma. As a result, those episodes are discussed under one sub-section. Also worth noting, the Calpol alternative is two information-seeking episodes, too small to separate on the diagram. Otherwise, the information-seeking episodes are presented in chronological order of occurrences over time.

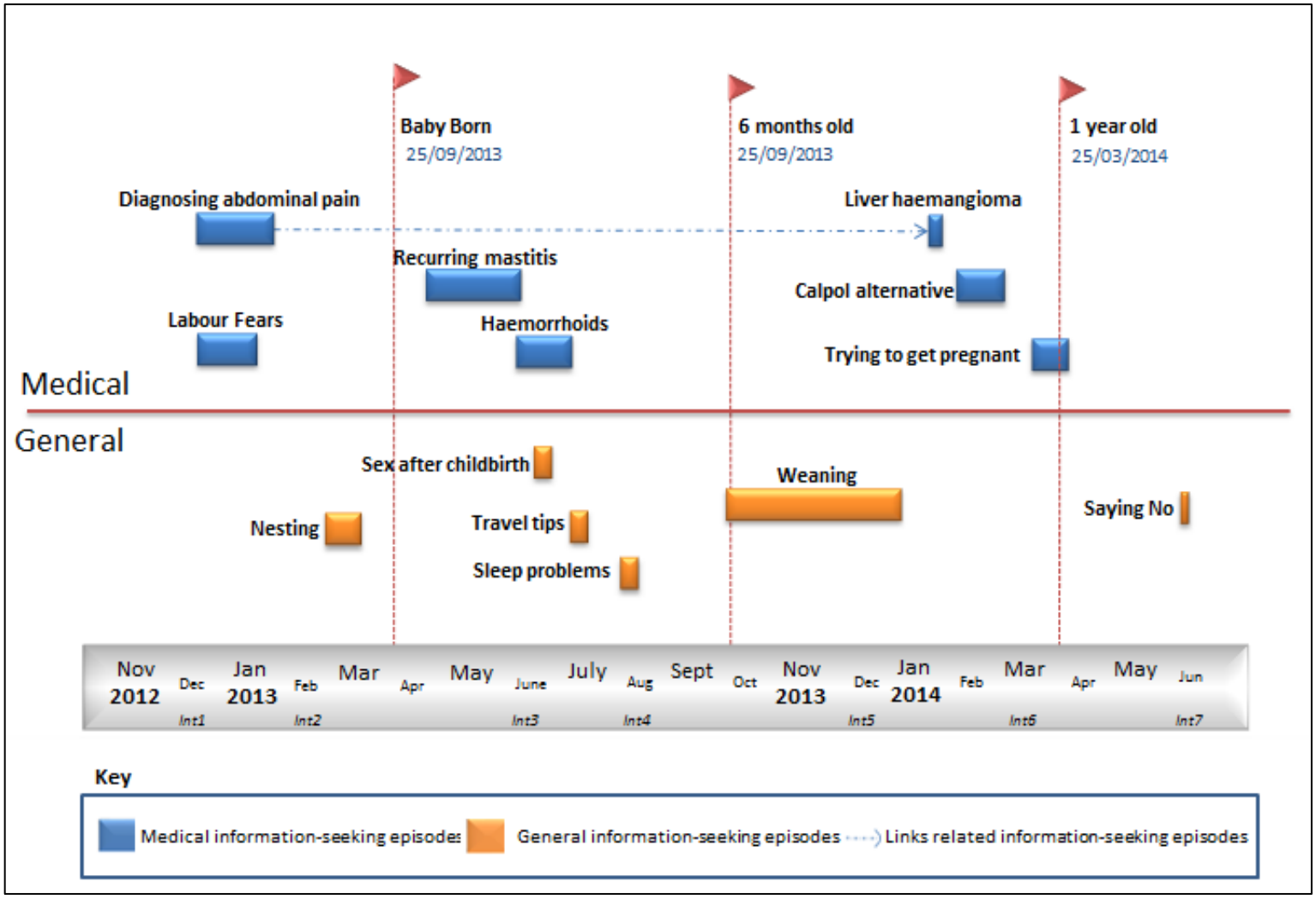


Figure 4-3 P8's Information-Seeking Timeline

4.1.1 Diagnosing Abdominal Pain to Liver Haemangioma *(Antenatal to Postnatal)*

These two medical information-seeking episodes have been grouped together despite the fact that they occurred approximately twelve months apart. This is because of the events of the first information-seeking episode. Diagnosing Abdominal Pain informs the events of the second episode, Liver Haemangioma. The first episode details P8's information behaviour when attempting to diagnose her illness. In the second information-seeking episode P8 knew the diagnoses but had to get tests to discover if the tumour had reduced in size after her pregnancy. These test prompted P8 to start information-seeking on the condition again.

Both of the information-seeking episodes involve cognitive and affective information needs. These stem from cognitive gaps, such as P8 needing a diagnosis in the first episode, or not knowing the size of the tumour in the second episode. Although the degree of uncertainty is higher in Diagnosing Abdominal Pain, both of these information-seeking episodes contain negative effects such as anxiety and fear. These emotions motivate P8 to continue information-seeking until she feels reassured.

4.1.1.1 *Diagnosing Abdominal Pain (Antenatal)*

Diagnosing abdominal pain is a medical information seeking episode that occurred in the antenatal period, see Figure 4-4. The episode contains three tasks, seven searches and a combination of online and expert information resources. The information-seeking episode began with P8 experiencing severe pain in her abdomen which was interfering with her life and her job. The primary goal of P8 was to stop the pain, but she did not know the cause. This cognitive gap was the driver of the information-seeking episode. P8 required a diagnosis and a solution.

"I couldn't go up the stairs because I was fainting and I was getting the pain." (P8)

In the first task, P8 visited her GP to attempt to discover the source of pain. The GP believed that the pain was likely a sign of gallstones. The GP referred P8 to the hospital for tests for confirmation. P8 decided to go for the tests. While she was waiting for the appointment P8 decided to spend her time searching for information online. However, because of GP's assertions the focus of her search

had now changed. P8 now had a new task, to research information on gallstones, specifically gallstones and pregnancy.

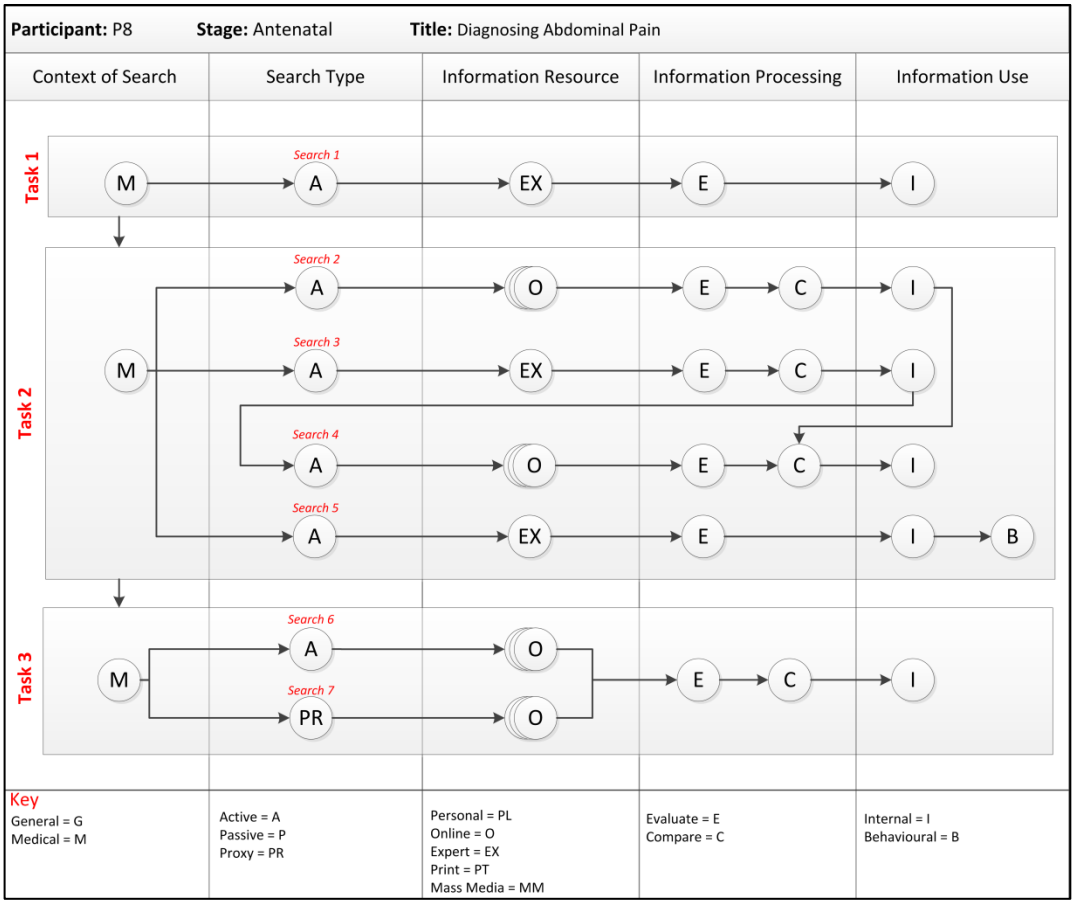


Figure 4-4 P8 - Diagnosing Abdominal Pain IBAT

The second task involved four active searches. Search two in Figure 4-4, the first search of task two, is an active search of multiple eHealth sites. Here P8 was researching information on gallstones during pregnancy. This search served two purposes. Firstly it provided information to solve a cognitive need. Secondly, it helped to manage anxiety while she waited for her ultrasound appointment.

The third search involved a hospital consultant at her ultrasound appointment. The consultant agreed with her GP's assessment that the problem was likely gallstones. While she waited for her test results she conducted another active search of eHealth resources, similar to search two.

When the results came back, the GP informed P8 that she did not have gallstones, she had liver haemangioma. The GP prescribed medication, which P8 decided to

take. The GP also attempted to reassure P8 about the condition but she had gotten a fright and felt the need to research the condition further.

> *"It's a little tumour but apparently, it's not bad or anything and is called haemangioma. But when he told me this is what you have I was like, "Oh, my God." So I looked it up."* (P8)

Task three in Figure 4-4 details P8's search for information now that she had a diagnosis. P8 enlisted her partner as a proxy search, and together they researched the condition using online resources. During this information-seeking episode, P8 repeatedly sought online information immediately after consulting with a medical professional. In all three instances, P8 used online resources to seek additional information to solve both cognitive and affective needs. In the last example, P8 also sought verification of what the GP had told her. The GP had attempted to offer reassurance but P8's uncertainty and anxiety were too high and she needed to verify what the GP has said with another source.

4.1.1.2 *Liver Haemangioma (Postnatal 6-12m)*

The medical information-seeking episode depicted in Figure 4-5 is set roughly a year after the previous episode. The episode contains one task, three searches and a mix of online and expert information resources. P8 was waiting for test results to discover if the liver haemangioma tumour had shrunk back down in size after pregnancy. She was driven to search online due to feelings of anxiety while waiting for the results. Her nerves were exacerbated by the fact that she had never found out what size the tumour had been when she was originally diagnosed. She was under the impression that the tumour had been "*big enough*", and perhaps the GP had not given her the exact size at the time because the GP had not wanted "*to freak [her] out, especially when they knew that in most cases they're nothing"* (P8).

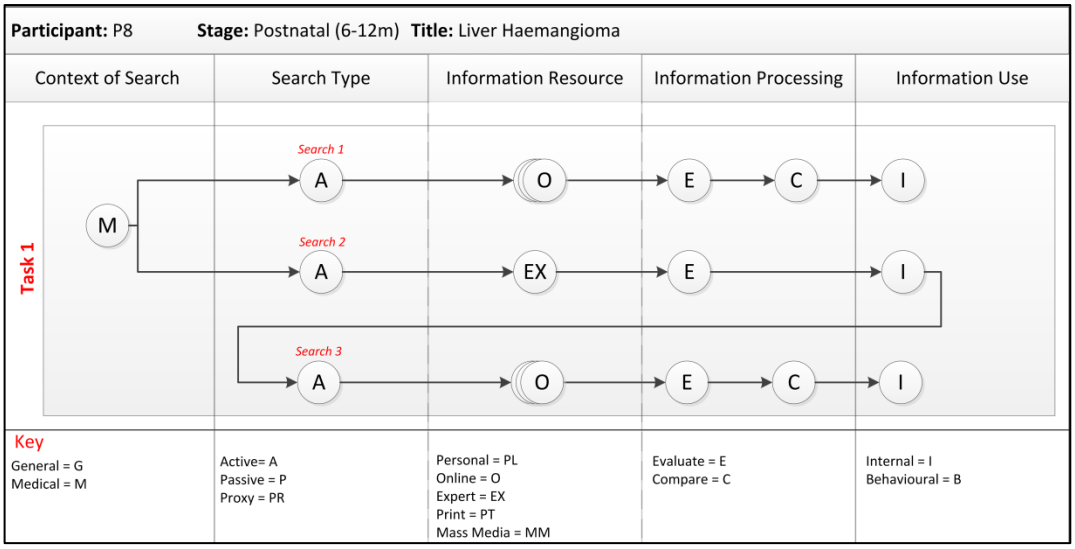


Figure 4-5 P8 - Liver Haemangioma IBAT

The aim of the task in Figure 4-5 is to discover the size of her tumour and if it has shrunk since pregnancy. The first search involved P8 searching online prior to getting the test results. P8 searched a number of online resources while awaiting the results. She found resources that contained images particularly useful as they helped her to visualise the information she was finding, particularly relating to the size of tumours. She found the images reassuring because when she saw some of the larger ones she felt that there was *"no way in hell [she] have one of these inside [her]*" (P8).

When the test results came back they showed the tumour had shrunk in size. P8 was also able to discover both the tumour's current and past sizes. It had reduced in size from 2.5cm to approximately 1cm. The GP provided a positive prognosis and attempted to reassure P8, but she still felt "*a little bit worried*" (P8).

P8 then displayed a similar pattern of information-seeking behaviour to the previous episode, by taking the information from her encounter with her GP and going back online. She used the information on the size of her tumour to search online and verify the positive prognosis provided by the GP.

4.1.2 Labour Fears (Antenatal)

This is a medical information-seeking episode which occurred in the antenatal period, see Figure 4-6. This episode involves two tasks, four searches and a combination of expert and print information resources. P8 was an active

information-seeker for both medical and general tasks. However, previous to this episode she had been avoiding labour information. When she did think about the labour process she became anxious and '*overwhelmed*' (P8). A number of her friends had given her books throughout her pregnancy, and she had chosen not to read the books that were related to the labour process itself.

This first task in Figure 4-6 is short and involves a passive search. The task was for P8 meet her midwife for a routine check-up. During the check-up, the midwife asked P8 if she was thinking much about labour yet. P8 admitted to feeling "*a bit apprehensive*" (P8) about the topic. During the discussion, the midwife recommended a book for P8 to read 'Birthing from within'. A book which happened to be included in the number her friends had donated. P8 evaluated the recommendation and decided to read the book.

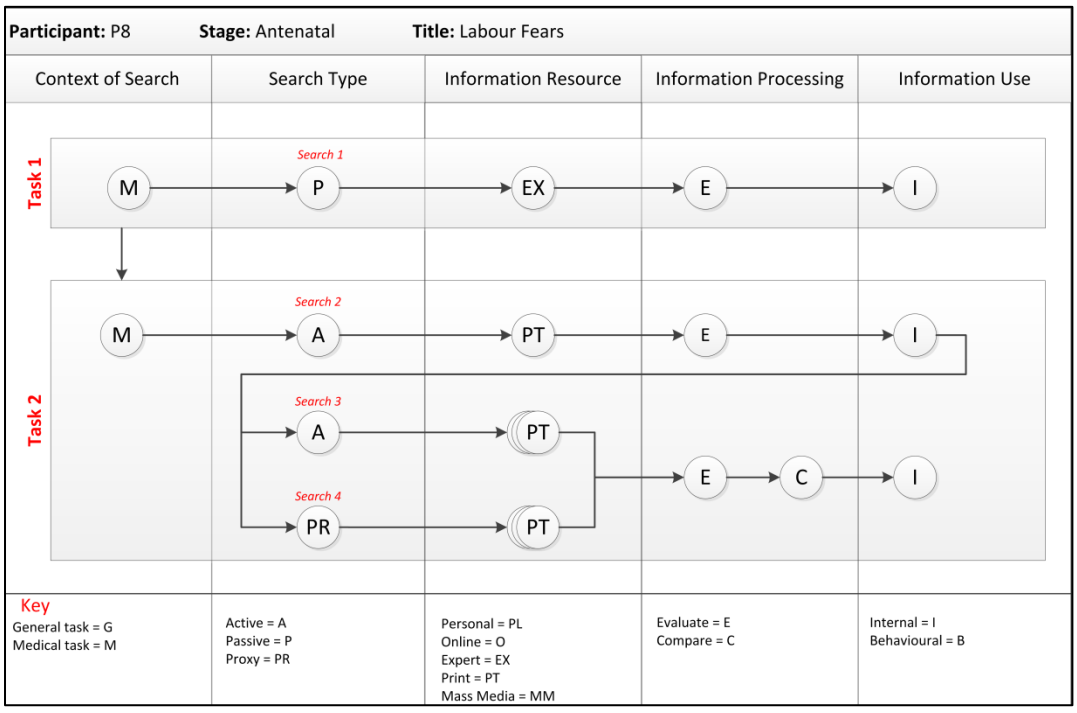


Figure 4-6 P8 - Labour Fears IBAT

The second task in Figure 4-6 involved learning more about the labour process, the thing P8 had been avoiding. The second task is therefore influenced by the first, by the recommendations of the midwife. It begins with an active search of the book that the midwife had suggested. When P8 evaluated the book she found it useful for dealing with her anxiety as it spoke about topics such as "*the three universal*

fears of labour" and "*preparing yourself emotionally"* (P8). This aided her in satisfying her emotional information needs.

The advice from the book helped her to stop avoiding labour information. For approximately three weeks, P8 and her partner researched the labour process by reading a number of different books and comparing them. The information from the "Birthing from within' book influenced how she approached the search. Her aim was to consider her emotional needs instead of just "*grabbing knowledge from everywhere*" (P8). After the search was finished, P8 felt that she was now "*ready emotionally*" for what was to come (P8).

4.1.3 Nesting (Antenatal)

Nesting is a general information seeking episode that took place in the antenatal period, see Figure 4-7. The episode contains two tasks, five searches and a mix of personal, print and online information resources. For approximately the last month of her pregnancy P8 started researching babies and parenting. P8 was feeling confident about the pregnancy because it was "*quite an established pregnancy so [she] didn't think that things would go wrong"* (P8). This left her with free time to research. As P8 was a first-time mother who already had an interest in developmental information because of her education and her job, it is perhaps unsurprising that she choose to research babies and parenting.

The first task in Figure 4-7 involved researching general information on *babies and parenting.* The information-seeking episode begins with two personal information resources being evaluated and then compared against each other. Both resources were from Greece and the interactions were electronic. The first search was active and involved P8 soliciting parenting advice from a friend. The second was a passive search because a different friend brought the topic up in conversation. The two friends had different perspectives and philosophies when it came to parenting. When P8 compared their conflicting viewpoints she ultimately went with the first friend as experience had taught her to trust that friend's advice. That friend had recommended that she read a book, 'The Continuum Concept'. The first task illustrates the importance of experience with an information resource in developing

trust. It is that experience that aided P8 in her decision between two conflicting information resources.

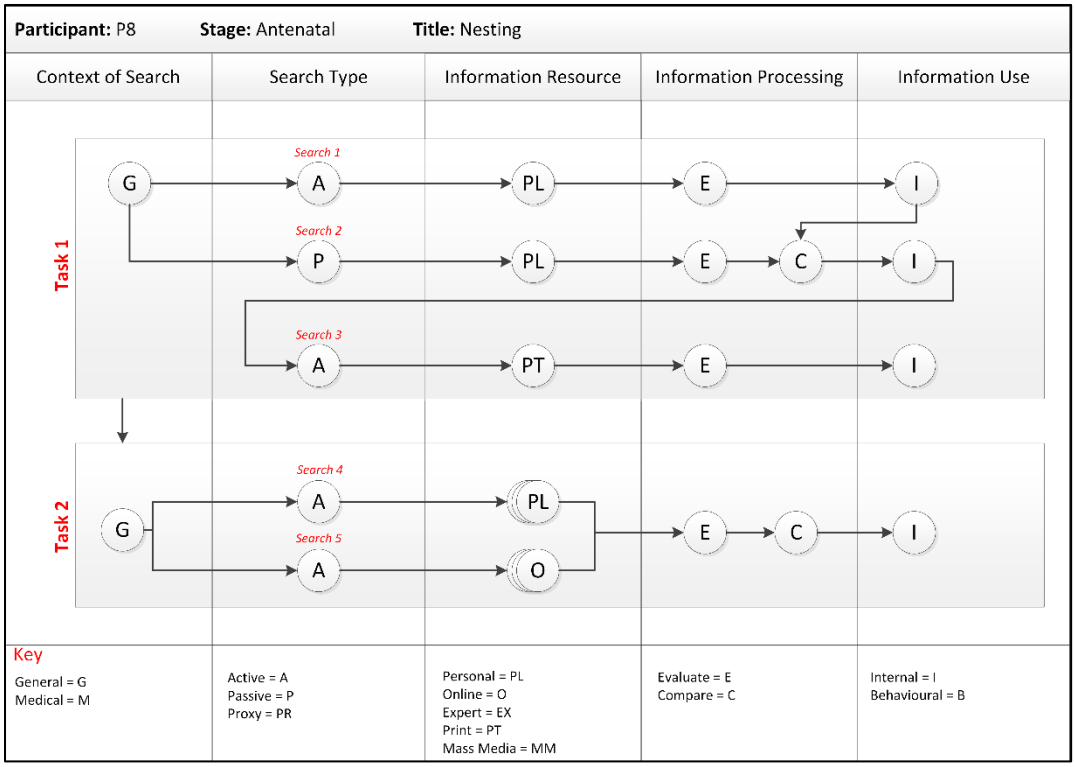


Figure 4-7 P8 - Nesting IBAT

As part of the new general task, P8 actively sought experiential information from parents and fact-based information from online medical journals. She evaluated the information from the different parents and online medical journals and compared her findings against the concepts raised in the book. To P8, both resource types corroborated the book. Based on the information P8 had found, she decided to reconsider her opinion on how long she was going to keep the baby sleeping in her bedroom after it was born.

4.1.4 Recurring Mastitis (Postnatal 0-6m)

These four medical information-seeking episodes are the first postnatal information-seeking episodes. They are grouped together because they describe three instances of the same illness (mastitis) that occurred over a five-week period and the hyperlactation that occurred because P8 became confused by conflicting advice from different experts. The first information-seeking episode in this group occurred three weeks after P8's baby was born. The events of each information-seeking episode inform the next.

The three mastitis episodes, when taken together, show an interesting pattern. In the first episode, P8 relied on personal and expert resources. Her partner acted as a proxy to search online when she had questions as she did not feel up to searching herself. In the second information-seeking episode there was an increase in information-seeking activity by P8. In this episode, she became frustrated by the lack of information on recurring mastitis available online and the conflicting information she received from the various health professionals. By the third episode, her information-seeking was at its lowest. She remained frustrated by the information she received from the health professionals and was now worried about a possible fourth reoccurrence.

The fourth information-seeking episode in this series was set five weeks after the third mastitis episode. P8 had received conflicting advice from expert information resources on how to use the breast pump to help clear the mastitis during the previous episodes. During this episode, P8 discovered that her problems with hyperlactation were caused by the pump. P8 experienced feelings of frustration because this was never explained to her by the experts and it would have made it easier to choose between conflicting medical professionals.

4.1.4.1 *Mastitis First Occurrence (Postnatal 0-6m)*

Figure 4-8 illustrates a medical information-seeking episode that occurred just three weeks after P8 had her baby. The episode contains one task, five searches and a mix of expert, personal and online information resources. At this point in time, P8 was still recovering from her emergency C-section and getting used to being a new mother. Her energy levels were low, and information-seeking was not a priority for her.

Once P8 developed mastitis she did engage in information-seeking, actively consulting a number of different resources. As illustrated in Figure 4-8, her preference was for expert and personal information resources over other options. First she "*spoke to [her] midwife, [her] doctor, [her] sister and another two or three friends who had previously had it when they had babies in the past*" (P8). With this combination, she was getting both expert advice and real life experience.

The aim of the task in Figure 4-8 was to discover a solution for P8's mastitis and to find methods to manage its impact while she had it. P8 consulted expert information resources in search one two. Both of the experts, her midwife and GP were of the opinion that she should be able to continue breastfeeding, which was a priority for her when trying to reduce the impact of the mastitis. Her GP also provided her with a prescription for antibiotics, which P8 decided to take. P8 hoped that the antibiotics would be the solution to the mastitis.

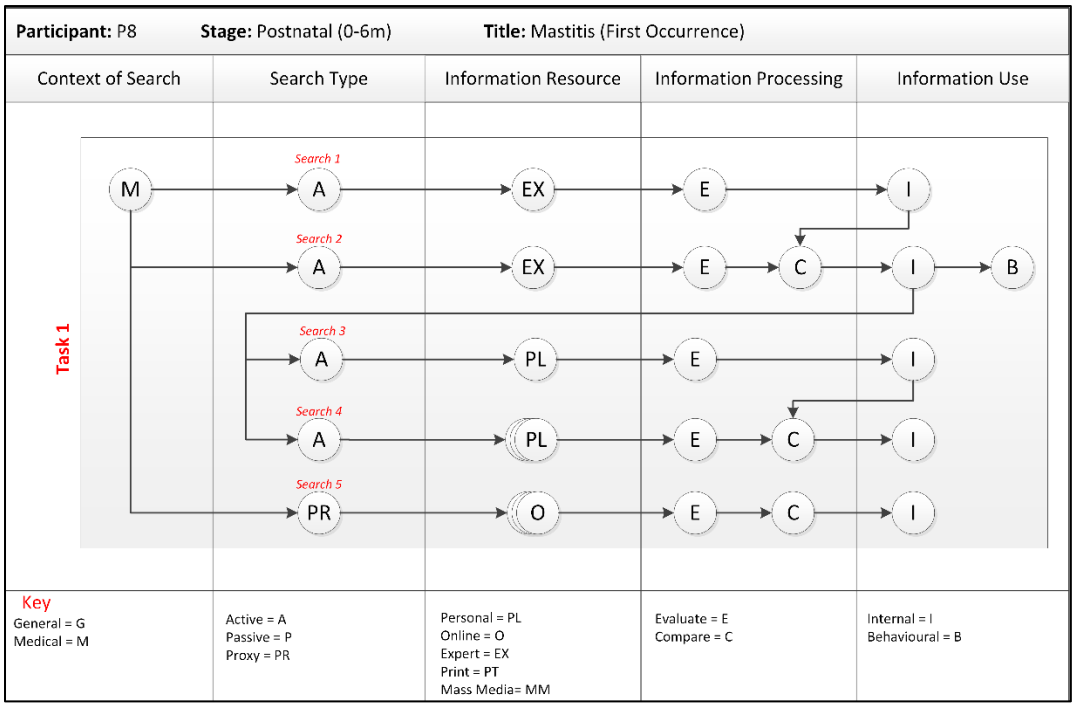


Figure 4-8 P8 - Mastitis (First Occurrence) IBAT

After P8 had elicited the expert advice she decided to contact her sister and a number of friends. Their opinion was valued because they had breastfeeding experience and personal experience with mastitis. The final search described in Figure 4-8 involved P8's partner conducting proxy searches of online resources. This is the only example of online resource access within this information-seeking episode. P8 stated that she felt so "*sick and that [she] could not do anything like*" (P8) researching online herself. Instead, P8 found it useful to delegate this to her partner when questions arose.

During this information-seeking episode, only the expert advice led to behavioural information use. After consulting with the experts P8 continued to breastfeed and took the antibiotics. However, the information they provided was not enough to

completely satisfy her information needs. This is evident in her continued search for information related to mastitis, consulting both family and friends.

4.1.4.2 *Mastitis Second Occurrence (Postnatal 0-6m)*

Figure 4-9 illustrates the second occurrence of mastitis, which quickly followed the first. This medical information information-seeking episode includes one task, seven searches and a combination of online and expert information resources. The aim of this episode was the same as the first occurrence of mastitis, to discover a solution for P8's mastitis and to find methods to manage its impact while she had it. However, P8 experienced higher levels of uncertainty and anxiety during this episode because this was the second occurrence in such a short time.

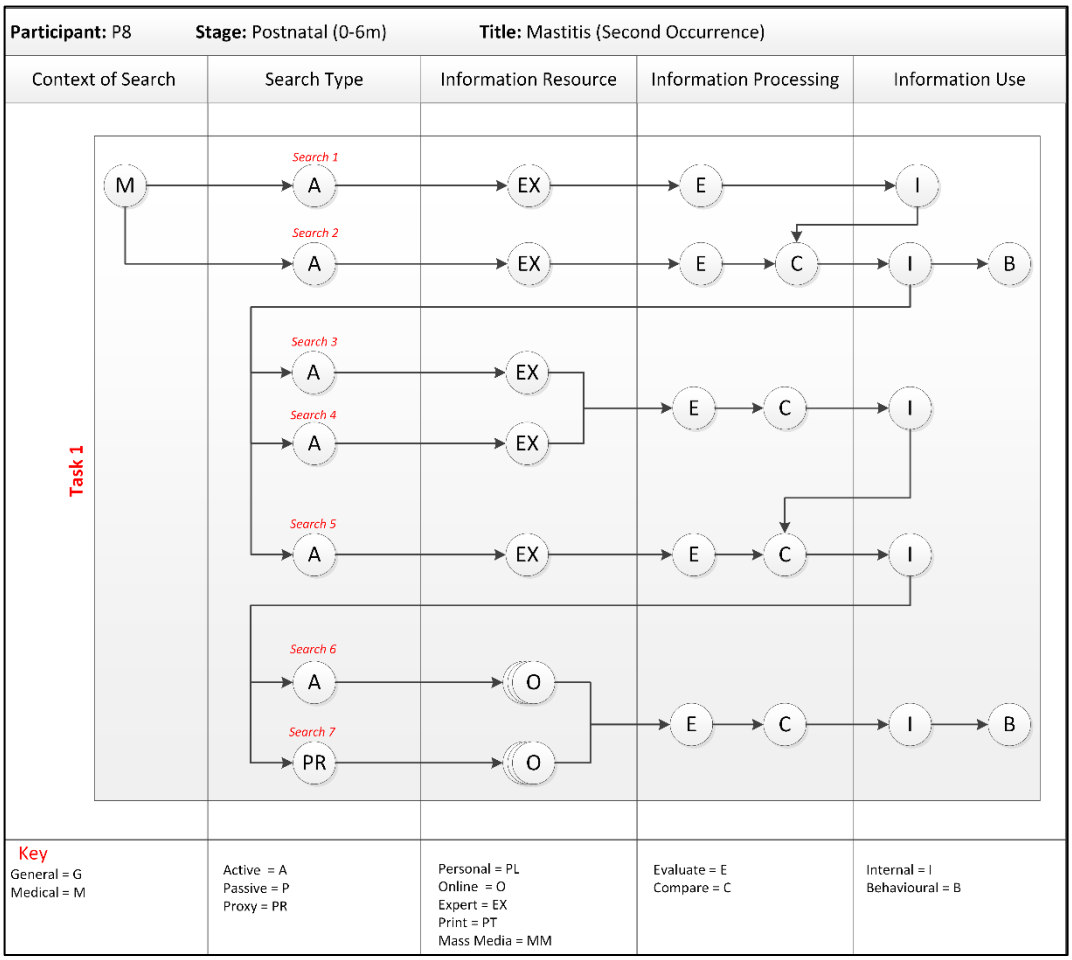


Figure 4-9 P8 - Mastitis (Second Occurrence) IBAT

P8 conducted more information-seeking during this episode. However found P8 difficult to find information resources that met her information needs. The online resources did not reference multiple occurrences of mastitis, which made them less

complete and relevant in P8's opinion. The expert information resources disagreed on how P8 should manage to breastfeed with mastitis, which P8 found "*very confusing*" (P8).

Similar to the previous episode, the first two searches in Figure 4-9 involved P8 consulting her midwife and GP. P8 received a similar response to the last episode in that they both stated that she could continue breastfeeding and her GP provided her with antibiotics which she decided to take. However, although both the GP and midwife agreed that she could continue breastfeeding, they did not agree on the process. This left P8 confused over which advice to take. The GP also booked P8 in for two appointments, one with a lactation consultant and one with the hospital for an ultrasound to ensure nothing more serious was going on.

Searches three and four describe P8's visit to the hospital for her ultrasound appointment, see Figure 4-9. During that appointment, P8 met with two hospital consultants. Both of them disagreed with her GP and midwife. The consultants advised her, to stop breastfeeding completely. The ultrasound itself when it came back was normal and P8 had nothing more serious than mastitis.

P8's next appointment was with the lactation consultant, see search five Figure 4-9. The lactation consultant was supportive of her continuing to breastfeed. The lactation consultant agreed with the midwife's advice and disagreed with GP's on the use of breast pumps. After leaving the lactation consultant, P8 was confused by the conflicting advice. She decided to search online to discover more information on mastitis and breastfeeding during mastitis. Her partner helped her to search, acting as a proxy. She found it difficult to find information that she deemed relevant, as it all only discussed single occurrences of mastitis. In the end, she decided to use a hybrid of the GP and lactation consultant's advice as it appeared to work better for her at that time.

4.1.4.3 *Mastitis Third Occurrence (Postnatal 0-6m)*

Figure 4-10 represents the third mastitis information-seeking episode. The medical information-seeking episode is shorter than the previous episode as it contains only one task and two searches. During the episode P8 only accessed expert information

resources. This task had the same aim as the previous two occurrences. Although the aim is the same in all three, achieving the aim became more complicated with each new occurrence. As this episode occurred shortly after the end of the last one, P8's level of uncertainty and anxiety increased further. P8 did not want to stop breastfeeding but she did not want to keep getting mastitis and the experts did not seem to have the answers.

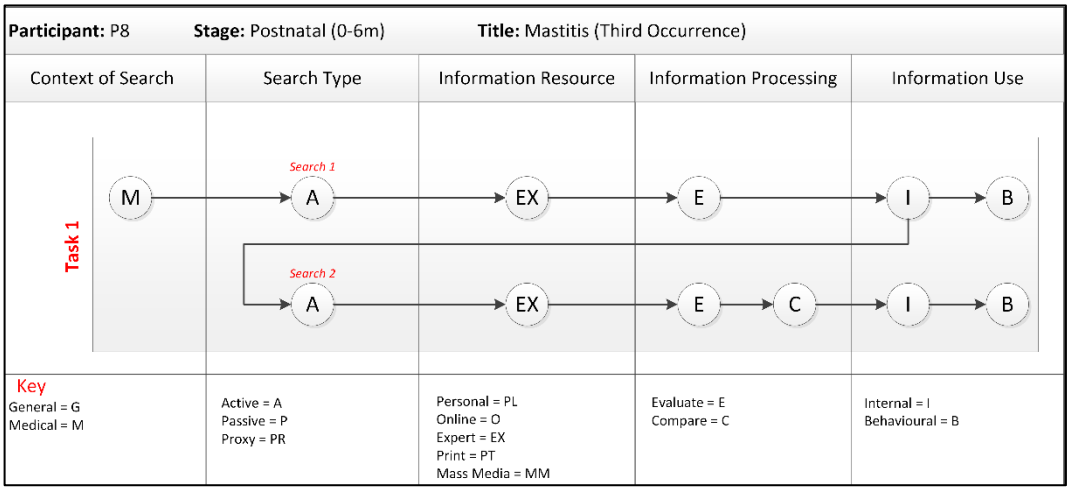


Figure 4-10 P8 - Mastitis (Third Occurrence) IBAT

When P8 got mastitis for the third time, her GP was on holiday so she consulted another GP whom she knew, see search one Figure 4-10. He had a different method for treating mastitis than her GP. He proposed testing a milk sample to find the exact antibiotic she should be on. He also suggested placing her on a generic antibiotic. P8 decided to go with this treatment option. The results of the milk sample were to go to her regular GP, as she would have returned from holiday by then.

When the results came back, P8 went to her own GP. The GP placed her on the specific antibiotic suggested by the results. P8 asked questions related to the mastitis, such as the likelihood of another reoccurrence. However, she did not find the answers very helpful as the GP could not "*guarantee it wouldn't happen again*" (P8). After discussing breastfeeding options, she decided to continue, her current hybrid approach.

4.1.4.4 *Hyperlactation* *(Postnatal 0-6m)*

The medical information-seeking episode described in Figure 4-11 occurred five weeks after the previous episode. The episode contains one task and two searches. P8 relied solely on online information resources during this episode. The events of this episode occurred as a direct result of decisions made during the previous mastitis information-seeking episodes.

The aim of this information-seeking episode was to discover a solution to her hyperlactation. The first search in Figure 4-11 involved P8 searching through the La Leche League forum. A forum is one information resource, however, there are multiple posts on a forum, which is why the C for compare is included under information processing. During her search, P8 encountered a post where a woman had included a link to a medical article that she recommended. P8 decided to follow the recommendation and read the article.

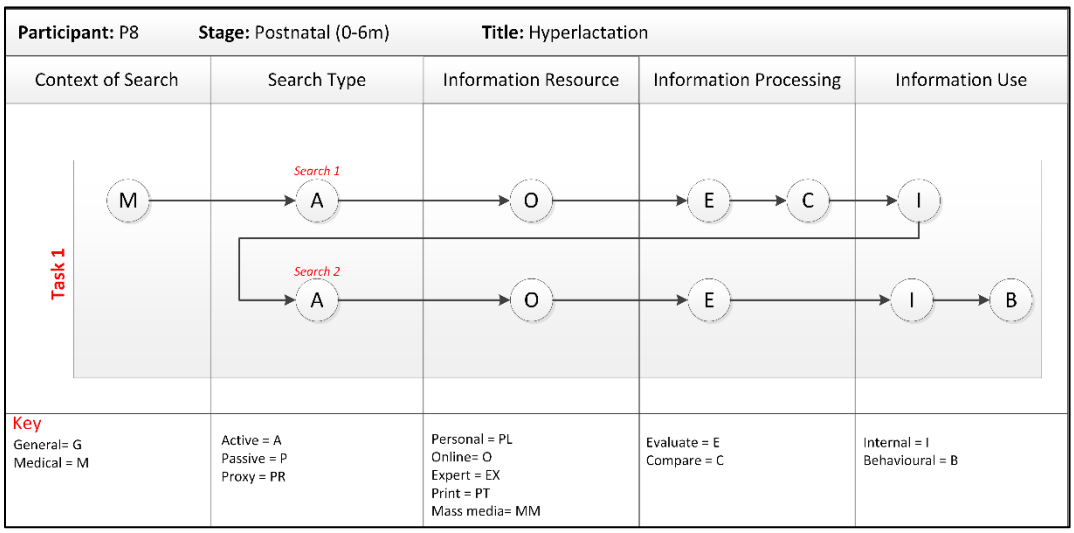


Figure 4-11 P8 - Hyperlactation IBAT

P8 stated that the medical article provided a detailed explanation as to why she was overproducing milk. The article also explained how she could go about correcting the problem. While P8 was happy that she now knew what to do, she was frustrated that this problem had occurred. Both the midwife and the lactation consultant had told her that the breast pump was not good but the GP had told her that it was good for clearing the mastitis. P8 found the medical article useful because it explained to her how her body worked and how using the pump resulted in her current issues. None of the medical professionals had gone into these details

or informed her of the potential side effects. P8 decided to take the advice presented in the article in order to resolve her hyperlactation problems.

4.1.5 Sex after Childbirth (Postnatal 0-6m)

This general information-seeking episode depicted in Figure 4-12, took place in the postnatal period, approximately three months after the baby was born. The episode contains two tasks, four searches and a combination of online and personal information resources. This is the first general information-seeking episode reported by P8 in the postnatal period. P8 stated that the quantity of her information-seeking reduced in the postnatal period after the baby was born. In her opinion, this was partly due to a reduction in her free time. Leading up to this episode P8 was worried about how long it was taking her to be ready to have sex with her partner. P8 felt that her C-section was part of the issue, as she was still "*in pain*" and felt that this was making her "*very slow*" (P8).

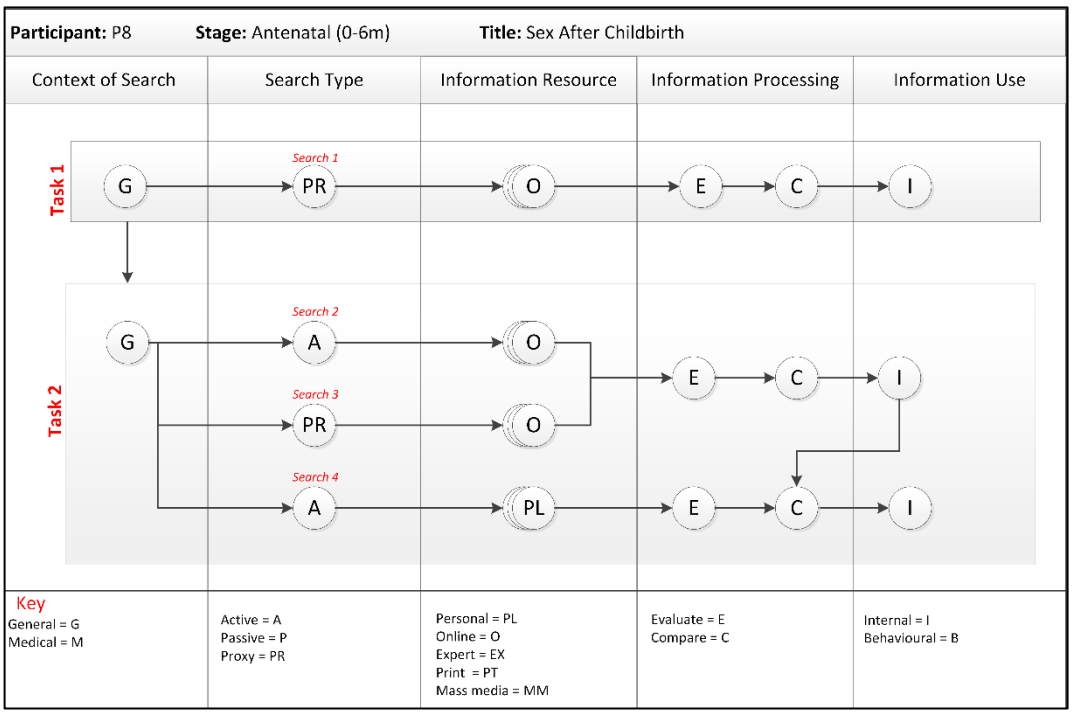


Figure 4-12 P8 - Sex after Childbirth IBAT

As illustrated in Figure 4-12, the information-seeking episode involved two general tasks. P8's partner was heavily influential throughout this information-seeking episode, acting as a proxy in both tasks. During the first task, he got his information from forums, a resource P8 normally shunned. However, during this episode P8 found it reassuring to hear about others in a similar situation. As a result of the

forums utility in this information-seeking episode, P8 began to change her perception of them.

The goal in the first task was to discover other new mother's perceptions to sex after childbirth. The first search in Figure 4-12 is a proxy search involving P8's partner. Her partner decided to undertake an internet search, focusing on forums. He wanted to discover other people's experiences. P8 had been distrustful of the information provided by forums. However, P8 found the results of her partner's search comforting. He informed her that many people on the forums were talking about similar things. He told her not to worry, that based on the forums her feelings appeared to be "*very common"* (P8).

The findings of P8's partner motivated a new task. Now that P8 knew she was not alone in her feelings, she wanted to understand them. To achieve this both P8 and her partner began searching online resources. P8 also spoke to friends and relatives to discover their experiences. In their search, she found information that suggested there was a hormonal link between breastfeeding and a reduction in sex drive. More importantly for P8, by researching the information she began to feel her situation was "*okay*" and "*normal*" (P8).

4.1.6 Travel Tips (Postnatal 0-6m)

The general information-seeking episode depicted in Figure 4-13 occurred in the first postnatal period. The episode contains two tasks, three searches and a combination of online and personal information resources. The information-seeking episode is an example of P8 using information found while searching for one task, during another.

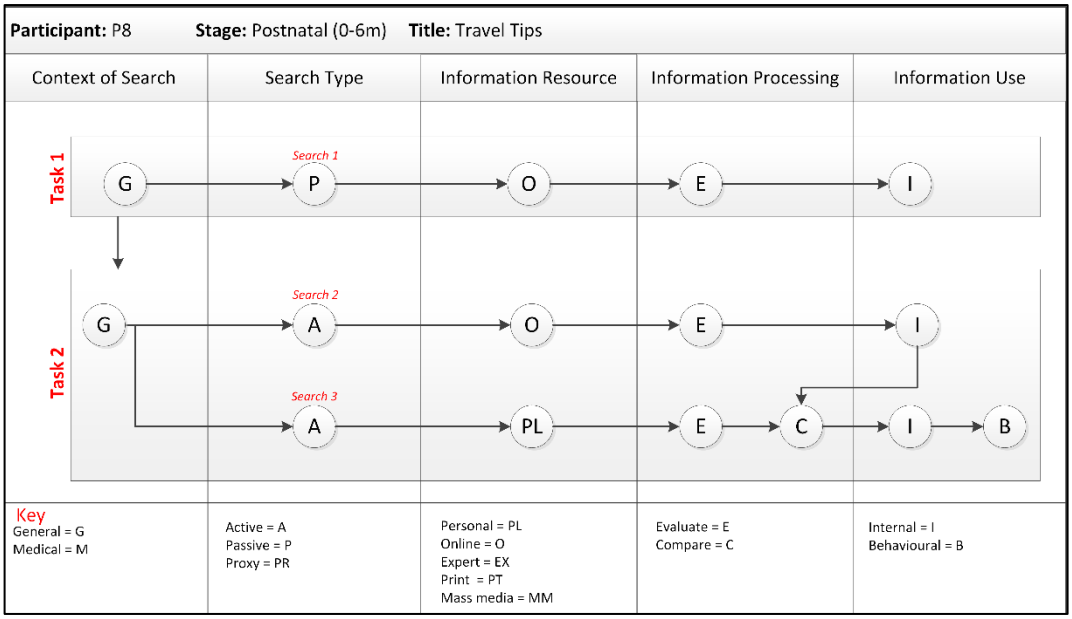


Figure 4-13 P8 - Travel Tips IBAT

The first task in Figure 4-13 had a broad goal, it involved seeking relevant information relating to either childhood development and parenting strategies. These were topics that P8 often searched for information on. The first search is represented as a passive search because P8 was not looking for specific information here, she was browsing the Babycentre newsletter to see if there was anything of interest. P8 had subscribed to the newsletter at the start of her pregnancy and continued to receive the weekly emails. During her review of the newsletter, P8 did find a topic of interest which resulted in a change of task and further information-seeking.

P8 was planning to take her daughter on a trip to Greece. She had intended to research information on bringing infants on planes but had not done so up to this point. It was, therefore, serendipitous for that week's newsletter to contain a link to an article on travel tips. When she saw the synopsis and the link to the article, P8 was motivated to begin her search into travelling with an infant. This was the beginning of the second task.

The second task involved two active information searches. In the first of these, search two in Figure 4-13, P8 accessed the article on the Babycentre website that had been referenced in the Babycentre email newsletter. It had always been P8's plan to search the Babycentre website for tips on travelling with an infant. P8 had

intended to search there because she "*knew Babycentre would have [the information], it holds everything*" (P8).

The other information resource that P8 consulted, the third search in Figure 4-13 was a friend who had previously brought a three-month-old child on a long-haul flight. P8 compared the advice from her friend with the tips from the Babycentre article. Ultimately P8 decided to implement some of the advice she had gotten from her friend. She valued the real world experience her friend was able to provide.

4.1.7 Sleep Problems (Postnatal 0-6m)

The general information-seeking episode illustrated in Figure 4-14 took place in the postnatal period, between zero and six months. The episode contains one task and two searches. P8 relied solely on online resources during the episode. P8's daughter had been sleeping through the night for approximately two months prior to this information-seeking episode. However, she had now started to wake during the night. P8 had a number of theories that might explain the change in sleep pattern, including teething or a growth spurt but ultimately was not sure of the cause. This uncertainty generated both cognitive and affective information needs.

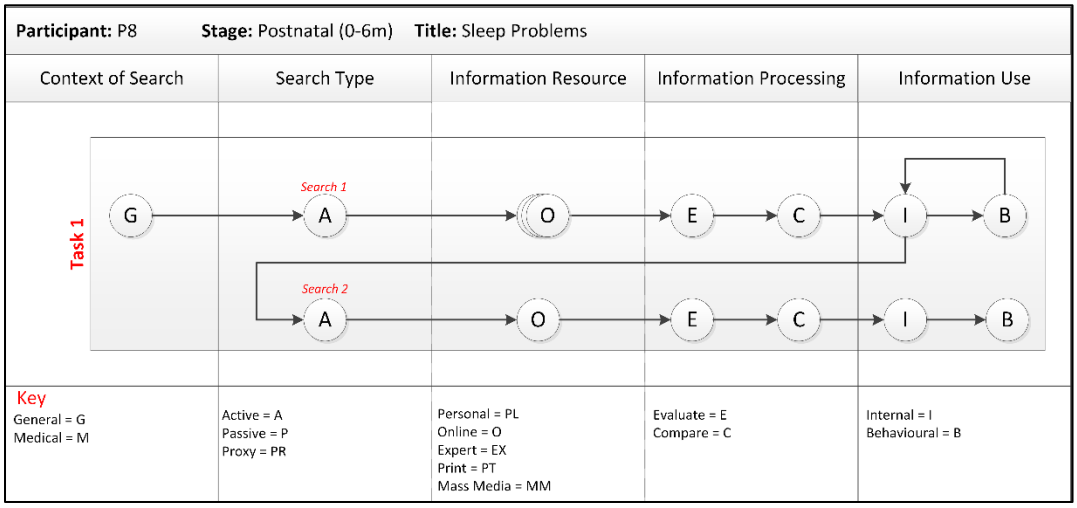


Figure 4-14 P8 - Sleep Problems IBAT

The first search in Figure 4-14 was an active search of online information resources. During this search, she evaluated and compared multiple online resources and chose one piece of advice to act upon. It suggested that if the child was feeding well, not to offer the breast or more food for comfort if the baby woke during the night as it could cause issues with feeding. This advice was relevant to P8 as it was

aimed at breastfeeding mothers. It was also advice that, in her opinion made sense. However, this change in behaviour lasted only one night as she found that in practice the advice did not sit with her *"instincts"* (P8). P8's parenting philosophy was based on instinct and observation. P8, therefore, informed her partner that she needed to search again for an alternative solution.

The second search was informed by the rejection of the first behaviour change. The first search had only offered a potential method of soothing the child and not a cause for the problem. This only satisfied part of the information need. P8 is an individual who likes to understand the why of a situation. Finding a solution to her daughter's change in sleep patterns without finding a reason for the alteration was never likely to be enough to satisfy P8.

As illustrated in Figure 4-14, the second search was brief, only involving one online resource. This may partly reflect the new focused nature of the search. P8 visited the Alpha Parent Blog. This is a resource that she valued because of the credentials of the author and the use of references and links. The blog included timelines on infant and toddler sleep cycles and here she was able to find information that explained why the child had started to wake. Knowing the cause of the change in her child's sleeping pattern and that it is often temporary, solved some of the cognitive and affective information needs for P8. P8 now knew it was nothing to be concerned about. The blog solved the remainder of P8's information needs by providing information on how to soothe the child if and when she did wake during the night. The soothing advice was more in line with P8's parenting philosophy than the previous advice had turned out to be, and so she decided to use it.

4.1.8 Weaning (Postnatal 6-12m)

The weaning information-seeking episode illustrated in Figure 4-15 is the first within the postnatal six to twelve-month category. The episode contains one task, seven searches and a mix of personal, print and online information resources. The task involved developing a weaning strategy that would allow P8 to reduce her child's dependence on breastmilk before P8 returned to work. In order to achieve this goal, P8 conducted multiple searches and employed multiple information

resources. The quantity of information-seeking within this task reflected a number of key factors. Firstly, this task was a priority for P8 because of its time-sensitive nature it needed to be completed before she returned to work. Secondly, she experienced conflicting advice which made it difficult for her to develop a strategy. Thirdly, the novelty of the task, as a first time mother this was something she was unfamiliar with.

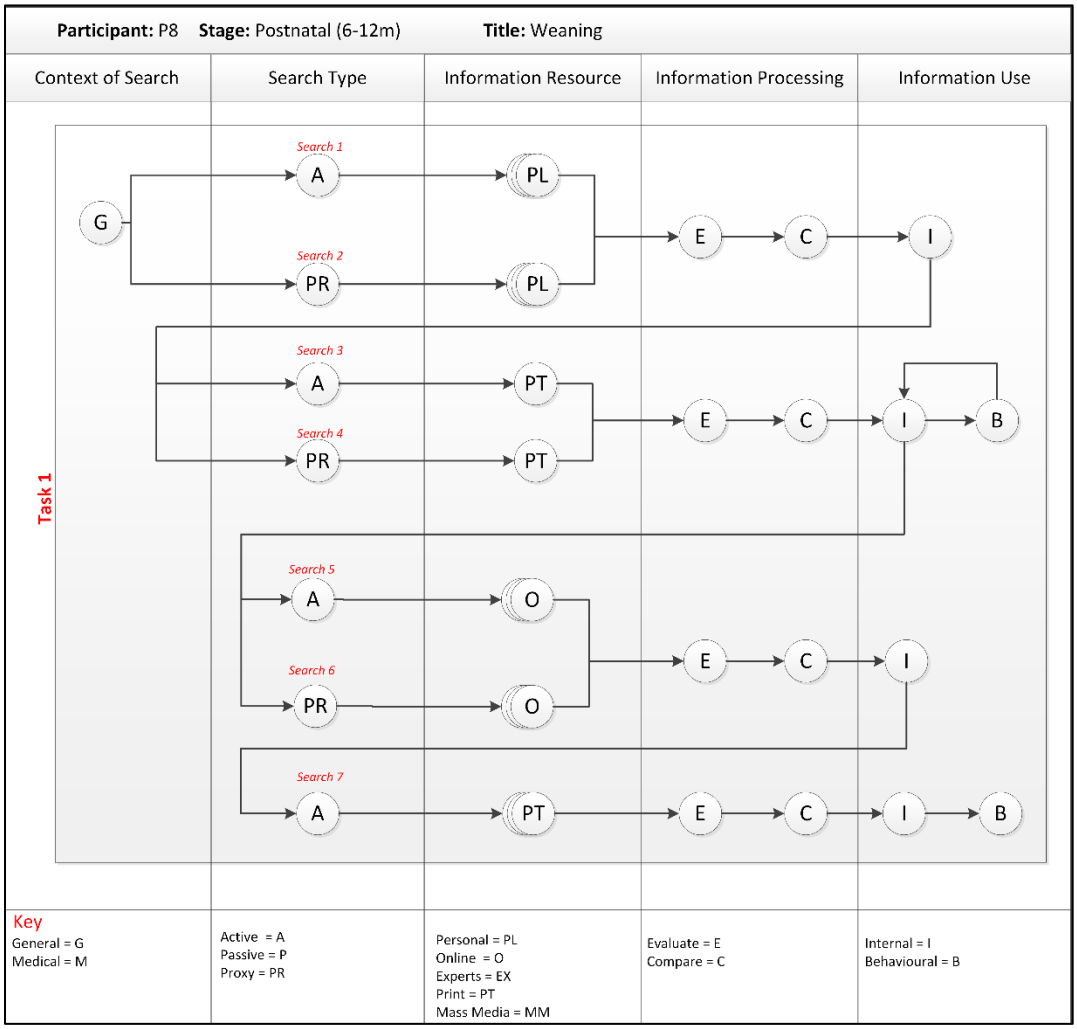


Figure 4-15 P8 - Weaning IBAT

The first four searches in Figure 4-15 involved P8 information-seeking in combination with her partner. P8's partner was particularly active within this information-seeking episode, as is evident in both Figure 4-15. The first information resources they both consulted were friends. P8 wanted to speak to "*people who had experience*" (P8). This was a characteristic that P8 appeared to value more in the postnatal period. She received a broad range of advice from her friends, some even donated books they had found helpful. One piece of advice that stood out for

her was to listen to her instincts. Many of her friends had felt confused from listening to too many different people with different perspectives when they had been first-time mothers; ultimately they had felt "*really lost*" (P8). This likely stood out for P8 because it fit with her parenting philosophy.

P8's partner wanted them to read a book on baby-led weaning that had been passed on to the couple by a friend. P8 stated that she thought she would be a fan of the method. They were going to Greece to spend time with her parents. As they would have more available time together on the trip, they decided to read the book and try out the method while they were there, searches 3 and 4 in Figure 4-15. When P8 evaluated the book she found it was badly written, she found that the authors were "*just repeating themselves*". She still tried out the method for three weeks but found that it was not practical in the time she had left before she was to return to work.

After the book, P8 moved on to searching online. She stated that she could not face another book for a while after reading the baby led weaning book. She did have some internet access problems while she was in Greece, but she searched when she could, and when she returned home her information-seeking increased. Her partner also helped with her online search for information. However, because of the conflicting information and viewpoints online P8 found herself "*a bit confused*" (P8). She stated that it took her a while to realise that some of the people, particularly in the blogs and forums were "*fanatics of what they believed*" (P8).

In the end, P8 thought back to what her friends had said about listening to her instincts. She compared what she had found to what her partner had found and decided to develop a weaning strategy that would work for them. P8 picked through the books her friends had given her, taking ideas from different volumes. P8 even incorporated some of Gina Ford's outlines into the mix. Gina Ford is somebody who P8 traditionally refers to with disdain because she disagrees with her parenting philosophy. However, in this case, P8 found that the features of the book were useful, particularly the way the book provides "*the outlines and then goes into more details*"(P8). This was how P8 continued with weaning, taking bits

and pieces from multiple sources and incorporating those that worked into her own strategy.

4.1.9 Calpol to no colour paracetamol (Postnatal 6-12m)

The two information-seeking episodes included in this section are grouped together because they occur close together chronologically and the outcome of the first information-seeking episode informs P8's actions in the second. The first medical information-seeking episode, the Calpol alternative was motivated by cognitive information needs. There was no anxiety involved during that episode. The behavioural change at the end of the episode continued to be used in the beginning of the second information-seeking episode.

The second information-seeking episode, Nurofen alternative, is also medical but includes both cognitive and affective information needs. There was anxiety in the second episode because P8's daughter was ill. This information-seeking episode was more complicated than the first, not only because of the affective information needs. There was a time sensitivity present in the Nurofen alternative that was not a factor in the first information-seeking episode.

4.1.9.1 *Calpol Alternative (Postnatal 6-12m)*

This medical information-seeking episode depicted in Figure 4-16 occurred in the second postnatal period, six to twelve months. The episode contained two tasks, two searches and a combination of online and personal information resources. The initial driver behind this information-seeking episode was P8 observing that her daughter appeared to become hyperactive whenever she was given Calpol. The goal was to discover if there was any evidence to support her observations.

P8 had come to believe that was perhaps not a good thing that her daughter became "*so happy after*" (P8) she was given Calpol. As a result, P8 consulted a number of online resources looking for information relating to Calpol and hyperactivity, see search one Figure 4-16. When P8 discovered reports of that an additive in the red dye in Calpol that could cause hyperactivity she decided to look for an alternative.

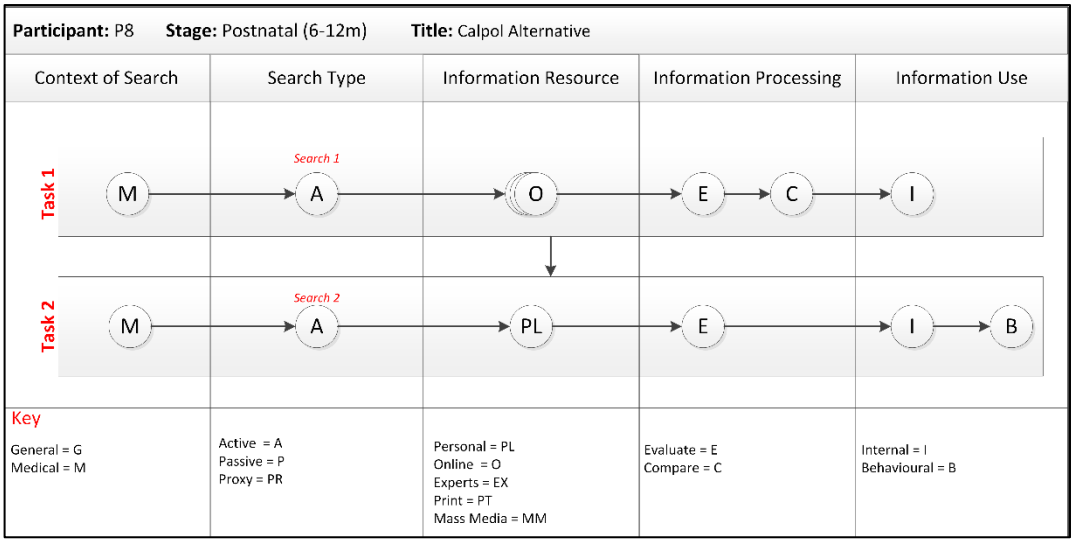


Figure 4-16 P8 - Calpol Alternative IBAT

The second task in Figure 4-16 details the search for an alternative medication to Calpol. The task was very short, only involving one information search. P8 spoke to a friend who recommended Nurofen for Children. P8 was satisfied because it was "*orange flavour, so there is no red dye, it is white*" (P8). P8 took the recommendation and decided to use it instead of the Calpol. Similar to other postnatal information-seeking episodes, this task displays the value that P8 placed on information from other parents. The smaller number of resources used here may signify a low level of concern over the task, however, it may also signify a growing confidence when making parenting decisions.

4.1.9.2 *Nurofen Alternative (Postnatal 6 – 12m)*

The Nurofen Alternative was a medical information-seeking episode that occurred shortly after the Calpol Alternative. The episode contains two tasks, three searches and a combination of online and expert information resources. P8 had just returned to work following her maternity leave when her daughter became ill. Her daughter was very healthy throughout the course of this study and this was one of the few times that she became ill. This information-seeking episode included both cognitive and affective information needs. As a result of the child's illness, there was evidence of uncertainty and anxiety. These feelings were not aided by her recent return to work.

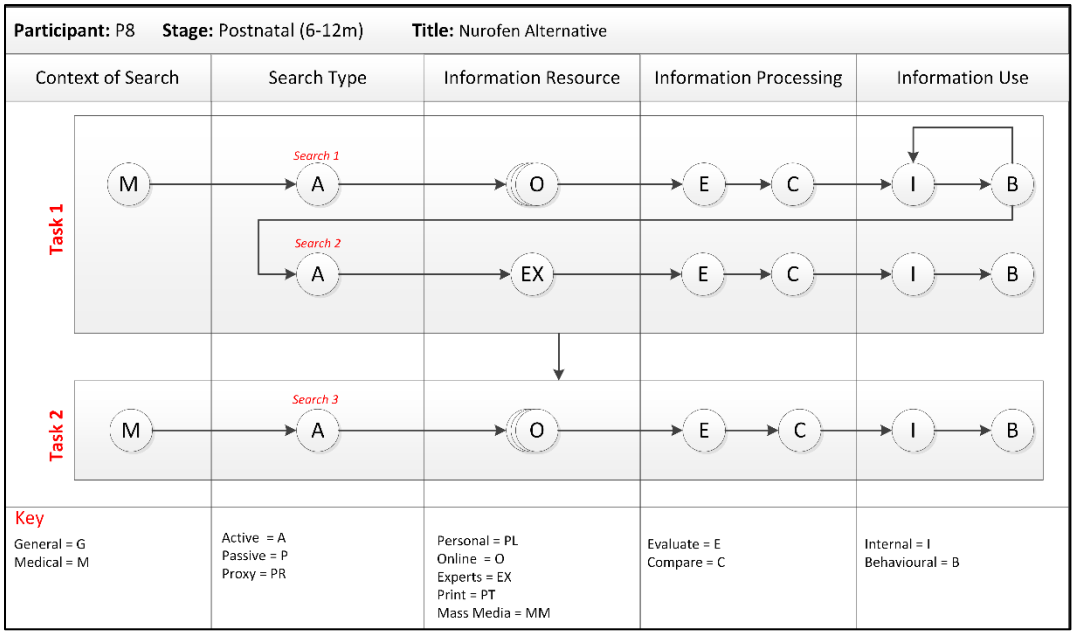


Figure 4-17 P8 - Nurofen Alternative IBAT

The first task in Figure 4-17 began with P8 worried about her daughter's temperature. P8 was uncertain about whether to bring the child to the GP or not. P8 felt the child "*was sick, but she wasn't that sick either*" (P8). P8 decided to search online to discover what constituted a "*really alarming temperature*" (P8). Based on what she found she felt reassured. P8 decided to wait and see how she progressed on her own. P8 was giving the child Nurofen for Children to help with the temperature. This decision was based on what she had found during the Calpol alternative information-seeking episode.

When the child did not get better after a couple of days, P8 decided to bring the child to the GP, see search two Figure 4-17. During the consultation, P8 quizzed the GP about what she had read about high temperatures and the possibilities of convulsions. The GP helped to reassure P8 on the matter, informing her that those types of convulsions are "*not that dangerous*" (P8). The GP prescribed P8's child "*asthma type medication to open up her chest and get rid of the phlegm*" (P8), which P8 decided to give her daughter. When the GP discovered that P8 had been giving her daughter Nurofen for Children, the GP informed P8 that links had been uncovered between it and asthma and coughing. The GP recommended a paracetamol without colouring to P8 as an alternative.

The second task in Figure 4-17 represents P8's desire to research what the GP had said about Nurofen for Children and the suggested alternative. As previously stated and illustrated in the diagram, P8 gave the child the asthma medication as soon as it was prescribed. However, before switching from the Nurofen for Children, P8 did an online search. This could be because the need to switch from Nurofen was not as urgent as the need to give the child the asthma medication. This gave P8 the room to verify the information the GP had given her. Verifying information is a common pattern for P8, especially for information-seeking episodes involving affective needs, for example, the diagnosing abdominal pain information-seeking episode. In the end, P8 was happy that the information she found online confirmed what the GP advised and she switched to the colourless paracetamol.

4.1.10 Trying to get pregnant again (Postnatal 6-12m)

This medical information-seeking episode in Figure 4-18 occurred in March 2014, just as P8's daughter was approaching her first birthday. The episode contains one task, three searches and a combination of online and expert information resources. The aim of the task was to discover if P8's continued breastfeeding could be negatively impacting her fertility. Once this idea occurred to P8 it was something that she needed to investigate. This was an emotive topic for P8. P8 had a history of fertility problems and really wanted a second child.

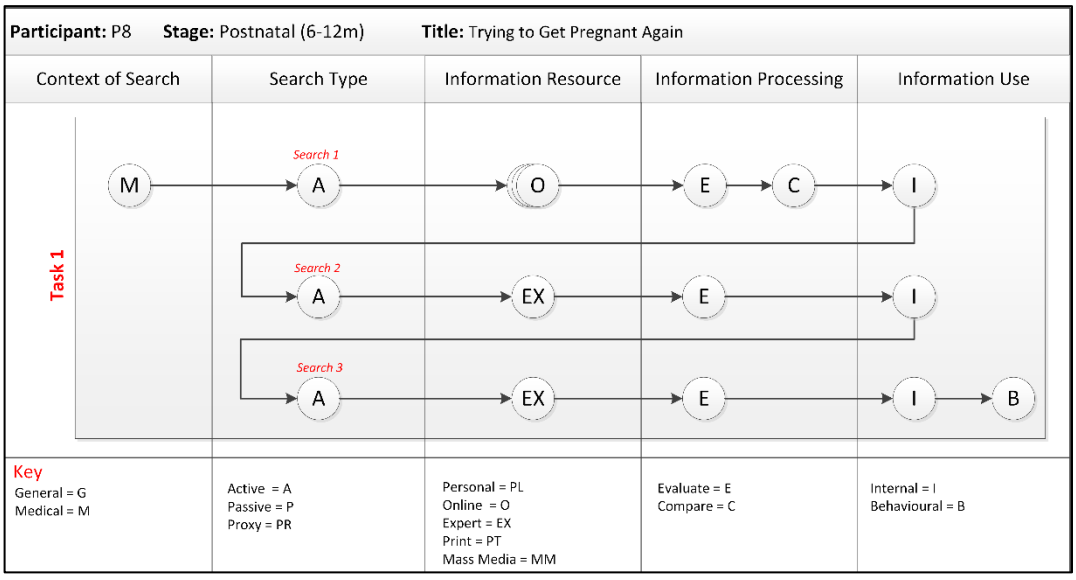


Figure 4-18 P8 - Trying to get pregnant again IBAT

The first search that P8 conducted to test her theory that her continued breastfeeding could be negatively impacting her fertility is depicted in Figure 4-18. P8 searched through a combination of eHealth sites and forums. During her search, she found a number of articles related to older mothers which warned of "*one specific hormone, prolactin that could be elevated*" (P8) during prolonged breastfeeding. As P8's online search had suggested her fears could be correct, her second search involved a visit to her GP to seek advice and to get her prolactin levels tested, see Figure 4-18.

P8's GP was happy to check her prolactin levels and also suggested doing a full health check while P8 was there. The third search in Figure 4-18 depicts P8 returning for the test results. P8's GP informed her that the results were all normal. However, the GP still advised that P8 should stop breastfeeding to increase her chances of getting pregnant. As a result of the GP's advice P8 decided to stop breastfeeding completely in order to increase her chances of getting pregnant.

Other than the Third Occurrence of Mastitis, this is the only medical information-seeking episode where P8 did not do further research after visiting an expert, whether that was a GP, midwife or hospital consultant. This could reflect the quantity of online information-seeking conducted by P8 prior to visiting the GP. It could also reflect the type of emotion/affect linked to this information-seeking episode and P8's willingness to try any suggestion. Although this information-seeking episode ends with P8 taking the GP's recommendation, the topic of fertility is something that P8 continued to search throughout the remainder of the study.

4.1.11 Saying No (Postnatal 12m+)

The general information-seeking episode illustrated in Figure 4-19 occurred in the final postnatal period after her daughter turned one. This is the only example for this period included here. P8 experienced a reduction in information-seeking following her return to work in January 2014, which she partly attributed to a reduction in free time. The information-seeking episode includes two tasks and two searches. P8 relied completely on online resources during this episode. P8 compared the information she found against experience that she had gained

through work. This episode had similarities to the travel tips information-seeking episode as they both involved the Babycentre newsletter.

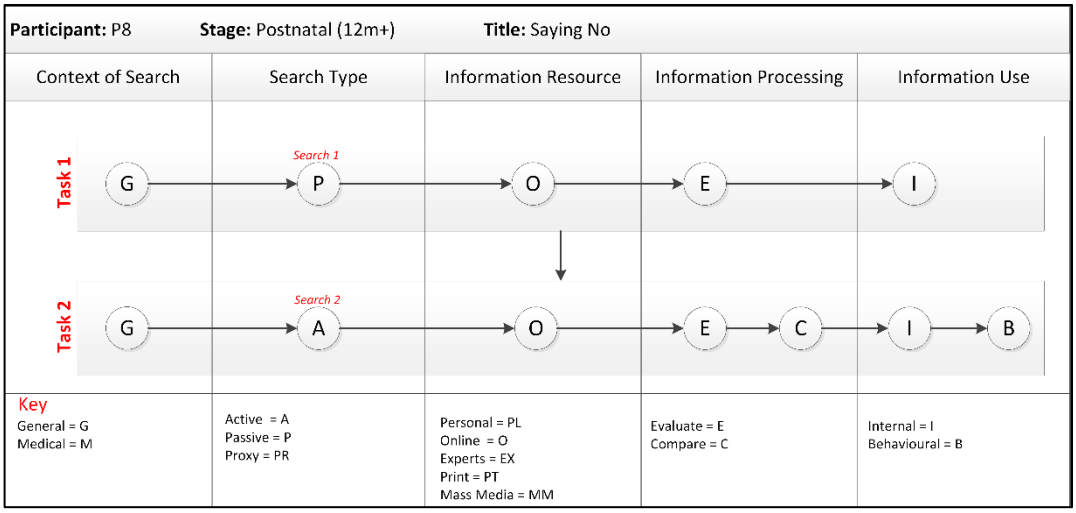


Figure 4-19 P8 - Saying No IBAT

This information-seeking episode includes two general information-seeking tasks, see Figure 4-19. The first task has the same broad goal as the first task in the Travel Tips information-seeking episode, to seek relevant information relating to childhood development and parenting strategies. The first task also involves the same information resource, the Babycentre email newsletter.

Within this newsletter, P8 found a link to an article on the topic of children starting to say no. This was a coincidence as P8's daughter had only just started to say the word the week before. This was one of the main reasons that P8 had continued to access the Babycentre newsletter since she originally signed up during her fifth week of pregnancy. P8 found that the newsletter was very relevant. Up to this point, P8's daughter appeared to reach milestones at exactly the time proposed by the newsletters.

P8 decided to read the article. P8 was interested in how best to handle the introduction of the word no and the possible behavioural impacts. This was the basis of the second task in Figure 4-19. This task was of particular interest to P8 as it was something she had some exposure to during her work as a special needs assistant.

P8 evaluated the article and felt it made some good points. Particularly when it suggested that parents should *"choose their no's" (P8),* as a method of trying to prevent children from starting to overuse the word. P8 found that she compared the article to her experience as a special needs assistant. That experience agreed with the article, as she had found *"the less you use no to the child, the less they will be inclined to use it"* (P8). As a result of her practical experience agreeing with the article, P8 opted to implement the advice.

4.2 RQ1: What Subjective Assessment Criteria Are Used During Information Processing?

The purpose of this question is to identify and discuss the subjective assessment criteria used by P8 during information processing. In Chapter Three, information processing was described as the process of evaluating and comparing information resources. Evaluation is concerned with assessing the quality of individual information resources whereas comparison is concerned with contrasting information resources against other information resources, this can also include previous experience or beliefs. The aim of this process is to find information that meets the individual's information needs.

4.2.1 Subjective Assessment Criteria (P8)

This section explores the subjective assessment criteria P8 used to judge the quality of different information resources. The subjective assessment criteria are divided into those used to appraise information resource and those used to assess the information. Summary tables are utilised to demonstrate the subjective assessment criteria discussed by P8. For each criterion, there are illustrative quotes which describe the criterion's meaning to P8. An X is used to indicate the type or types of information resources P8 was referring to in the illustrative quote. Lessons are taken from P8's perceptions of all types of information resources to identify design guidelines at the end of the section. The subjective assessment criteria for information resource are explored first, see Table 4-1.

Convenience is the first criterion in Table 4-1. Convenience was a popular criterion for P8, it was the second most commented on subjective assessment criterion for

information resources. P8 viewed online and personal resources as convenient sources of information. Online resources were convenient because they were readily available at any time. Personal resources and the Babycentre newsletter were convenient because they brought information to her, without her having to actively seek it. P8 found that interesting topics could naturally come up in conversation when she spoke to people, see Table 4-1. The newsletter was emailed weekly until the child was a year old. The weekly frequency suited P8 until she returned to work because she then had less time. It would have suited P8's needs if the newsletter had changed to monthly earlier.

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Convenience			X			*"Yeah, [the newsletter] comes and I always look at it. I find it actually very convenient."*
			X			*"Since I went back to work which was before she turned one, I wasn't always reading the weekly newsletters….. because again, lack of time."*
			X			*"For the health stuff, I would look a lot at the internet because it's easier. It's just accessible anytime."*
	X					*"I suppose I would talk to people more about general information because it comes up in conversation as well."*
Credibility			X			*"I highly recommend it for parents; it's called the Alpha Parent. It's written by a woman, a mother who has a lot of qualifications in childcare as well."*
	X					*"I spoke to friends first, people who had experience."*
	X					*"I would listen to my sister if she told me something. But that's the thing; I would listen to my sister because I trust my sister."*
			X	X		*"Obviously, I prefer if I recognise who wrote it, I would even Google the name of the author though I don't tend to do that with websites that much. It's mostly with books that I would Google the authors."*
			X			*"People write anything in forums you can't really trust them."*
Format			X			*"Some websites look like really bad websites. Now having said that there might be good articles in sites like that, but overall I think aesthetically when a site is full of ads or flashing ads or things like that it can be a bit dodgy."*

Table 4-1 P8 Information Resource Subjective Assessment Criteria

Credibility was the subjective assessment criterion for information resources that P8 discussed most often. P8 determined the credibility of print resources based on the expertise of the author, see Table 4-1. Although P8 stated that she did not regularly research the expertise of the producers of online content, P8 did find the Alpha Parent blog more credible because it listed the author's qualifications and

personal experience as a mother. P8 spent much of the study wary of the information provided on online discussion forums; part of the reason for this was the fact that she could not authenticate who produced the information.

Trust is an important factor within credibility judgements. From Table 4-1 it is evident that P8 trusted the advice of her sister. This was also the case with her partner, whom P8 relied on to search for information for her, to act as a proxy searcher. For P8, personal experience in a particular area was something that gave the resource credibility. However, P8 often liked to access both personal experience and fact-based medical resources together, that way she could verify the information from two different angles. For example, during the antenatal period, P8 accessed personal resources along with online medical studies to verify information on co-sleeping she had found in a book. The personal resources gave her insight into the experiences of parents, whereas the medical information explained information on stress hormones.

The final criterion in Table 4-1 is **format.** Although not discussed as often as the other criteria in Table 4-1, it is an issue that P8 referred to when considering whether she would access an information resource again. It was also an issue that she discussed in relation to information processing and information use outcomes.

Effective use of multimedia such as images and video-aided P8 to process information. For example, P8 compared different images of tumours to help her conceptualise her own. P8 was waiting on the results of a scan to discover if her tumour had shrunk. P8 found looking online at the size of different tumours reassuring because there was "*no way in hell [she] could have one of these inside [her]"* (P8). P8 also recounted how she selected a book solely based on the format of the book. This book on infant weaning was a publication that P8 would have typically overlooked, due to a conflict in parenting approach, however, she found the outlines and the chapter summaries appealing. Subsequently, she incorporated this publication into her weaning strategy

Table 4-2 illustrates the subjective assessment criteria that P8 used to assess the information provided by information resources. The first of these is **complete**. P8

preferred to have a **complete** picture, to have all the information, including the worst case scenario. P8 found that it made it easier to make a decision. During the postnatal period, P8 had to decide between the conflicting advice from her GP and a lactation consultant. In the end, P8 choose a hybrid of the two solutions. This resulted in medical complications. Several months later, P8 found a medical article online which explained the lactation consultant's advice in further detail, including the biological processes involved. P8 felt frustrated because she would have paid greater attention to the lactation consultant's advice if it had been explained to her in those terms.

Criteria	Information Resource					Illustrative Quote
	PL	**EX**	**O**	**PT**	**MM**	
Complete		*X*	*X*	*X*		*"I believe in covering the worst case scenario as thoroughly as you can when you give information"*
				X		*"But they were not actually telling you what to do, and you didn't realise this until you had read the book until the very end."*
Use of Language		*X*				*"They communicated all this information very clearly. I found them in the labour ward amazing."*
			X			*"Well for me it depends on how it is written, and what they say because people tend to exaggerate sometimes."*
			X	*X*		*"The language is definitely important, I mean how well written something is."*
Freedom from Bias		*X*				*"We found them not massively but definitely a bit biased towards about medical interventions during the antenatal class….. It's not that they are telling you go and have them, but they keep repeating how they are now available"*
References			*X*			*"The Alpha Parent Blog has a lot of links to articles because [the author] is doing the research in a scientific way."*
			X			*"I suppose a good site for me is a site that has links to the references where they get their own information from. So, you can then deepen the research more and more yourself."*
Relevance			*X*			*"There was nothing about Ireland obviously and what happens here."*
			X			*"They are very relevant because [my child] seems to be like a textbook baby in terms of the age that she seems to be doing things."*
Reliability			*X*			*"In the first page usually of results you get the basic sites that would maybe be a bit more reliable."*
			X			*'I suppose usually the place I always start and I still do, is Babycentre. I think it is an amazing site, a very reliable site and a general site. I just Google the search words plus Babycentre UK.'*

Table 4-2 P8 Information Subjective Assessment Criteria

P8 discussed the **use of language** and its importance for communication for expert, online and print resources, Table 4-2. It was important to P8 that information was easy to understand. The quality of the writing influenced P8's judgement of the quality and credibility of the message. Although there were some complications during P8's delivery, she found that the medical professionals ensured that they clearly communicated everything that was happening. This helped to reassure P8.

The next criterion in Table 4-2 is **freedom from bias**. P8 was sometimes conscious of the perspective of those presenting/creating the information and how that might influence the information that she received. The quote in Table 4-2 refers to her experience at the antenatal class. As somebody who wanted to have a homebirth, P8 felt that the hospital antenatal class was more geared towards hospital-based labour and potential interventions. P8 also discussed the different perspectives she encountered in the parenting forums. She found that people could be very intense about their perspectives which could lead to some aggressiveness when people disagreed.

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References were an important criterion for P8, likely influenced by her educational background. The importance and usefulness of references was something P8 discussed on a number of occasions during the study. P8 considered references in a website to be a sign of quality information that was produced from scientific research, see Table 4-2. P8 also stated that her ideal online resource would include references that would allow her to continue to further her own research.

There are two types difference types of **relevance** include in Table 4-2, relevance to the task and relevance to the location. Relevance to the task refers to evaluating information against the task that prompted the search. The task can evolve as the search continues and new information is found. This type of relevance relates to finding information specific to your country or local area i.e. localised information.

The final criterion in Table 4-2 is **reliability**. P8 was not specific about how she determined reliability; however, P8 did state that reliable online resources were often if not always found on the first page of the Google search results. As P8 became more familiar with the information resources available for expectant and new mother, she became more confident in her ability to evaluate online resource reliability. She stated that 'they are quite standard at this age, and I have found the ones that are okay, you definitely feel okay, that's quite reliable.'

4.2.2 Design Guidelines

This section discusses the design guidelines that were identified based on P8's subjective assessment criteria discussed above. As with the subjective assessment criteria themselves, the design guidelines have been separated into guidelines focused on eHealth information resources and guidelines focused on eHealth information.

Table 4-3 contains the design guidelines for eHealth resources that were identified for P8. Each guideline attempts to highlight a feature of an eHealth resource that P8 valued or to address an issue that P8 identified. Convenience was a popular criterion for P8, it was discussed in relation to online and personal resources. During the interviews P8 discussed the value of information resources being available whenever she required. In the antenatal period, work colleagues became information resources simply because they were available and convenient. To increase the convenience of eHealth resources it is suggested that they should be designed to be accessible on a broad range of devices, see Table 4-3. This would make the resource convenient to access to a greater range of situations.

The other design guideline identified under convenience, suggests that users should be able to change the frequency of push content. This guideline emerged based on

P8's discussion of the Babycentre email newsletter. Although P8 remained loyal to the newsletter throughout the study, there were times when the frequency of delivery was too much and she stopped reading for a time. If she had been able to adjust the frequency to a more condensed digest, particularly after she returned to work, the information resource would likely have better served her needs.

Criteria	Design Guideline
Convenience	The site should be accessible on a wide range of devices.
	Allow users to change the frequency of push content.
Credibility	Clearly display the credentials of contributors to the site.
	List experience (professional and/or personal).
Format	Consider the size, number, and placement of multimedia.
	The appropriate use of multimedia can be used to enhance a user's understanding of a topic.
	Use outlines and summaries to provide an overview of topics.

Table 4-3 Design Guidelines - eHealth Information Resources (P8)

Credibility was the information resource criterion that P8 discussed most often. P8 discussed it in relation to print, online, expert and personal information resources. P8 referenced the importance of both personal and professional expertise. As a result, it is proposed that an eHealth resource should clearly display the credentials of contributors to the site. It is also proposed that authors should list experience along with qualifications, and that should include both any relevant experience professional and personal.

The set of guidelines in Table 4-3 are associated with the format criterion. P8 has discussed that a bad aesthetic would turn her away from a website before she had read an article because she would distrust the information inside. P8 also referenced times were videos and images were more useful than text at helping her to understand an issue. These points are reflected in Table 4-3 where the researcher proposes that eHealth resources should use multimedia to enhance user understanding of topics, were relevant. However, designers should consider the size, number and placement of the media so as not to overwhelm the site or the user. The last guideline under format is the suggestion to use outlines and summaries. These provide an overview of the topic allowing the user to more effectively skim an article to the area of interest.

Table 4-4 contains the design guidelines for eHealth information that were identified for P8. The first criterion in Table 4-4 is complete. P8 is detailed orientated this was particularly important to her. Two design guidelines were proposed for this criterion, the first is that topics should be covered in as much detail as possible. The second suggests that articles could include a mix of both personal and expert opinions/examples. The second guideline emerged because P8 has combined both personal stories and fact-based information from eHealth resources during several information-seeking episodes. If the eHealth resource combined them in one article or resource then it would be a more complete information resource.

Criteria	Design Guideline
Complete	Topics should be covered in as much detail as possible.
	Include a mix of personal stories and expert opinions.
Use of Language	Provide clear, concise information.
Freedom from Bias	Clearly, state the perspective from which articles are written
	Avoid negative comments against those who do not share the perspective
References	Clearly display references for sources.
	Provide references for users who wish to do additional research on a topic.
Relevance	Localise information for different regions.
Reliability	Optimise website design to improve search engine rankings.

Table 4-4 Design Guidelines - eHealth Information Content (P8)

The second criterion in Table 4-4 is the use of language. For P8 the language used in an article not only influenced her ability to understand the points raised within it, but it also influenced how much she trusted the information it contained. As a result, it proposed that an article should provide information in a clear and concise manner.

The third criterion in Table 4-4 is freedom from bias. P8 did not immediately reject information that was written from a particular perspective, particularly if the information and information resource met all other criteria. However, P8 preferred if the perspective was clearly stated. This can be seen with the Alpha parent blog, which P8 only stopped using because of the negative comments the author and her followers started posting on social media against people who did not agree with her philosophy. Two guidelines were identified for this criterion which reflects P8's behaviour. Firstly, it is advised that if any article is written from a particular perspective or philosophy it should be clearly stated. Secondly, it is suggested that

the author should avoid negative comments related to any individuals or groups who do not share the same perspective.

References were a method that P8 used to verify the quality of information provided by an information resource and as a means to further her own information-seeking. As such, it is suggested in Table 4-4 that eHealth articles should include a list of references for where they sourced their information. It may also be useful to include a list of references related to the topic to facilitate any users who wish to know more.

The last two criteria in Table 4-4 are relevance and reliability. For relevance, it is suggested that eHealth information should be tailored to local regions where possible. This is because it is something that P8 looked for but found difficult to find at times. Under reliability, it is suggested that eHealth resources be designed to feature near the top of search results. This is because P8 used this as a determination of reliability.

4.3 RQ2: What are the Information Use Outcomes?

The purpose of this question is to identify and discuss the information use outcomes for P8. There are two stages of information use outcomes, internal and behavioural. Internal use outcomes involve changes to an individual's cognitions or affective state as a result of information-seeking. Behavioural use outcomes refer to changes in behaviour as a result of information-seeking. It is the assumption of our operational definition that information use begins at the point of cognitive use. This may involve a new opinion/belief or it could involve a confirmation or change to an existing opinion/belief.

4.3.1 Information Use Outcomes for P8

Figure 4-20 is the Information Use Pattern Outcome Diagram (IUOPD) for P8. The IUOPD provides an illustrative analysis of all the information use outcomes of the information-seeking episodes discussed in the first part of this chapter. Each of the different paths represented in the IUOPD are discussed in detail below the diagram. However, from a first review of Figure 4-20 it is evident that the most common information use outcomes for P8 as described in the information-seeking examples

are (1) a cognitive change which results in further information-seeking, (2) a cognitive change while results in positive affect, and (3) a cognitive change which results in behavioural use.

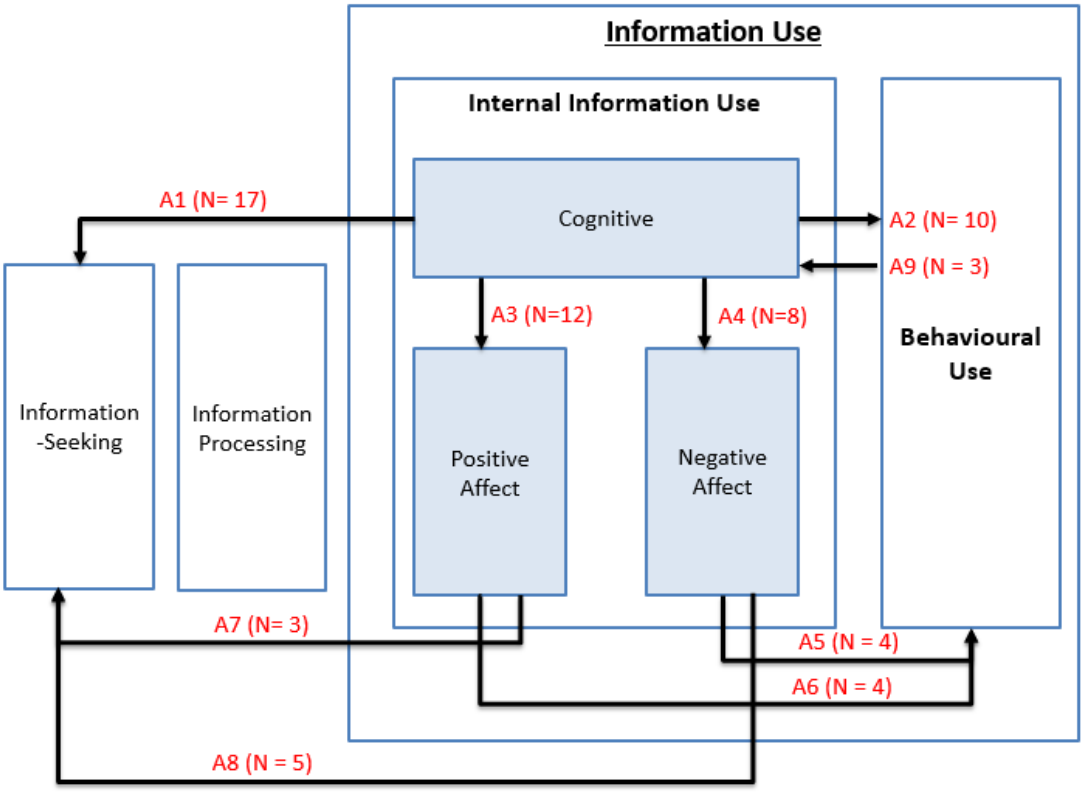


Figure 4-20 Information Use Outcome Pattern Diagram (P8)

Table 4-5 contains information use outcomes for P8 that did not include affective use. The first two outcomes in Table 4-5 start with cognitive use and progress from there. The third outcome was seen less often, it starts with behavioural use and results in cognitive use. Cognitive use is defined in this study as times where information results in the creation, confirmation or change in an opinion or belief.

Based on the analysis of the example information-seeking episodes, cognitive use resulting in information-seeking was the most common information use outcome for P8, see Table 4-5. Opinions or beliefs can be directly related to the task itself, or an information resource. For P8, recommendations and referrals she received from other sources influenced which information resources she accessed. The referrals alerted her to other potentially relevant information resources. For example, during the nesting information-seeking episode P8 decided to read 'The Continuum Concept' based on the recommendation of a trusted friend. P8 also decided to read

an article on children starting to say no because a synopsis was included in the Babycentre email newsletter.

Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking	Diagnosing Abdominal Pain	1	1
		Diagnosing Abdominal Pain	2	3
		Labour Fears	1	1
		Nesting	1	2
		Nesting	1	3
		Mastitis (First Occurrence)	1	2
		Mastitis (Third Occurrence)	1	1
		Hyperlactation	1	1
		Travel Tips	1	1
		Sleep problems	1	1
		Weaning	1	1&2
		Weaning	1	3&4
		Calpol Alternative	1	1
		Nurofen Alternative	1	1
		Trying to get pregnant again	1	1
		Trying to get pregnant again	1	2
		Saying No	1	1
A2	Cognitive use resulting in behavioural use	Mastitis (First Occurrence)	1	2
		Mastitis (Third Occurrence)	1	1
		Travel Tips	2	3
		Sleep problems	1	1
		Weaning	1	3&4
		Weaning	1	7
		Calpol Alternative	1	2
		Nurofen Alternative	1	3
		Trying to get pregnant again	1	3
		Saying No	1	2
A9	Behavioural use resulting in cognitive use	Sleep problems	1	1
		Weaning	1	3&4
		Nurofen Alternative	1	1

Table 4-5 P8's Information Use Outcomes - A1, A2 & A9

Cognitive use did not always mean that all questions were answered, ambiguity could still result in further information-seeking. In the diagnosing abdominal pain information-seeking episode, P8 searched for additional information online after her GP informed her that her pain was likely gallstones. P8 exhibited the same behaviour after search three when the hospital doctor informed P8 that he believed that her GP was likely correct. Although it may appear surprising that P8 continued to search for information after the hospital doctor seemed to confirm her GP's diagnosis, P8 was still left with uncertainty. P8 was pretty confident of the diagnosis at this point, however, she could not be sure until the test results came back. The

main cognitive gap at this point was potential treatment options. P8 was unsure if there was anything that could be done to relieve her pain until after she gave birth.

The third most common information use outcome for P8 was cognitive use resulting in behavioural use, see Table 4-5. Behavioural use was observed for P8 during both medical and general tasks. Behaviour use for medical tasks primarily involved medication, either for P8 or her daughter. In order to make these decisions, P8 utilised information resources she judged as credible. Primarily the decisions were based on the advice of a medical expert. One exception to this was the Calpol alternative information-seeking episode. P8 made her decision based on the recommendation of a friend, another parent.

For P8, behavioural use for general tasks involved parenting strategies and diet changes. P8 based behavioural use decisions for general tasks on a wider variety of information resources. For example, in the travel tips information-seeking episode, P8's decision was based on a personal information resource. While during the weaning information-seeking episode P8 combined a number of information resources, including online and print resources to develop a weaning strategy. The reason P8 combined information resources during the weaning information-seeking episode is because she was unable to find one information resource that supplied all the information she required.

The final type of information use outcome in Table 4-5 is behavioural use resulting in cognitive use. These are instances where P8 made a behaviour change and learned something. In all three of the examples in Table 4-5, P8 learned that the behaviour change did not suit her for one reason or another and decided to search for further information.

Table 4-6 contains information use outcomes for P8 that include positive affect. The first outcome in Table 4-6, is the second most common outcome for P8 and involves cognitive use resulting in positive affect. The other two outcomes in Table 4-6, start with positive affect and progress from there, either to information-seeking or behavioural use.

Code	Description	Episode	Task Num	Search Num
A3	Cognitive use resulting in positive affect	Diagnosing Abdominal Pain	3	6&7
		Liver Haemangioma	1	1
		Liver Haemangioma	1	3
		Labour Fears	2	2
		Labour Fears	2	3
		Hyperlactation	1	2
		Sex after Childbirth	1	1
		Sex after Childbirth	2	2 & 3
		Sex after Childbirth	2	4
		Sleep problems	1	2
		Nurofen Alternative	1	1
		Nurofen Alternative	1	2
A6	Positive affect resulting in behavioural use	Hyperlactation	1	2
		Sleep problems	1	2
		Nurofen Alternative	1	1
		Nurofen Alternative	1	2
A7	Positive affect resulting in information-seeking	Labour Fears	2	2
		Sex after Childbirth	1	1
		Nurofen Alternative	1	2

Table 4-6 P8's Information Use Outcomes – A3, A6 & A7

P8 was an individual who valued detailed explanation. In both the diagnosing abdominal pain and liver haemangioma information-seeking episodes, online information resources were able to offer P8 reassurance where her GP had failed. The reason for this is because they confirmed his assurance in a more detailed manner. The use of images during the liver haemangioma information-seeking episode also allowed P8 to picture the tumour in a way that words could not, which P8 found particularly reassuring. P8's preference for detail can also be seen in the hyperlactation information-seeking episode. In this episode, P8 was relieved to finally have found an information resource that explained the process that had resulted in her issue and to have a solution.

The Alpha Parent was a blog that P8 accessed during postnatal period. She valued it because of the author provided her credentials and she backed-up her information by providing references. The blog featured in the sleep problems information-seeking episode. The information provided on the site made P8 happy for two reasons, firstly, it reassured P8 that the child's sleep problems were temporary, and secondly, the advice on the site was exactly what P8 wanted to do anyway.

In the postnatal period, P8 began to see the value of forums. Although P8 would not rely on them as her only source of information during an information-seeking

episode, she did find it comforting to know that she was not the only person experiencing a particular problem. This was demonstrated in the sex after childbirth information-seeking episode.

Positive affect can be the outcome in and of itself or it can lead to further outcomes. For P8, positive affect has resulted in further information-seeking and behavioural use. Positive affect resulted in behavioural use when the advice gave P8 confidence in her existing opinion or parenting philosophy, for example the sleep problems information-seeking episode.

Positive affect also gave rise to behavioural use when the information resource was able to reassure P8. During search two of the Nurofen alternative, the GP was able to assuage P8's worries concerning the risk of convulsions for high temperatures. Once he succeeded with that, P8 put her daughter on the asthma type medication he prescribed. However, as illustrated Table 4-6, P8 also conducted information-seeking as a result of the same interaction. During the same visit, P8's GP warned her about Nurofen for Children causing coughs in some children and offered an alternative. Instead of immediately changing, P8 went online and looked for other information resources to confirm what he said. The difference between the actions could be attributed to the time sensitivity of the first task. It could also be linked to the fact that a trust friend had recommended Nurofen for Children to begin with.

There are two other examples of positive affect leading to information-seeking, see Table 4-6. In the sex after childbirth information-seeking episode, when P8 discovered that other women were experiencing the same feelings as her, she began to feel normal. However, it also made her want to understand the biological reason behind her feelings, which sparked her information-seeking. Another example of positive affect leading to information-seeking is the labour fears information-seeking episode. The print resource reduced P8's feelings of anxiety about the labour process which encouraged her to read more books to further prepare.

Table 4-7 contains information use outcomes for P8 that include negative affect. The first outcome in Table 4-7, involves cognitive use resulting in negative affect.

The other two information use outcomes start with negative affect and progress from there, either to information-seeking or behavioural use.

Code	Description	Episode	Task Num	Search Num
A4	Cognitive use resulting in negative affect	Diagnosing Abdominal Pain	2	5
		Liver Haemangioma	1	2
		Mastitis (Second Occurrence)	1	2
		Mastitis (Second Occurrence)	1	3&4
		Mastitis (Second Occurrence)	1	5
		Mastitis (Second Occurrence)	1	6&7
		Mastitis (Third Occurrence)	1	2
		Weaning	1	5&6
A5	Negative affective resulting in behavioural use	Diagnosing Abdominal Pain	2	5
		Mastitis (Second Occurrence)	1	2
		Mastitis (Second Occurrence)	1	6&7
		Mastitis (Third Occurrence)	1	2
A8	Negative affect resulting in information-seeking	Diagnosing Abdominal Pain	2	5
		Liver Haemangioma	1	2
		Mastitis (Second Occurrence)	1	2
		Mastitis (Second Occurrence)	1	5
		Weaning	1	5&6

Table 4-7 P8's Information Use Outcomes – A4, A5 & A8

The second and third occurrences of mastitis feature more than other information-seeking episodes in Table 4-7. The negative affect in these information-seeking episodes is caused by (1) the experts not knowing what was causing P8 to have three occurrences of mastitis in such a short period, (2) the experts not being able to guarantee that she would not get mastitis again, (3) the conflicting advice provided by the different experts on how she should proceed with breastfeeding, and (4) her inability to find relevant information online. The negative affect prompted her to search for more information in order to try and resolve her uncertainty but by the third occurrence she had almost given up on finding an answer. The behavioural use P8 decided upon during these episodes were based on frustration. At different points, P8 either decided to continue her current breastfeeding plan while waiting for further information or decided to combine the bits of conflicting advice that made sense to her because she did not have enough information to decide between the experts.

The weaning information-seeking episode followed a similar pattern to the recurring mastitis episodes. In that conflicting and incomplete information, resources lead to further information-seeking. P8 ultimately devised her own

strategy by combining multiple information resources. However, there was less environmental or task-related uncertainty with weaning information-seeking episode. This meant that P8 was ultimately satisfied with the decision that she reached, which was not the case in the recurring mastitis information-seeking episodes.

For both the diagnosing abdominal pain and liver haemangioma information-seeking episodes, the reassurance of a credible information resource was not enough to resolve uncertainty. P8 needed to search online for more information, to back-up what the GP told her. It was the online information that was able to reassure her in both instances, partly because of the level of detail provided and partly because the information confirmed what the GP had already told her.

4.3.2 Discussion

The previous section examined P8's information use outcomes based on the example information-seeking episodes. Based on the discussion it was clear that some of the subjective assessment criteria discussed in RQ1 influenced P8's information use outcomes. This section explores how this information can be applied to provide further detail to the associated design guidelines for P8 that were identified in RQ1, see Table 4-8.

In RQ1 convenience was identified as a criterion for information resources, while references were identified as a criterion for information. During the analysis for this research question, it was discussed that P8 had selected information resources based on references provided by other information resources. The Babycentre newsletter was an information resource that P8 accessed throughout the study. It was an information resource that she found convenient because it was emailed directly to her. It was also an information resource that kept her engaged with the main Babycentre website by providing her links to articles that she regularly deemed to be relevant to her information needs. As discussed above, P8 is a very detailed orientated individual. P8 has shown a preference for having all the facts before making a decision. The opinion of a credible information resource was not always sufficient for P8 to make a decision, or to feel reassured. P8 needed enough

information to feel she understood the situation. When P8 found it difficult to find one complete information resource, as was the case in the weaning information-seeking episode, P8 was willing to combine multiple information resources. However, if the goal of an eHealth information resource is to be the primary information resource for this demographic, then covering topics in sufficient detail should be the aim.

Type	Criteria	Design Guideline
EHealth Information Resources	Convenience	The site should be accessible on a wide range of devices.
		Allow users to change the frequency of push content.
	Credibility	Clearly display the credentials of contributors to the site.
		List experience (professional and/or personal).
	Format	Consider the size, number, and placement of multimedia.
		The appropriate use of multimedia can be used to enhance a user's understanding of a topic.
		Use outlines and summaries to provide an overview of topics.
EHealth Information Content	Complete	Topics should be covered in as much detail as possible.
		Include a mix of personal stories and expert opinions.
	Use of Language	Provide clear, concise information.
	Freedom from Bias	Clearly state the perspective from which articles are written
		Avoid negative comments against those who do not share the perspective
	References	Clearly display references for sources.
		Provide references for users who wish to do additional research on a topic.
	Relevance	Localise information for different regions.
	Reliability	Optimise website design to improve search engine rankings.

Table 4-8 Design Guidelines for eHealth Resources for P8

P8 was not always willing to combine incomplete information resources. During the recurring mastitis information-seeking episodes, P8 discounted online information resources as irrelevant because they only covered single occurrences of mastitis and did not go on to discuss multiple occurrences. The same series of episodes demonstrated that incomplete information can make it difficult for an individual to decide between conflicting advice, particularly when the information resources meet all other criteria.

For P8, personal stories could either be credible, comforting or both, depending on the author. P8 did not associate much credibility to stories on forums because she could not authenticate the authors. P8 found the Alpha Parent Blog to be credible because of the credentials supplied on the site. In certain information-seeking episodes, P8 combined personal stories and fact based sources to provide herself

with a complete picture of a situation. P8 found personal stories to be comforting because they were a way for her to know that she was not the only person to experience an issue. For an eHealth resource, personal stories could be used as a means to normalise a situation for a user and provide comfort for a user. This could then be combined with facts which would inform the user and which could provide potential solutions.

4.4 RQ3: What are the Primary Information Resources for Medical and General Tasks during the Antenatal and Postnatal Periods?

Research Question Three (RQ3) identifies the primary health-related information resources accessed by P8 for medical and general tasks. The longitudinal nature of the study affords the opportunity to identify P8's preferences at four different points in time (both antenatal and postnatal). Identifying P8's primary health-related information resources at different points in time allows the researcher to highlight any changes in P8's preferences. This information can be used to add context to the design guidelines produced in RQ1. Of particular interest is understanding any fluctuations in P8's preferences for eHealth resources.

4.4.1 P8's Primary Information Resources

Figure 4-21 illustrates the information resource types that P8 reported accessing during general tasks. Each information resource type was counted once for every general information-seeking episode that P8 reported accessing the resource type. The number of times that P8 accessed an information resource did not factor into the count. Figure 4-21 is split into each of the four study periods so that changes in P8's information resource preferences can be observed. For P8, online resources were the primary resource for general tasks throughout the four study periods. Print resources were the second most popular every period except the first postnatal period, where personal resources were popular.

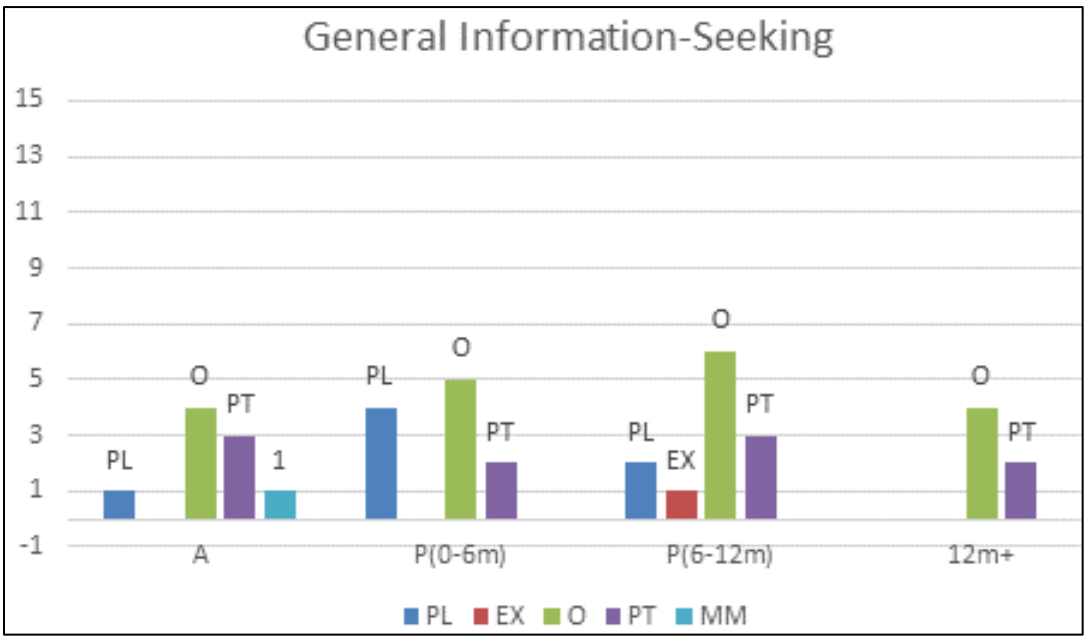


Figure 4-21 Information Resources Accessed for General Information-Seeking (P8)

Figure 4-22 illustrates the number of information-seeking episodes involving each type of information resources for medical tasks for P8. Unlike general tasks, there was not one primary information resource across all four periods. Expert information resources were the primary information resource for first the antenatal and first postnatal period while online information resources took over as the primary information resource for the final two postnatal periods. The choice of medical professionals during the first two periods could reflect a number of factors. Firstly, this period encompasses pregnancy, labour, and early motherhood, as a first-time mother this was a new and uncertain time for P8. Secondly, P8 experienced a number of stressful medical conditions across this period, including liver haemangioma and recurring mastitis, which required medical interventions. Lastly, P8 would have had access to medical professionals during this period, as P8 had originally been scheduled for a home-birth, P8 would have had more regular visits with a midwife than most of the participants in the study.

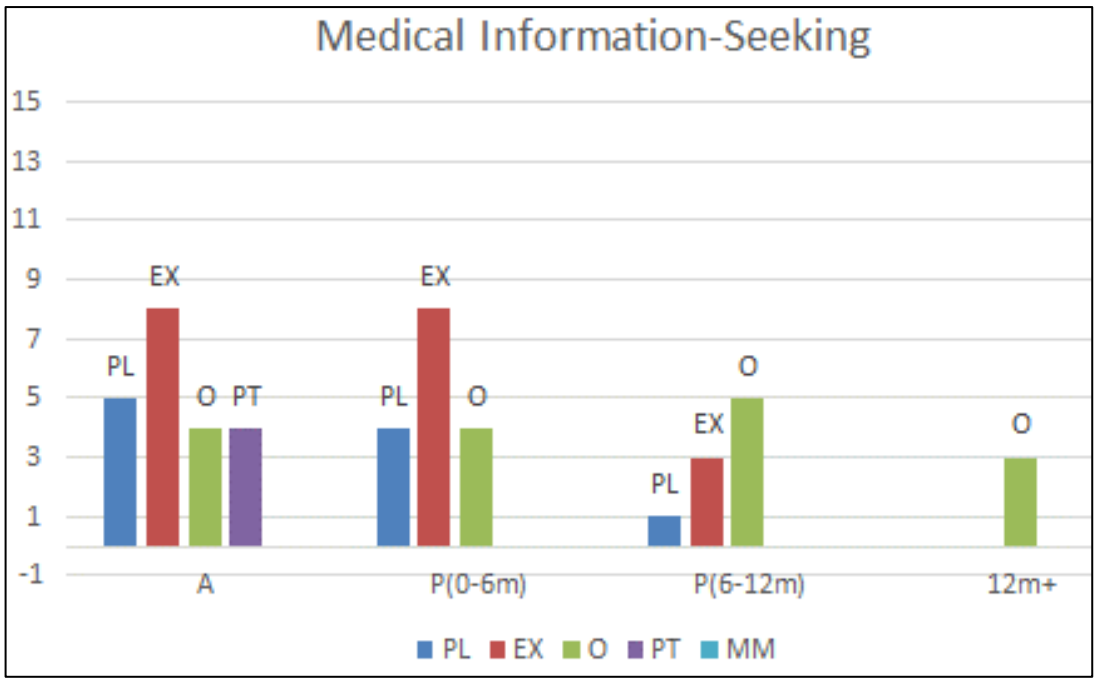


Figure 4-22 Information Resources Accessed for Medical Information-Seeking (P8)

Figure 4-23 illustrates the changes in P8's general and medical information-seeking across the four study periods. Although there is some fluctuation, P8's information-seeking declined for both general and medical tasks between the antenatal period and the final postnatal period. The slight increase that can be seen in the postnatal period (6-12m) was P8 preparing to return to work, see Figure 4-23. A pattern emerges when Figure 4-23 is compared against the previous two figures. For both general and medical tasks, the variety of information resources was greater in periods where P8 reported more information-seeking.

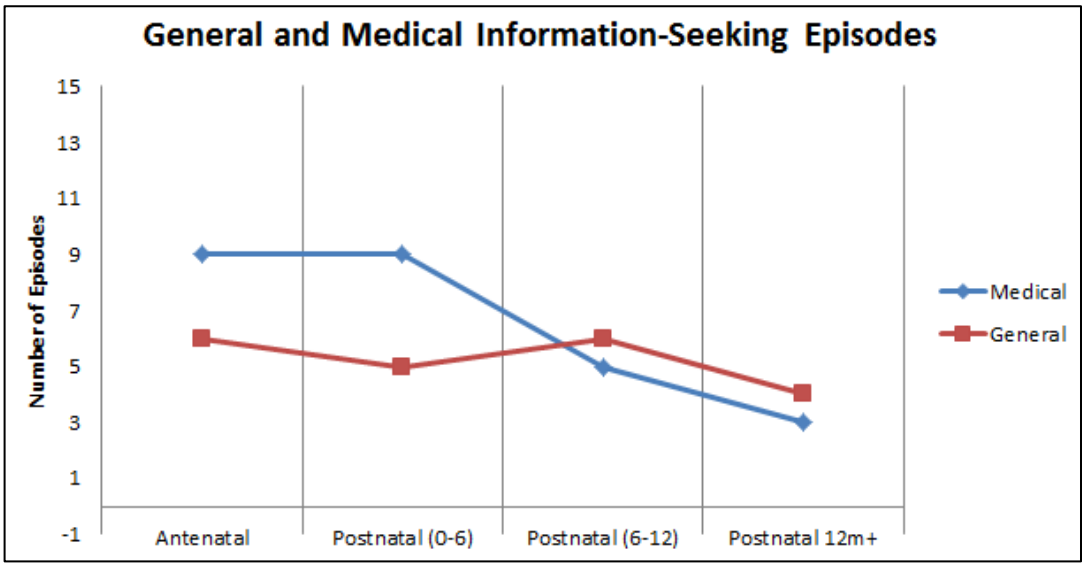


Figure 4-23 Frequency of General and Medical Information-Seeking (P8)

4.4.1.1 *Antenatal period*

As is illustrated in Figure 4-23 this period was one of the busiest for both medical and general information-seeking for P8. As a first-time mother, many of the tasks during this period were new to P8, which would have influenced her information-seeking. This was one of the periods where P8 used the highest variety of information resources for both medical and general tasks. Online information resources were the primary resource for medical tasks and experts were the primary resource for medical tasks.

During this period, P8 experienced medical tasks with high levels of uncertainty, for example, the diagnosing adnominal pain and labour fears information-seeking episodes. During these episodes, experts were always an important feature, as P8 determined them to be credible. Experts were sometimes augmented by other information resources which offered other features. Online resources could offer further detail and were available whenever she required. P8 researched the credentials of the authors of books, making print resources credible and convenient.

P8 found her midwife to be "*fantastic*" during this period. The midwife used to visit P8 at home for her consultations because P8 had originally signed up for a homebirth. Home visits likely increased the convenience of the midwife as an information resource. The midwife also used to recommend additional information resources such as books, this aided P8's own information-seeking.

P8 stated that both print and personal resources "*influenced [her] a lot*" during this time. P8 valued combined the personal experiences of the others with fact-based information she found either online or in print to provide her with a more holistic picture. An example of this behaviour can be seen in the nesting information-seeking episode. Although P8 valued personal experience during this period, she did not trust the information from forums, either for medical or general tasks. This was because she could not verify the author.

While many of the general tasks were new to P8 as a first-time mother, some of the tasks towards the end of her pregnancy started to touch on an existing area of

interest. As P8 neared the end of her pregnancy P8 began to prepare for the new baby by researching newborns, including developmental information and parenting strategies. This was information that was of particular interest to P8 because of her research masters and her current profession as a special needs assistant.

4.4.1.2 *Postnatal (0-6m) period*

The number of information-seeking episodes for this period was nearly identical to the previous. This is despite P8 reporting a drop in information-seeking at the start of this period. This was due to time restrictions with a new baby and the time it took to recover from an emergency C-section. P8's partner did take responsibility for some of the information-seeking, acting as a proxy for P8 when her time was limited or when she wanted another opinion.

The primary information resources were the same for the different task types as the previous period. Expert information resources acted as the primary resource for medical tasks and online information resources acting as the primary resource for general tasks. Personal information resources were more popular in this period for general tasks because of convenience; people were visiting the house to see her and the baby. P8 found that topics would either come up naturally or she could ask specific questions depending on her needs.

The medical tasks during this period were primarily focused on P8. P8's daughter was healthy. After leaving the hospital the two searches P8 conducted involved colic and vaccinations. P8, on the other hand, had several medical complaints during this period, from mastitis to haemorrhoids. Mastitis, which was previously discussed in detail, was particularly stressful due to the uncertainty of the recurring condition and the difficulty getting information.

4.4.1.3 *Postnatal (6-12m) period*

This period saw several changes, including (1) a change in the primary resource for medical tasks, (2) a drop in information-seeking for both task types, and (3) P8 returning to work. Online resources became the primary resource in this period for both medical and general tasks. With P8 returning to work and her time becoming more limited, this change could be attributed to the convenience of online

resources. However, another factor was also at play. P8 was becoming more confident during this period. The researcher saw evidence of P8 using online resources to confirm existing opinions rather than to search for new information. There was also an improvement in P8's health, which further facilitated this change.

A number of the general tasks during this period were focused on P8 returning to work. The largest of these was weaning which needed to be completed before P8 returned to work. During this task, P8 experienced problems with conflicting information and incomplete information resources. Another task that P8 had difficulty with while preparing to return to work was looking for childcare. P8 found it difficult to find information on local providers online.

4.4.1.4 *Postnatal (12m+) period*

P8 reported that her information-seeking was at its lowest at this stage. This was partly due to a reduction in needs and partly due to a lack of time, now that she was back at work. P8 was not browsing online like she had done earlier in the study; all her searches were task based. The primary information resources for both task types were online information resources.

4.4.2 Discussion

The aim of RQ3 was to identify the primary information resources used by P8 for medical and general tasks. The previous section examined P8's primary information resources for each of the four antenatal and postnatal periods. Reference was made to the influence of context, such as time. This section will examine this information in relation to the design guidelines identified for P8 in RQ1.

As is summarised in Table 4-9 , online resources are P8's primary resource for general tasks while expert resources are the primary resources of medical tasks. When general and medical tasks are combined together, the antenatal and postnatal (0-6m) periods were the busiest for P8 in terms of information-seeking. This was because as a new mother, P8 had a lot new information to learn during those periods. P8's health also suffered during the antenatal and first postnatal period. This resulted in a number of medical tasks.

	Medical		General	
	Number of Episodes	***Primary Resource***	***Number of Episodes***	***Primary Resource***
Antenatal	9	Expert	6	Online
Postnatal (0-6m)	9	Expert	5	Online
Postnatal (6-12m)	5	Online	6	Online
Postnatal 12m+	3	Online	4	Online

Table 4-9 P8's Primary Information Resources for Both Medical and General Tasks

Table 4-10 provides a summary of the design guidelines for eHealth resources for P8 that were identified as part of RQ1. Expert resources were the primary information resource for both the antenatal and postnatal (0-6m). In the both these periods P8 had the added advantage of a midwife whom she trusted, that called to her house for consultations. This combines two important criteria, convenience, and credibility. If eHealth resource can demonstrate that they are using high-quality contributors on their site, then they may also be able to combine these attributes.

Type	Criteria	Design Guideline
EHealth Information Resources	Convenience	The site should be accessible on a wide range of devices.
		Allow users to change the frequency of push content.
	Credibility	Clearly display the credentials of contributors to the site.
		List experience (professional and/or personal).
	Format	Consider the size, number, and placement of multimedia.
		The appropriate use of multimedia can be used to enhance a user's understanding of a topic.
		Use outlines and summaries to provide an overview of topics.
EHealth Information Content	Complete	Topics should be covered in as much detail as possible.
		Include a mix of personal stories and expert opinions.
	Use of Language	Provide clear, concise information.
	Freedom from Bias	Clearly state the perspective from which articles are written
		Avoid negative comments against those who do not share the perspective
	References	Clearly display references for sources.
		Provide references for users who wish to do additional research on a topic.
	Relevance	Localise information for different regions.
	Reliability	Optimise website design to improve search engine rankings.

Table 4-10 Design Guidelines for eHealth Resources for P8

As previously discussed, P8 did not see the value in forums until the postnatal period. However, she always valued personal experience. P8's issue with forums was not being able to check the credentials of the author like she did with print resources. The design guidelines in Table 4-10 purpose combining personal stories with expert opinions to create a complete information resource. But they also suggest listing but the personal and professional experience of contributors. It is

suggested that this would provide both a complete and credible information resource.

In the antenatal period, P8 found it difficult to find advice on Step B which was local to Ireland. While preparing to return to work P8 found it difficult to find local childcare information. Providing localised information can make an eHealth resource appear more relevant to a user.

It is clear from the discussion above that P8's information-seeking declined over the four study periods. As P8's information-seeking declined, online resources became the primary resource for both medical and general tasks. As online resources became the primary resource, and information-seeking declined, Babycentre became the primary resource. P8 went to Babycentre first because she felt that the site covered a broad range of topics. This highlights the importance of having a complete resource if a site wishes to keep a user engaged over time. Another factor in keeping P8 loyal to the Babycentre website was the email newsletter, which kept her engaged. However, at several points, P8 stopped reading the newsletter because she did not have the time. This was particularly problematic once she returned to work. If the newsletter had not automatically reduced in frequency when her daughter turned one, P8 may have lost interest. This suggests that users should be allowed to customise the frequency of push content so that it is more effective.

Chapter 5: Analysis of Participant Ten

At the start of the study, P10 was married, over thirty-five and already had two children, see Figure 5-1. P10 has a research masters and worked as primary school teacher prior to having children. Before becoming pregnant with her third child, P10 had been planning a return to teaching and had started job-sharing with another teacher, on a temporary basis. However, when P10 discovered she was pregnant, she decided to delay her return to teaching.

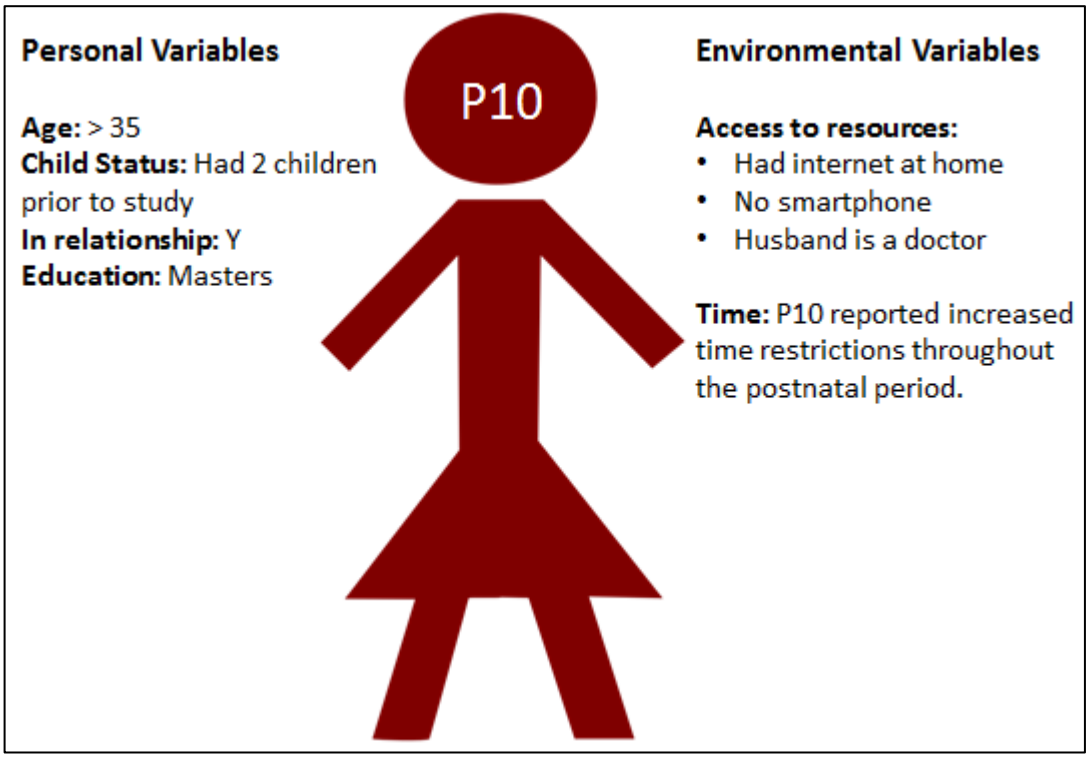


Figure 5-1 Characteristics P10

P10's husband is a doctor, during the study he acted both as an information resource and as a proxy search, researching information for P10. P10 did comment on how much she valued her husband having access to up-to-date medical information. Her husband has also influenced P10's perception of online information resources. He discouraged her from seeking information online because as a '*layperson*' (P10) she may misconstrue the information she found.

Based on discussions with P10 it was probably not too difficult to discourage P10 from searching for information online. P10 was not somebody who enjoyed browsing for information. She stated that her information-seeking needed to have

a purpose. When P10 did have a question, she found turning on the computer to inconvenient and instead preferred *"to go the usual books first, or talk to people"* (P10).

The only time that P10's age appeared to influence her information-seeking was during the antenatal period. P10 was concerned that her age might affect her pregnancy, and that created the first information-seeking episode in the following section.

Figure 5-2 illustrates P10's general and medical information-seeking. P10 conducted the majority of her general information-seeking in the antenatal period. In this period, P10 was nesting, predominately researching and purchasing products. P10's general information-seeking significantly declined in the postnatal period. For general tasks, P10 found that she was often relying on her experience, *"referring back to what [she] felt worked for the last two times"* (P10). When P10 encountered conflicting information, she would just rely on her experience. P10 attributed part of her reduction in information-seeking to time constraints and a lack of anything to look up.

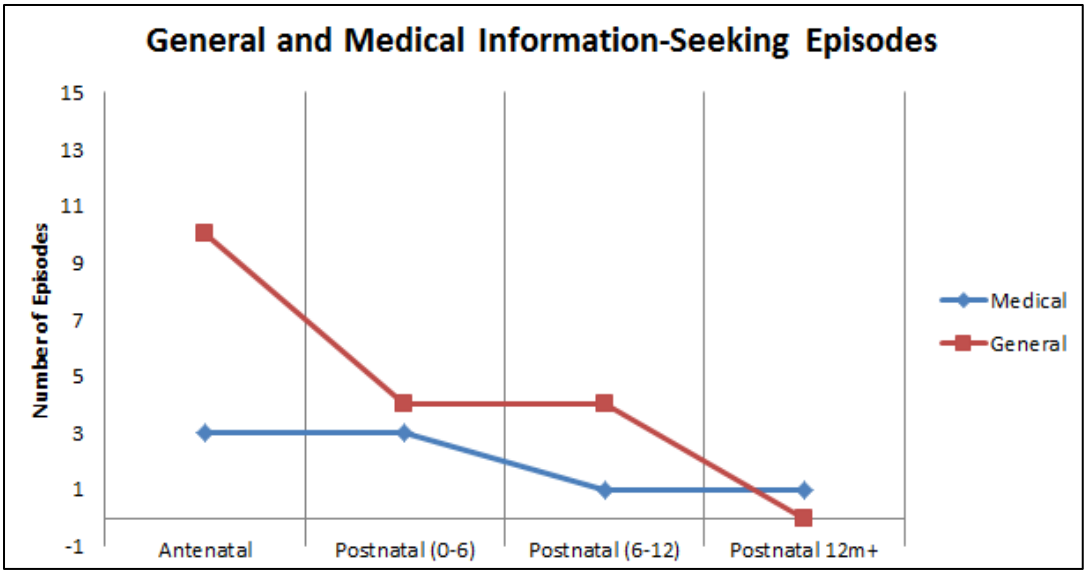


Figure 5-2 P10 - General and Medical Information-Seeking Episodes

P10's medical information-seeking started low and declined over the course of the study, see Figure 5-2. P10's newborn son did not appear to suffer any illnesses during the study. As a result, P10 did not report any medical information-seeking concerning her son; all the medical information-seeking episodes involved her. It is

possible that P10's husband may have addressed some of P10's minor medical concerns as part of everyday conversations. Those concerns would therefore never have become proper information-seeking tasks.

5.1 Information-Seeking Episodes (P10)

This section analyses information-seeking examples to provide insight into P10's information behaviour. The section includes an analysis of six medical and four general information-seeking episodes. P10 only reported eight medical information-seeking episodes over the course of the study and the six discussed here are the richest. P10 reported eighteen general information-seeking episodes, the majority of which involved research and purchasing products. The four selected here cover three different areas. The Wonder Bibs episode was selected as an example of researching products that also demonstrated the impact of website features on P10's trust. The two weaning episodes were selected because all the participants covered that topic. Finally the Au Pair episode highlights P10's distrust for online information resources.

Figure 5-3 is a timeline which illustrates all the information-seeking episodes analysed in this section. By selecting episodes from each of the four time periods, the researcher can comment on any changes observed in P10's information-behaviour over time. Any episodes connected using arrows in Figure 5-3 are directly related to each other, for example, the two weaning information-seeking episodes. As a result, those episodes are discussed under one sub-section. Otherwise, the information-seeking episodes are presented in chronological order of occurrences over time.

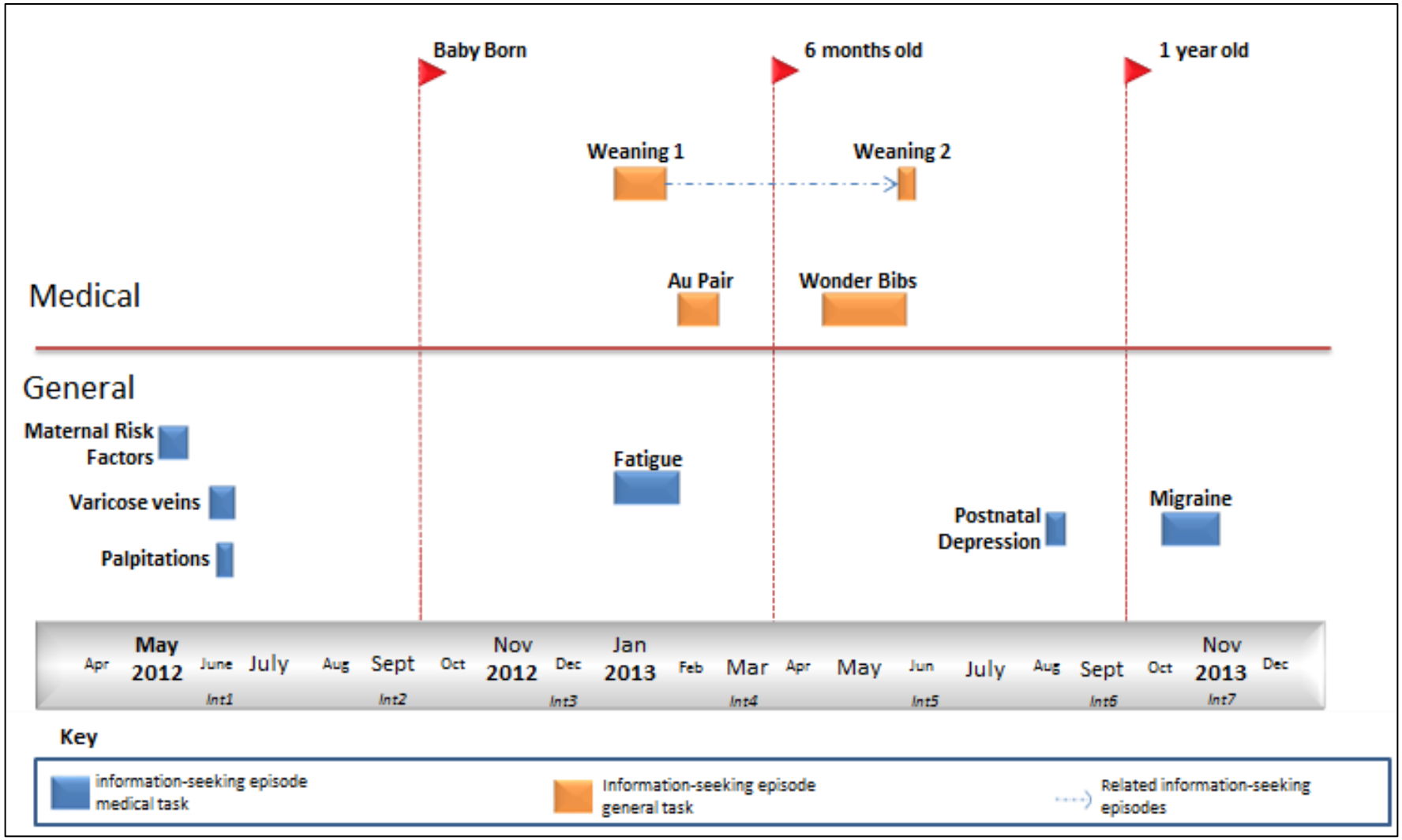


Figure 5-3 Information-Seeking Timeline P10

5.1.1 Maternal Age Risk Factors *(Antenatal)*

The medical information-seeking episode illustrated in Figure 5-4 occurred during the antenatal period. The episode contained one task, two searches and two information resources, one print and one expert. When P10 discovered she was pregnant, she was concerned her age might increase the odds of her child having a chromosomal disorder. P10 had suffered terribly with morning sickness at the start of the pregnancy, and because the pregnancy was not planned P10 had not been taking supplements. These issues combined to raise P10's concern over the health of the baby. The episode described below details P10's search for information to alleviate those concerns.

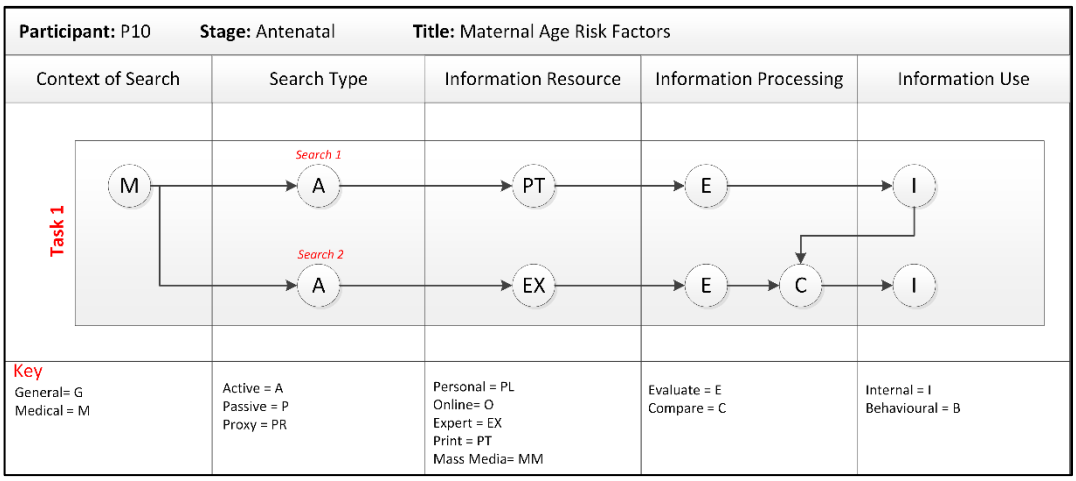


Figure 5-4 P10 - Maternal Age Risk Factors IBAT

The aim of task one was to discover the impact of her age on the odds of her child having a chromosomal disorder, see Figure 5-4. The first resource P10 consulted was a book, 'What to Expect When You Are Expecting.' P10 had purchased this book when she was pregnant on her first child, in 2002. Although she was conscious some things had changed since the book was published, P10 typically found the book to be a useful resource. However, in this example, P10 did not perceive the book to be helpful. She found the statistics they provided made things "*seem worse*" (P10). She decided to stop reading and to stop *"focusing in on the negative"* (P10).

In Figure 5-4, the second information resource P10 consulted was an expert resource, a hospital consultant. The consultant initially told P10 her odds had gone up in the six years since she had her second child. However, based on the results of

a scan the consultant informed P10 of her odds were in fact at a similar level to six years ago.

> *"When the doctor scanned, he said, "Look, it's measuring that." He said, "That brings your odds really back to one in eight hundred." That kind of gave me comfort."* (P10)

P10 decided against having more definitive but riskier tests conducted. P10 found speaking to the consultant was enough, and she did not want to research anymore. P10 felt, *"the more pregnancies you have, the less you take for granted"* (P10). She decided it was better to accept she had no control because otherwise, she would be *"nervous wreck every day"* (P10).

5.1.2 Varicose veins *(Antenatal)*

The second medical information-seeking episode of the antenatal period is depicted in Figure 5-5. Similar to the previous example, this episode contained one task and two information resources. During this episode, P10 consulted a combination of personal and expert resources. P10 developed some varicose veins on the back of her legs early on in her pregnancy. She blamed the development on her age because it was not something she had suffered during her previous pregnancies. As it occurred relatively early in her pregnancy, P10 was concerned it would become a bigger problem as the pregnancy developed.

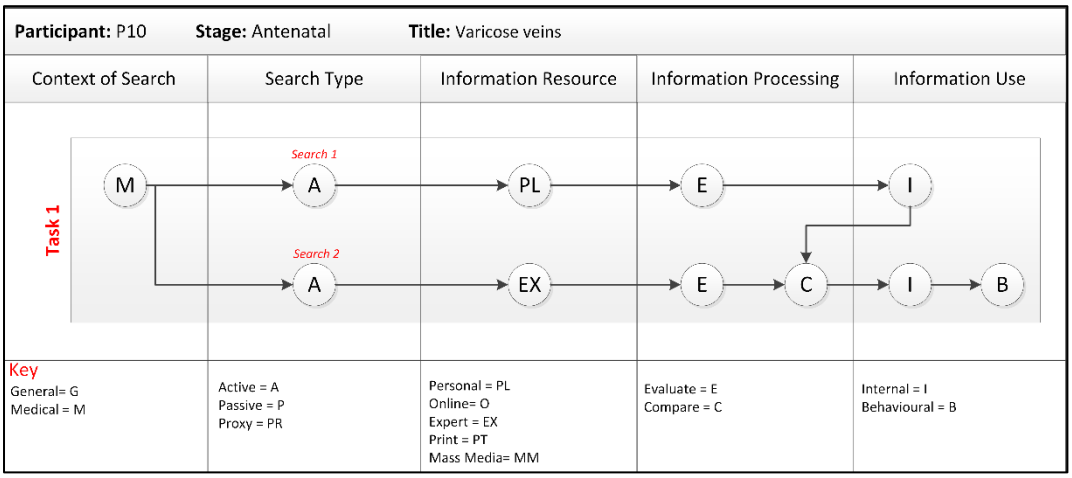


Figure 5-5 P10 - Varicose veins IBAT

The aim of task one in Figure 5-5 was to find out more information about varicose veins and any methods for preventing them. P10 first spoke to a friend of hers who had mentioned she had problems with varicose veins during a previous pregnancy.

P10 described how she "*liked to talk to people about things*" (P10). This was because personal experiences could often offer "*better insights into*" (P10) an issue. In this example, P10's friend explained how when she was pregnant, her varicose veins had gotten so bad her legs had gone black and had become very painful. This account alarmed P10.

In Figure 5-5, the second information resource P10 consulted was an expert resource, a hospital consultant. During her next check-up, P10 decided to ask the consultant about the varicose veins. The consultant was able to reassure P10. He suggested methods for preventing more varicose veins developing. The consultant also informed P10, if any varicose veins remained after the pregnancy was over, they were easy to remove with laser treatment. P10 decided to take the consultants advice and found the problem "*stabilised*" and she did not get any more varicose veins.

5.1.3 Palpitations *(Antenatal)*

The medical information-seeking episode illustrated in Figure 5-6 occurred in the antenatal period. As with the previous episodes, this episode involved one task. However, unlike the previous episodes, P10 only consulted one information resource during this episode, see Figure 5-6. The difference may be credited to P10's familiarity with the problem. P10 was used to experiencing palpitations, usually if she was run down or ill. During pregnancy, the palpitations became "*very pronounced*" and "*very disconcerting*" (P10). P10 had experienced this during her previous two pregnancies but felt there was a difference in how the palpitations were presenting this time.

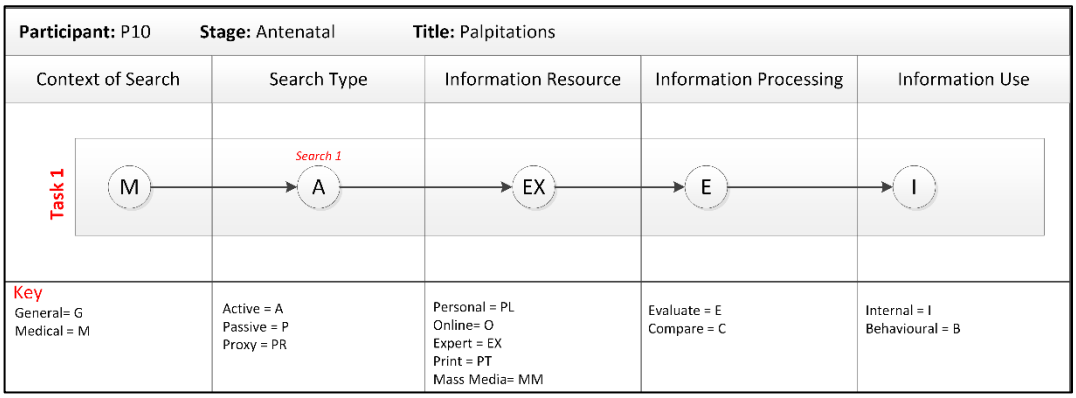


Figure 5-6 P10 – Palpitations IBAT

P10 had found the palpations she experienced during pregnancy were often her "*body warning [her] that [she] might be pushing it too far*" (P10). They might occur if she was too active or if she had not eaten. The palpitations were also the reason why she avoided tea and coffee. P10 had consulted medical professionals during her previous two pregnancies about the palpitations. P10 had also worn a Holter monitor during her last pregnancy and was informed the palpitations were nothing to worry about.

P10 was concerned during this pregnancy because she had two instances of palpitations lasting two hours. She did not remember ever having palpitations which lasted so long. One of the instances was during the middle of the night so she could not think of what she could have done to have caused it.

> *"I had two bouts when my heart was all over the place I had no regularity with my heart beats they were like ectopic beats, big explosions in the heart and there was one and then another and then another one and you felt like you had to take deep breaths to regulate the beat."* (P10)

The aim of task one in Figure 5-6 was, therefore, to discover if the change in the palpitations was anything to worry about. P10 also wanted to understand what was causing the palpitations. During a check-up, P10 asked the opinion of the consultant. The consultant informed P10 there was nothing to worry about, but if they happened again and went on too long or she got dizzy, then she should go to the hospital. P10 commented, if they were nothing to worry about, then she doubted she would drive to the hospital if it happened again in the middle of the night. The consultant was not able to give her more information on what triggered the palpitations.

5.1.4 Fatigue (Postnatal 0-6m)

The medical information-seeking episode illustrated in Figure 5-7 occurred in the postnatal period (0-6m), just as her son turned three months. This was the first episode for P10 which contained more than one task and two searches. This episode involved two tasks, six searches, both active and passive, and a mix of expert, print, and online information resources. This information-seeking episode

details P10's efforts to find a cause and solution to her feelings of fatigue. The number of searches is reflective of the length of time the issue persisted.

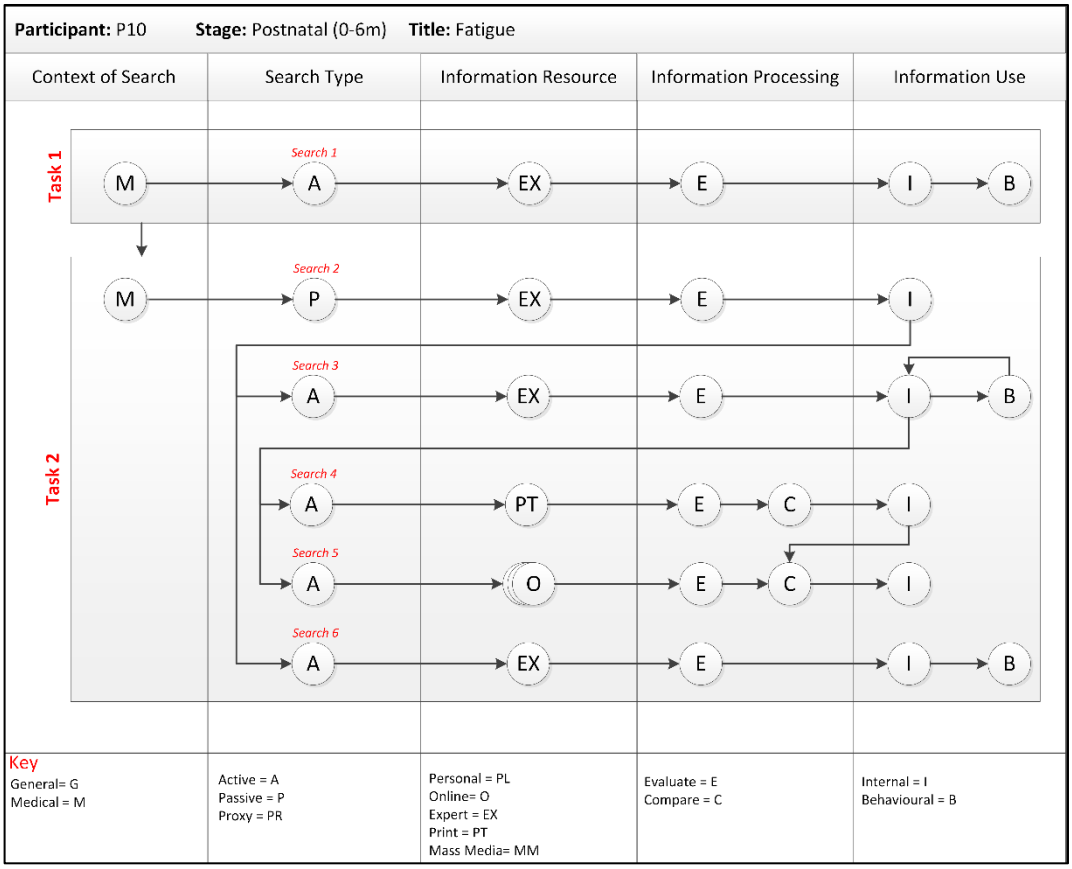


Figure 5-7 P10 - Fatigue IBAT

P10 had expected everything to get easier once the child had gone past three months because the child would be "*heartier*" (P10). Instead, she found she had become run down and was suffering from fatigue. P10 observed that because she had not availed of it went it was offered, she had lost the help people had volunteered when her son was younger. P10 felt busy during the day because of the school runs, after school activities and looking after the baby. Her son was not sleeping well at night which was negatively impacting her sleep.

Although P10 had her theories over what had caused her to become run down, she felt there might be something else wrong. Therefore the aim of the first task in Figure 5-7 was to discover the problem. To achieve this, P10 visited her GP, search one Figure 5-7. The GP conducted a blood test and informed P10 she had a virus. The GP also advised P10 to get some help. Something P10 did take on board. She was able to get help from friends and family for activities such as the school run.

The second task in Figure 5-7 involved P10 was trying to recover from the virus and combat the fatigue through nutrition. After P10 had visited the GP, she had a chance encounter with a neighbour who is also a nutritional therapist. P10 told the therapist of her problem and arranged an appointment. P10 had two appointments with the nutritional therapist, searches three and six in Figure 5-7. During the first consultation, the therapist reviewed P10's diet and suggested foods to improve her energy levels. The second appointment was a follow-up, during which the therapist suggested P10 change the vitamins she was taking. In each case, P10 adopted the changes proposed by the nutritional therapist.

The two appointments with the nutritional therapist were approximately a month apart. In between the appointments P10 consulted the nutrition section of the book 'What to Expect the First Year' and conducted an online search. P10 reviewed these additional resources because she felt her energy levels were not returning fast enough. Although she did not make any changes based on either the print or online resource, P10 rated the print resource higher. P10 found the book "*very well written*" and she found the question and answer format to be "*quite effective*" (P10). On the other hand, P10 found it difficult to trust health information she found online. P10 had a tendency to "*take it with a grain of salt*" (P10). Sometimes if she found something interesting online, she might investigate further, but it did not happen in this example.

5.1.5 Au Pair (Postnatal 0-6m)

The general information-seeking episode illustrated in Figure 5-8 occurred in the postnatal period (0-6m). The episode involved one task, three searches, and a mix of personal, online and expert resources. This information resource occurred as a result of the fatigue P10 experienced during the previous episode. P10 had friends and family helping her out, which she found was helping her to feel better slowly. However, she was still pushing herself sometimes when she should not. P10 felt she was not "*going to get better if [she] kept pushing against [her] body when it was telling [her] it was exhausted"* (P10). As a result, she decided to get an Au Pair for a few months. The episode detailed below describes P10's search for an Au Pair.

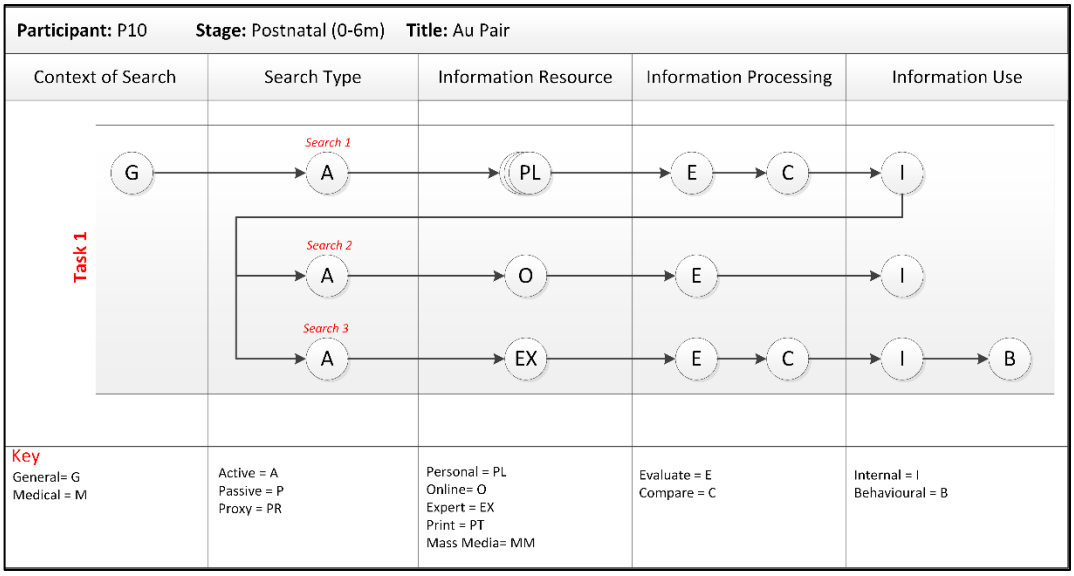


Figure 5-8 P10 - Au Pair IBAT

The aim of task one in Figure 5-8 is to find an Au Pair. P10 decided to consult friends who previously had Au Pairs to learn more about their experiences and to discover how they found their Au Pairs. From talking to people, P10 refined and adjusted what she wanted in an Au Pair. For example, it was originally crucial for P10 to find somebody who could drive so they could do the school run. However, P10 changed her mind when it was pointed out that the average age of the Au Pairs was eighteen or nineteen and most were coming from countries where they drove on the opposite side of the road.

From her friends, P10 discovered her friends had either found the Au Pairs online or using an agency. Figure 5-8 illustrates that P10 first visited the website which her friends suggested. P10 was unable to view information on the Au Pairs unless she registered and created a profile herself. P10 was not "*really comfortable about putting all of this information online, just putting it out there*" (P10). P10 was also unsure whether she would trust the information provided by the Au Pairs on the site because they were "*selling themselves*" (P10). P10 decided if she did not know the people on the website and if there was no method to verify them, then she could not trust the information they provided.

For the third search in Figure 5-8, P10 contact the agency which was recommended by a friend. P10 explained to the agency what she was looking for, and they

provided her with Au Pair profiles which matched her requirements. From the profiles, P10 was able to select an Au Pair.

5.1.6 Weaning (Postnatal 0-12m)

The two general information-seeking episodes included in this section occurred in the first two postnatal periods, between zero and twelve months. These two information-seeking episodes are grouped together because they covered different aspects of weaning. The first information-seeking episode, weaning 1, explores P10 searching for information on how to stop breastfeeding when her son keeps refusing the bottle. The second information-seeking episode, weaning 2, examines P10 researching information on when particular foods should be introduced.

The first information-seeking episode involved stress and negative affect both because of the situation and because P10 found it difficult to find information to satisfy her needs. The second information-seeking episode was purely cognitive in nature. This was a task P10 was confident completing. P10 was able to use her experience as a guide.

5.1.6.1 *Weaning 1* *(Postnatal 0-6m)*

The general information-seeking episode illustrated in Figure 5-9 occurred in the first postnatal period, (0-6m). The episode involved one task, three searches and a mix of print and expert information resources. P10 had tried on multiple occasions to wean her son off breast milk and onto a bottle, but he kept refusing the bottle. It did not matter if the bottle contained formula or breastmilk. This episode describes P10 seeking information on alternative strategies for weaning her son on to a bottle.

The first search in Figure 5-9 involved P10 consulted the book ‘What to Expect in the First Year.' The book was a popular information resource for P10. However, she did not find any new solutions on this occasion. The second search involved P10 contacting Cuidiú a local breastfeeding support group. However, P10 was frustrated by her experience with the support group. She did not find them very helpful. P10 felt the breastfeeding counsellors were more interested in keeping people breastfeeding then helping them to wean.

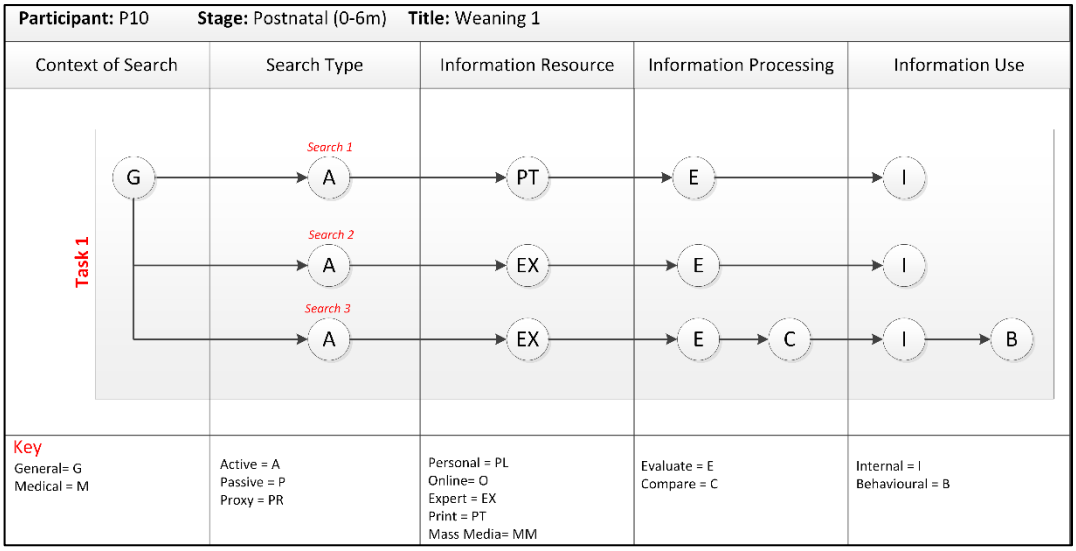


Figure 5-9 P10 - Weaning 1 IBAT

Finally, P10 decided to ask the public health nurse during a routine check-up. P10 found the public health nurse to be a useful resource because she had experienced a similar problem with one of her children. The nurse advised P10 she should postpone her plan to stop breastfeeding because she was just about to wean her child on to solids. It would be easier to concentrate on one at a time. The nurse also advised P10 if she gave her son a cup of liquid with each meal, he should gradually reduce the quantity of breastmilk he was taking from her. P10 was satisfied with this solution. Although it was not a quick fix, it made sense to her.

5.1.6.2 *Weaning 2* *(Postnatal 6-12)*

The general information-seeking episode depicted in Figure 5-10 occurred in the second postnatal period, (6-12m). The episode contained one task, one search and a variety of print information resources. This episode describes P10 weaning her son on to solid food. This was a process P10 was familiar with. It differed from the previous episode because P10's son was more interested in solid food than he was moving away from breastfeeding.

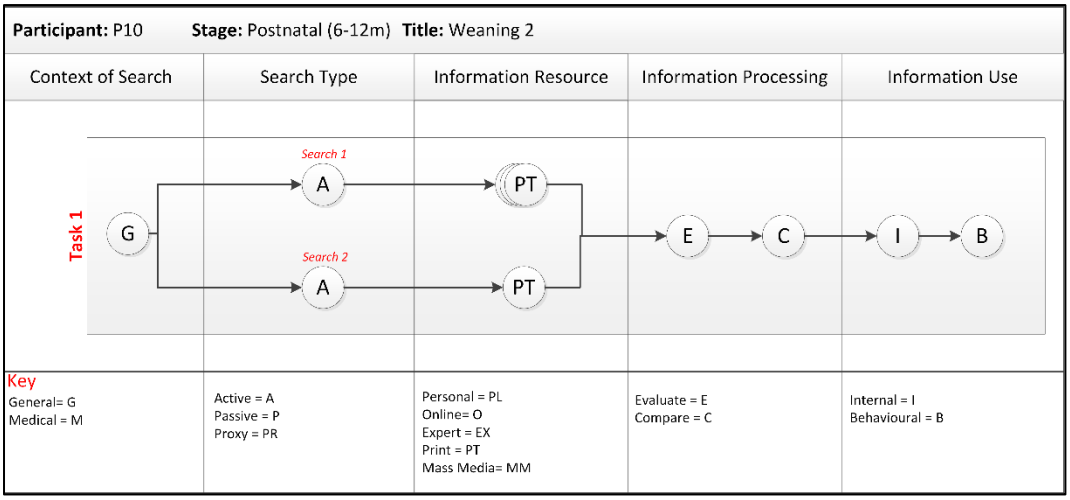


Figure 5-10 P10 - Weaning 2 IBAT

The aim of the task described in Figure 5-10 was to plan out recipes and when foods should be introduced. P10 achieved this goal by using a combination of books (search one) and an Annable Karmel meal planner which came free with a newspaper (search two). P10 found there were some conflicts between her books on when certain foods should be introduced, for example, eggs. She supposed the conflicts were caused by the differences in when the books were published. When conflicts occurred, P10 tended to rely on her previous experience weaning her two older children.

5.1.7 Wonder Bibs (Postnatal 6-12m)

The general information-seeking episode illustrated in Figure 5-11 occurred in the second postnatal period. The episode contained two tasks, three searches and a combination of personal and online information resources. This information-seeking episode describes P10 testing out a new type of bib and then deciding to purchase it. From this information-seeking episode, we discover features of an online resource can influence P10's purchase decisions.

The first search in Figure 5-11 was a passive search. During a conversation, P10's friend recommended a type of bib she termed "*fantastic*", called a Wonder Bib. Her friend had a spare one with her and offered it to P10 to try. P10 decided to test the bib out. P10 stated that she found it excellent; she kept washing and reusing it. Therefore, P10, decided to purchase more.

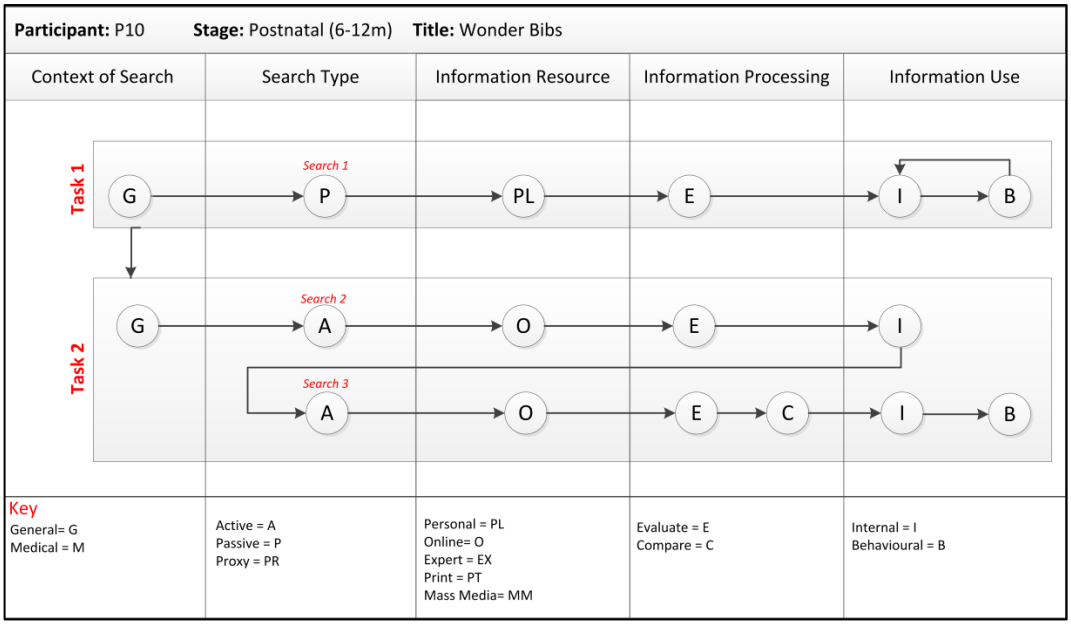


Figure 5-11 P10 - Wonder Bibs IBAT

The aim of the second task in Figure 5-11 was to buy more Wonder Bibs. The first place P10 went to was the Wonder Bibs website. However, P10 ultimately chose not to buy from their website. She found it "*disconcerting*" *(P10)* the way in which the price of the product remained in sterling even after she selected Ireland as her location. P10 wanted to know what the Euro price would be "*at the end of the day*" *(P10)* when all the charges were included.

P10 decided to go to Google and see if there were other sites selling Wonder Bibs. When P10 reviewed the search results, she saw Amazon listed. P10 decided to go to the Amazon website to purchase the Wonder Bibs, search three, see Figure 5-11. P10 stated it was easier because she already had an account set-up with Amazon, which meant she did not have to re-enter all her details. Amazon also automatically calculated the price in Euro's so she knew exactly how much she was paying.

5.1.8 Postnatal Depression (Postnatal 6-12m)

The medical information-seeking episode depicted in Figure 5-12 occurred towards the end of the second postnatal period, (6-12m). The episode contains one task, seven searches and a mix of personal, expert, print and online information resources. P10 was feeling very low and extremely anxious previous to this information-seeking episode. Her youngest son was now eleven months and was sleeping through the night. However, P10 was unable to sleep. P10 stated that she

had no energy and that made her feel guilty. The summer was coming to an end, and P10 was concerned about coping with the school run.

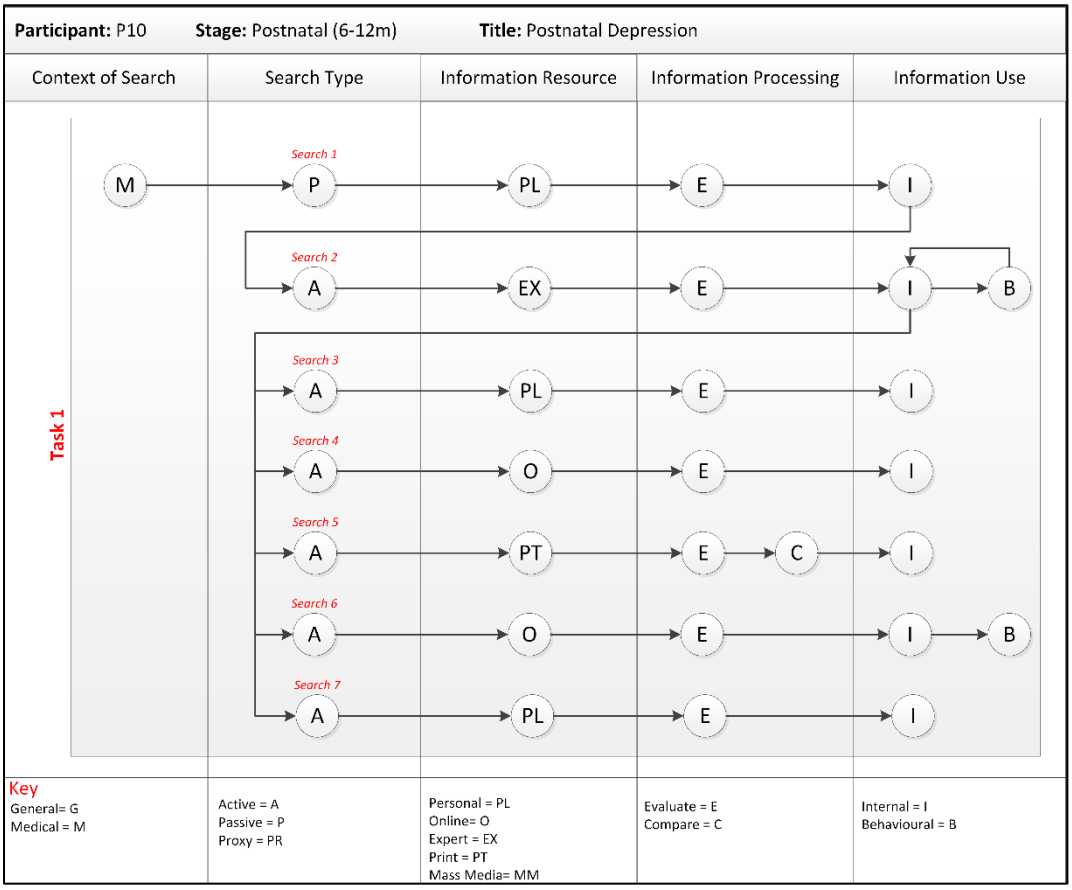


Figure 5-12 P10 - Postnatal Depression IBAT

The first search in Figure 5-12 was a passive search. P10's husband came home from work one evening to find her crying. After they had talked things through, he suggested she should visit their GP. P10 agreed and made an appointment. When P10 spoke to the GP, the GP told her he was sure it was postnatal depression. P10 wanted to understand why this had happened; she thought the fact she had stopped breastfeeding might have triggered it. However, the GP was more interested in fixing the issue. He said there were many potential causes, and it could be a combination of different factors. He suggested she could have been suffering from postnatal depression going back to January when she was suffering from fatigue, but her symptoms were presenting as physical.

P10 was hoping the GP would recommend some potent vitamins to boost her energy, although she was still taking the vitamins the nutritional therapist had recommended. Instead, the GP prescribed a type of anti-depressant which he

reassured her were not addictive. He also recommended a mindfulness course which she could attend in combination with the medication. P10 decided to take the medication and to investigate the course.

When P10 got home, the first thing she did was to talk to her husband, see Figure 5-12. As a doctor, he had experience with the medication she was prescribed. He informed P10 he had prescribed the medication for people before and went through how they work. Next, P10 went online to check the side effects of the medication, see search 4 in Figure 5-12. This was despite the fact her GP had expressly told her not to read the side effects. P10 explained that she was in such an anxious state by that point she had to check. The side effects listed made her worry. Interestingly it was not the extreme side effects which worried P10, such as "*bleeding out*" (P10) because she knew they were unlikely. It was the side effects which were an exacerbation of how she already felt. However, P10 trusted her GP and the information did not stop her from taking the medication. P10 found within seven days she *"felt like a new person, [she] had energy"* (P10).

Search five in Figure 5-12 was the book 'What to Expect When You are Expecting'. P10 was still curious as to the cause of her postnatal depression and turned to the book for answers. The book listed several possible reasons, including weaning. However, the book also agreed with the GP, in it said there was no definitive way of knowing the cause.

The sixth search in Figure 5-12 involved P10 researching the mindfulness course her GP had recommended. The only site she visited was the course website. P10 was satisfied with what she saw and booked a class. The final search in Figure 5-12 involved a discussion with a friend who also experienced postnatal depression after her third pregnancy. P10 found it helpful to talk to her friend although she aimed to be off the medication quicker than her friend.

5.1.9 Migraines *(Postnatal 12m+)*

The medical information-seeking episode described in Figure 5-13 occurred in the final postnatal period, (12m+). The episode contained two tasks, seven searches and a mix of expert, online, and personal information resources. In this episode, we

see P10's husband conduct two proxy searches on her behalf. P10 trusted his opinion, which was influenced by the fact that he is both her husband and a medical professional.

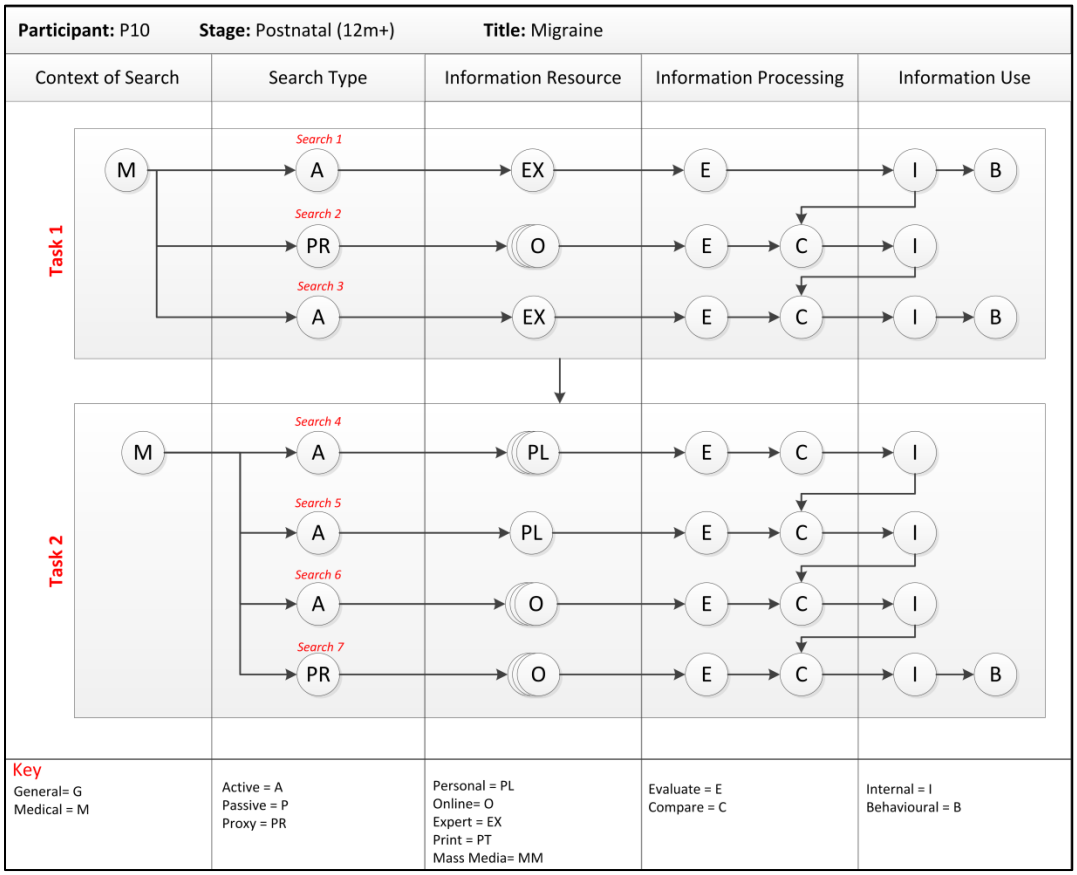


Figure 5-13 P10 - Migraine IBAT

The aim of the first task in Figure 5-13 was to discover what was wrong with P10. Her symptoms started when she was in a shopping centre. P10 was walking around a shop when she began to experience visual disturbances. Based on a description she had received from a friend, P10 was nervous her retina might be detaching. P10 decided to say it to the pharmacist when she was picking up a prescription, see search one in Figure 5-13. P10 wanted to go home but was nervous to drive. The pharmacist brought her into the back, gave her a glass of water and told her it sounded like the onset of a migraine. P10 was relieved she did not think it was something more serious.

After speaking to the pharmacist, P10 rang her husband. He came to the shopping centre and drove her home. By this point, P10's vision had improved, but she had a headache and a sick stomach. When P10 got home, she took some painkillers and

went to bed. Her husband conducted a search to ensure her symptoms were not a side effect of the medication she was on, search two, see Figure 5-13. However, this was not the case as the medication she was on is used to prevent migraines in some patients. P10 described how her husband had access to all the up-to-date medical information because he was a doctor. This meant she "*tended to refer to him*" (P10) for medical advice.

Search three in Figure 5-13 illustrates P10's visit to her GP. P10 told her GP what had occurred in the shopping centre, and the GP agreed with the pharmacist, it did sound like a migraine. The GP advised P10 to take painkillers straight away if the symptoms started again. The GP was hesitant to give her anything stronger, to begin with. P10 decided to take his advice.

P10 wanted to learn more about migraines and methods for preventing future attacks; this was the aim of the second task in Figure 5-13. P10 first spoke to a couple of friends of hers who also suffered from migraines. They were able to share information on their migraine triggers and different migraine prevention tips. P10 also spoke to her mother. P10 had forgotten her mother used to suffer from migraines. P10 felt her mother's migraines might have been hormonal because they stopped around the time of the menopause. This made P10 suspect her migraines might also have a hormonal trigger. P10 also asked her mother for information on what foods were a trigger for her migraines.

The sixth search in Figure 5-13 involved P10 searching online. P10 recounted to the researcher, how she selected a migraine online resource like she normally did with online information resources. P10 choose from the top results on the Google search list. The site provided her with basic information on "*what are migraines, what their symptoms are, and how you can deal with them?*" (P10). P10's husband also conducted an online search into migraines, but he came up with similar advice to what P10 had found. P10 combined the information from the online information resource with advice she had received from her friends and her mother. P10 used this information to make a list of her potential triggers and adjusted her lifestyle accordingly. For example, she cut out chocolate and oranges.

5.2 RQ1: What Subjective Assessment Criteria Are Used During Information Processing?

The purpose of this question is to identify and discuss the subjective assessment criteria used by P10 during information processing. In Chapter Three, information processing was described as the process of evaluating and comparing information resources. Evaluation is concerned with assessing the quality of individual information resources. Whereas comparison is concerned with contrasting information resources against other information resources, this can also include previous experience or beliefs. The aim of this process is to find information which meets the individual's information needs.

5.2.1 Subjective Assessment Criteria (P10)

This section explores the subjective assessment criteria P10 used to judge the quality of different information resources. The subjective assessment criteria are divided into those used to appraise information resource and those used to assess the information. Summary tables are utilised to demonstrate the subjective assessment criteria discussed by P10. For each criterion, there are illustrative quotes which describe the criterions meaning to P10. An X is used to indicate the type or types of information resources P10 was referring to in the illustrative quote. Lessons are taken from P10's perceptions of all types of information resources to identify design guidelines at the end of the section. The subjective assessment criteria for information resource are explored first, see Table 5-1.

The first information resource subjective assessment criterion for P10 is **convenience**, see Table 5-1. Online information resources were not P10's first choice for information. She did not have a smartphone and found it inconvenient to go and turn on the desktop computer. For P10 it was easier to pick up a book or call a friend. However, P10 did find online resources a convenient method for purchasing goods. At the start of her pregnancy, P10 began to order her grocery shopping online and got it delivered because she suffered from severe morning sickness. P10 liked to order products from Amazon because she had an account, which meant she did not have to re-enter all her personal details.

Criteria	Information Resource					Illustrative Quotes
	PL	EX	O	PT	MM	
Convenience			X			*"I would buy my shopping online. I'm doing it now because I was sick at the start and now it's just easier getting a big shop delivered because you don't have to lift all the stuff yourself."*
			X			*"We have an account with Amazon, so it is just easier; you don't have to put in all your details again."*
			X			*"I don't hate computers; I mean it is just more of an effort to turn it on. It's not the first place I think to go in terms of looking for information."*
Credibility			X			*"Basically the information was as trustworthy as the person, and when you don't know the person, how do you know the information is trustworthy?"*
			X	X		*"I think the information in a book just carries more weight with me than online information for some reason. I suppose maybe it's because it has been edited so many times people have to stand over what's written in a book."*
			X			*"Like Wikipedia, now I read it sometimes and then I just take that with a grain of salt; because of the fact that people can alter it."*
				X		*"If you can account for the knowledge. If there is either, an organisation that you can contact, or it's been signed by somebody, as in if it's an article that had been in the paper or it's an article written by somebody. That carries more weight as far as I'm concerned."*
		X				*"I thought the public health nurse was far better in terms of quality. She was a mother. She was expecting her third, and she had had exactly the same experience with her second refusing the bottle."*
Rank on Search List			X			*"It was like medicaljournal.com or something like that. It was one of those ones that come up very early. I didn't go, and I normally don't go too far down the search list."*
Usability			X			*"Then you were asked where you were purchasing from, and I put in Ireland, and then it still came up in pounds. So I kind of wasn't sure if what I was looking at was available and I found that disconcerting. I was also thinking, 'What's that now in Euros, really what would that be at the end of day with the postage and packaging?'"*

Table 5-1 P10 Information Resource Assessment Criteria

The second criterion in Table 5-1 is **credibility**. P10 had an inherent distrust for online information resources. She tended to take the information they provided "*with a grain of salt*" (P10) unless the website was created by a person or organisation she recognised. It was P10's opinion she could not trust information if she could not verify the identity of the author. Therefore she avoided user-generated content, such as forums, blogs or wikis.

Her husband's attitude may have influenced P10's opinion of the credibility of online information resources. P10 commented how she often relied on her husband for information because he is a doctor. He had advised P10 not to search for medical information online because "*as a layperson, you're attaching certain things*

to the information that may not be true at all" (P10). He instead advised her to get her information from her GP.

P10 felt printed information resources were more credible than online information resources because there was an author and perhaps an organisation attribution to the material. P10 also felt a printed information resource would have undergone an editing process.

P10 valued the advice of other mothers who had been through similar experiences. P10 stated that these mothers could provide her with information based on their experiences and information they had looked up themselves when they were in the same situation. P10 found her public health nurse particularly credible because she had the professional credentials and was a mother.

The third criterion in Table 5-1 is **rank on search list**. P10 described when she searched for information online she selected information resources from the top of the search list. The last criterion in Table 5-1 is **Usability**. P10 did not purchase the bibs on the Wonder bibs website because it did not function as she expected. P10 expected the price to change to Euros when she selected Ireland but when it remained in Sterling she felt uncomfortable. P10 was unsure what the final total would be once all the charges were added on, and the currency converted. P10 was more comfortable purchasing on Amazon because they converted the final price into Euros, so she knew how much she was paying.

Table 5-2 contains the subjective assessment criteria for information. The first criterion is **Complete**. P10 spoke about information resources providing lots of information but not the information she required. For P10, the information resource was not complete if it did not include the information she needed, as this meant she had to continue her information-seeking.

The second criterion in Table 5-2 is **currency**. P10 trusted and relied on her husband as an information resource. P10 valued his experience has a medical professional and his ability to access up-to-date medical information, see Table 5-2. P10 was comfortable using older books during the weaning process, but she was also

conscious advice had changed since the books were published. When conflicts did occur between information resources P10 tended to rely on her experience weaning her older children.

Criteria	Information Resource					Illustrative Quotes
	PL	EX	O	PT	MM	
Complete				X		*"That's an example of a website that had loads of information on it but was useless, well was useless for me at that moment because it didn't have the information that I needed. I needed the number, and I had actually to ring Dublin to get the number."*
Currency	X					*"My husband read up on it, but he didn't read it here, he read it at work. He has all the up-to-date information."*
	X					*"I suppose with medical things, my husband kind of has up-to-date medical stuff, online medical material that he just looks it up. So I tend to refer to him really."*
				X		*"I was a bit confused about what to do because the information was from an old book."*
Use of Language			X			*"You kind of know by reading, if it sounds serious and if it's got gravitas about it then I take it more seriously."*
				X		"Statistics...I don't know. They can make things seem worse than they are."
Relevant	X					*"I'm kind of the type of person; I like to talk to people about things. You get better insights … now, having said that though everyone has their own story and you have to take the relevant parts for you."*

Table 5-2 P10 Information Assessment Criteria

One of the methods P10 used to determine how much she trusted the information provided by an eHealth resource was the **use of language**, which is the third criterion in Table 5-2. P10 felt if the eHealth information had "*gravitas*" (P10) then it was worth *"taking more seriously"* (P10). Another language issue was the presentation of statistics. P10 commented that the way statistics are present can make an issue appear worse than it is. The final criterion in Table 5-2, involved P10 determining if the information was **relevant**. For P10, the personal experiences of others were an important information resource. However, she tended to take the parts of their stories which were relevant o her information needs.

5.2.2 Design Guidelines

The objective of this study is to identify design guidelines for eHealth information resources for expectant and new mothers. As discussed in Chapter 2, eHealth information resources use the internet and related technologies to provide health and wellness information and services to users. Therefore, eHealth resources are a

subset of the online resources described in the analyses. Participants may have found information to meet their needs on a broad range of information resources. However, the purpose of these guidelines is to create eHealth resource purposely designed to satisfy their needs.

This section discusses the design guidelines which were identified based on P10's subjective assessment criteria discussed above. As with the subjective assessment criteria themselves, the design guidelines were separated into guidelines which are focused on eHealth information resources and guidelines that are focused on eHealth information.

Table 5-3 contains the design guidelines for eHealth resources which were identified for P10. Each guideline attempts to highlight a feature P10 valued or to address a problem P10 identified. The first criterion, convenience, includes two design guidelines. The main reason P10 valued online resources was to purchase products, which is reflected in the convenience guidelines. The first guideline suggests eHealth information resources should facilitate multiple delivery options for any products sold on the site. P10 started getting her groceries delivered to home because she had severe morning sickness, so it suited her. For other users purchasing products from an eHealth site, it might suit to deliver products to their work or a depot.

Criteria	Design Guideline
Convenience	Facilitate multiple delivery options for products
	Reduce the amount of input required by users.
Credibility	Clearly display the credentials of contributors to the site.
	List experience (professional and/or personal).
Rank on Search List	Optimise website design to improve search engine rankings
Usability	Test website features to ensure that they all function as expected.

Table 5-3 Design Guidelines - eHealth Information Resources (P10)

The second design guideline which emerged from the convenience criterion suggests eHealth information resources should reduce the quantity of information users are required to input. P10 valued Amazon because it remembered her details and she did not have to re-enter her information.

The second criterion in Table 5-3 is credibility, which also includes two design guidelines. The first guideline suggests the credentials of all contributors should be

clearly displayed on the site while the second suggests listing the personal and professional experience, where appropriate. The purpose of these guidelines is to increase users trust in the content by verifying the expertise of the creators. P10 avoided online user generated content because she could not authenticate the authors. The guideline could help overcome this problem. If an author has both professional expertise and personal experience it would give them more credibility. P10 found the public health nurse more credible during the weaning 1 information-seeking episode because she had personal experience of the same weaning problem P10 was experiencing.

The third criterion in Table 5-3 is rank on search list. P10 declared she rarely scanned further than the top few websites on the Google search list when selecting an online information resource. This demonstrates the importance of optimising the design of eHealth information resources to enable them to appear higher on search engine rankings.

The final criterion in Table 5-3 is usability. P10 had problems trusting the Wonder Bibs website because the site did not function as she expected. P10 thought the currency would change to Euros when she selected Ireland as her location. When the price of the goods in her basket remained in Sterling, P10 decided to search to see if she could purchase the product somewhere else. This highlights the importance of ensuring website features function as a user expects.

Table 5-4 provides a list of the design guidelines identified for eHealth information for P10. These are grouped under four subjective assessment criteria: complete, currency, use of language and relevance. Two guidelines are included under the first criterion. The first guideline suggests eHealth information resources should contain information on a range of topics which would be of interest to their target audience. As previously discussed, an information resource was not considered complete if it did not include the information she required.

The other design guideline, included under the complete criterion, suggests eHealth resources should include a mix of personal stories and expert opinions. Table 5-4. P10 avoided user-generated content online. This was attributed to the fact there

was no way to authenticate the identity of the authors, which made her distrust the information. However, P10 valued the personal experiences of family and friends. If eHealth information resources could combine expert opinions with verified accounts of users who had experience of the issues, it could make the information resources more complete.

Criteria	Design Guideline
Complete	Include a range of topics that interest your target audience
	Include a mix of personal stories and expert opinions.
Currency	Information should be reviewed and updated regularly.
	Clearly state the last date information was updated.
Use of Language	Use authoritative language; avoid the use of slang and colloquialisms.
	Ensure that statistics are used appropriately and combined with a narrative.
Relevance	Highlight key points from articles and personal stories.

Table 5-4 Design Guidelines - eHealth Information Content (P10)

The second criterion in Table 5-4 is currency, which includes two design guidelines. During the weaning 2 information-seeking episode, P10 stated she was sometimes confused over what advice to take because her books were not new and research and changed. P10 has also commented that she appreciated how her husband could access up-to-date medical information as part of his job. EHealth information resources can increase user confidence in their information by regularly reviewing the content to reflect the latest research. EHealth information resources should publish the last date information was updated to highlight how current the information is.

The third criterion in Table 5-4 is the use of language. If information resources used serious language, which resulted in an article having “gravitas” (P10), P10 found she was more inclined to trust the information. This suggests the authors of eHealth information should attempt to use authoritative language when creating articles and avoid the use of slang words. The second design guideline for this criterion suggests eHealth information resources should ensure statistics are used appropriately and are accompanied by a narrative. This is to facilitate understanding and to prevent the anxiety that occurred during the maternal age risk factors information-seeking episode. In this episode, P10 felt the statistics in the printed information resources made her risk factors appear worse than they actual were.

The final criterion in Table 5-4 is relevance. P10 stated how she found listening to personal stories to be helpful but tended to take pieces from the stories which were relevant to her. A summary of the key points of eHealth articles and accompanying personal accounts should be included to facilitate the process.

5.3 RQ2: What are the Information Use Outcomes?

The purpose of this question is to identify and discuss the information use outcomes for P10. There are two stages of information use outcomes; these are internal and behavioural. Internal use outcomes involve changes to an individual's cognitions or affective state as a result of information-seeking. Behavioural use outcomes refer to changes in behaviour as a result of information-seeking. It is the assumption of our operational definition that information use begins at the point of cognitive use. This may involve a new opinion/belief or it could be a confirmation or change to an existing opinion/belief.

5.3.1 Information Use Outcomes for P10

Figure 5-14 is the Information Use Pattern Outcome Diagram (IUOPD) for P10. The IUOPD provides an illustrative analysis of all the information use outcomes of the information-seeking episodes discussed in the first part of this chapter. Each of the different paths represented in the IUOPD are discussed in detail below the diagram. The numbers represent a frequency count of each time that particular information use outcome occurred in one of the information-seeking examples. Each of the different paths represented in the IUOPD are discussed in detail below the diagram, using summary tables. However, from the first review of Figure 5-14, it is evident that the most common information use outcomes for P10 as described in the information-seeking examples are cognitive use resulting in positive affect (A3) and behavioural use (A2).

From Figure 5-14 it is clear that renewed information-seeking as a consequence of either cognitive use, positive or negative affect was not the most common outcome for P10. This was because P10 tended to be satisfied with information resources she deemed credible. In most cases, P10 did not feel the need to verify information with multiple information resources. However, P10 did state if she encountered

conflicting information she would *"keep searching until [she] got some consensus"* (P10). When internal use (cognitive or affective) prompted P10 to search for information, it was normally the cause of a new, related task. For example, during the migraine information-seeking episode when the GP confirmed P10's symptoms sounded like a migraine, P10 started a new task investigating migraines and their triggers.

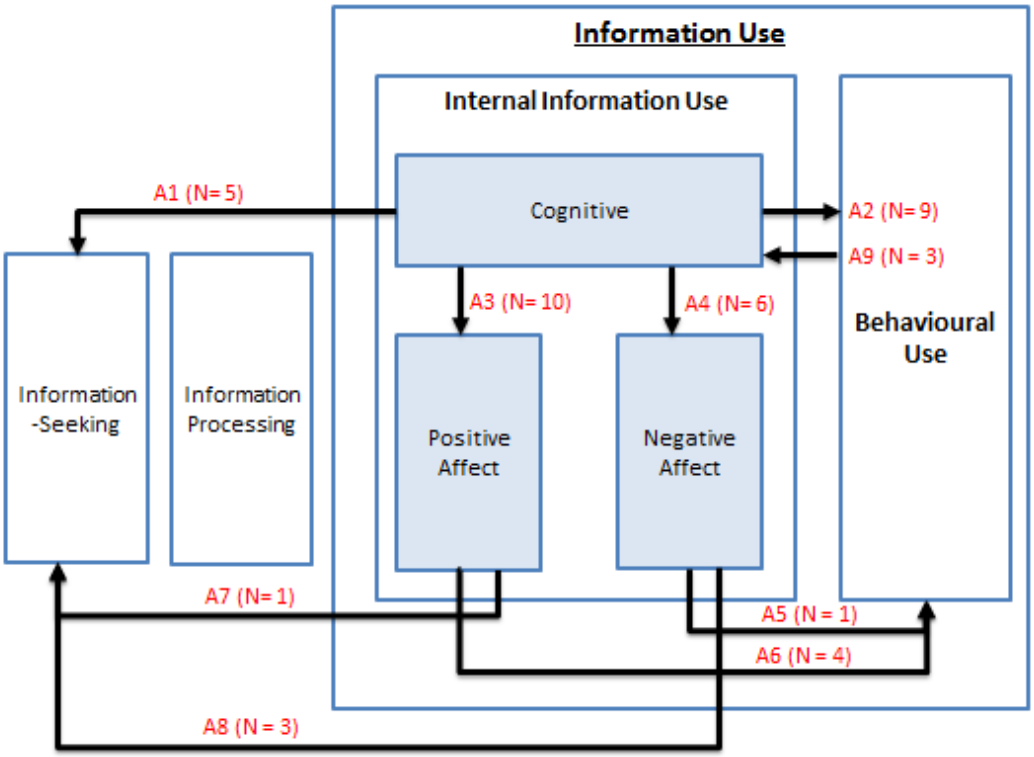


Figure 5-14 Information Use Outcome Pattern Diagram (P10)

The summary tables below include five columns which allow traceability back to the IUOPD and to the original information-seeking episodes where the data came from. The columns are: (1) the code which is visible in the IUOPD diagram, (2) the longer description of the information use outcome, (3) the information-seeking episode title, (4) the task number, and (4) the search number. Some searches had more than one outcome and will therefore appear more than once, for example an encounter with a medical professional may result in a participant taking medication and seeking further information.

Table 5-5 contains information use outcomes for P10 where the only internal use outcome was cognitive, i.e. there was no affective use outcome at that particular

stage. The first two outcomes in Table 5-5 start with cognitive use and progress either to information-seeking (A1) or to behaviour use (A2). Cognitive use resulting in behavioural use is the second most popular use outcomes for P10, see Figure 5-14. The third outcome starts with behavioural use and results in cognitive use (A9).

Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking	Fatigue	1	1
		Fatigue	2	2
		Fatigue	2	3
		Au Pair	1	1
		Wonder Bibs	1	1
A2	Cognitive use resulting in behavioural use	Fatigue	1	1
		Fatigue	2	3
		Fatigue	2	6
		Au Pair	1	3
		Weaning	1	1&2
		Wonder Bibs	1	1
		Wonder Bibs	1	3
		Postnatal Depression	1	6
		Migraines	2	4,5,6 & 7
A9	Behavioural use resulting in cognitive use	Fatigue	2	3
		Wonder Bibs	1	1
		Postnatal Depression	1	2

Table 5-5 P10's Information Use Outcomes - A1, A2 & A9

The fatigue information-seeking episode features prominently in Table 5-5 and provides good examples of the different types of cognitive use outcomes for P10. The first information use outcome from the fatigue information-seeking episode in Table 5-5 was cognitive use resulting in information-seeking. P10 did not question the GP's opinion that she had a virus and should ask for more help with the children. However, P10 did wish to investigate options for building her energy levels up.

The outcome of the second search of the fatigue information-seeking episode was P10 booking an appointment with the nutritional therapist. This was after a serendipitous encounter with her in the supermarket, which led P10 to believe the therapist would be a relevant information resource. This is similar to the example from the Au Pair information-seeking episode, where P10 continued information-seeking once she had a list of relevant information resources.

The third search of the fatigue information-seeking episode appears in the three different sections of Table 5-5. This is because P10 took the advice of the nutritional therapist and implemented diet changes. When the diet changes did not increase her energy levels fast enough, P10 decided to search alternative information resources while waiting for the next appointment. The Wonder Bibs information-seeking episode follows a similar pattern. P10 tried out a new type of bib at the recommendation of a friend. P10 found the bib to be excellent and decided to purchase some of her own. P10 decided to search online to find where she could purchase them.

Table 5-6 contains information use outcomes for P10 that include positive affect. The first information use outcome is cognitive use resulting in positive affect. This was the most popular information use outcomes for P10. The other two outcomes in Table 5-6, start with positive affect and progress from there, either to information-seeking or behavioural use.

Code	Description	Episode	Task Num	Search Num
A3	Cognitive use resulting in positive affect	Maternal Risk Factors	1	2
		Varicose Veins	1	2
		Palpitations	1	1
		Weaning 1	1	3
		Postnatal Depression	1	2
		Postnatal Depression	1	3
		Postnatal Depression	1	5
		Migraines	1	1
		Migraines	1	2
		Migraines	1	3
A6	Positive affect resulting in behavioural use	Varicose Veins	1	2
		Weaning 1	1	3
		Migraines	1	1
		Migraines	1	3
A7	Positive affect resulting in information-seeking	Migraines	1	3

Table 5-6 P10's Information Use Outcomes – A3, A6 & A7

The majority of the entries in Table 5-6 involved P10 interacting with an expert information resource. In the maternal risk factors and palpitations information-seeking episodes, P10 was satisfied with the reassurance she received from the medical professional and did not feel the need for any other action. In the varicose veins and weaning 1 information-seeking episodes, P10 was also satisfied with the

information from the health professionals, but in these cases, she acted on the advice they provided.

There are three entries in Table 5-6 for the postnatal depression information-seeking episode. These cover: (1) the relief P10 felt when the medication started to work, (2) the comfort she felt when she discovered her husband had experience prescribing the medication, and (3) the reassurance P10 felt talking to a friend who had been through a similar experience. None of these prompted P10 to take any other action such as information-seeking or behavioural use.

The migraine information-seeking episode was the only episode to have positive affect resulting in information-seeking, see Table 5-6. During the first and second searches of the information-seeking episode, a pharmacist and then her husband were able to provide reassurance to P10 but not a confirmed diagnosis. Once P10 visited her GP and received a confirmed diagnosis of migraine, she felt relieved it was not anything more serious. She also felt the need to investigate the condition, looking for triggers.

Table 5-7 contains information use outcomes for P10 that include negative affect. The first outcome in Table 5-7, involves cognitive use resulting in negative affect. The other two information use outcomes start with negative affect and progress from there, either to information-seeking or behavioural use.

Code	Description	Episode	Task Num	Search Num
A4	Cognitive use resulting in negative affect	Maternal Risk Factors	1	1
		Varicose Veins	1	1
		Weaning 1	1	2
		Wonder Bibs	1	2
		Postnatal Depression	1	2
		Postnatal Depression	1	4
A5	Negative affective resulting in behaviour use	Postnatal Depression	1	2
A8	Negative affect resulting in information-seeking	Wonder Bibs	1	2
		Postnatal Depression	1	1
		Postnatal Depression	1	2

Table 5-7 P10's Information Use Outcomes – A4, A5 & A8

The postnatal depression information-seeking episode appears more than any other in Table 5-7. This is not a surprise as P10 stated she was particularly anxious

at this time. Receiving the diagnoses and being placed on the medication initially increased her feeling of anxiety. This was the only time P10 reported going against the advice of her GP. P10 elected to read the side-effects of the medication despite her GP's advice against it, knowing the side-effects did not help her anxiety. However, it did not dissuade P10 from taking the medication as she trusted her GP.

During the weaning 1 information-seeking episode, P10 did not find the counsellors from the breastfeeding support group to be credible because they were recounting second-hand information. The women she spoke to had breastfed until their children were two to three years old, so could not offer her first-hand advice on how to wean.

P10 became nervous after listening to her friend describe how bad her legs got, during the varicose veins information-seeking. P10 was also nervous during the Wonder Bibs information-seeking episode. The fact the site did not function as expected, the price was not displayed in Euros made P10 nervous of purchasing on the site and led her to search for another option.

5.3.2 Discussion

The previous section examined P10's information use outcomes based on the example information-seeking episodes. Based on the discussion it was evident some of the subjective assessment criteria discussed in RQ1 influenced P10's information use outcomes. This section explores how this information can be applied to provide further detail to the associated design guidelines for P10 that were identified in RQ1, see Table 5-8.

Credibility was an important criterion for P10 during the study. When information resources that she deemed to be credible, offered her information, it was often sufficient to satisfy both her cognitive and affective information needs. Credible information resources tended to be a mix of expert information resources and personal information resources with experience of the particular task. This demonstrates the importance of eHealth information resources displaying both the credentials and experience (professional and personal) of website contributors, see Table 5-8.

Type	Criteria	Design Guideline
EHealth Information Resource	Convenience	Provide easy home delivery options for commercial sites.
		Reduce the amount of input required by users.
	Credibility	Clearly display the credentials of contributors to the site.
		List experience (professional and/or personal).
	Rank on Search List	Optimise website design to improve search engine rankings
	Usability	Test website features to ensure that they all function as expected.
EHealth Information Content	Complete	Include a range of topics that interest your target audience
		Include a mix of personal stories and expert opinions.
	Currency	Information should be reviewed and updated regularly.
		Clearly state the last date information was updated.
	Use of Language	Use authoritative language; avoid the use of slang and colloquialisms.
		Ensure that statistics are used appropriately and combined with a narrative.
	Relevance	Highlight key points from articles and personal stories.

Table 5-8 Design Guidelines for eHealth Resources for P10

Personal experience and accounts are meaningful for P10. When the counsellors of the local breastfeeding group were not able to provide first-hand information, P10 found them less credible as an information resource. The personal accounts of other mothers have influenced P10's information-seeking, her behaviour and resulted in both positive and negative affect. An eHealth information resource would, therefore, be more complete if it incorporated the accounts of mothers along with the expert opinions, see Table 5-8. This would provide P10 with both her preferred information resources in one place.

P10 stated that she was disconcerted when the Wonder Bibs website did not function as expected. It led her to distrust the site and purchase the product elsewhere. When providing health information and services, it is important users trust the provider. Therefore eHealth information resources should ensure the site functions as expected, see Table 5-8.

The way statistics were presented in the printed information resource P10 during the maternal risk factors information-seeking episode resulted in increased anxiety. P10 later felt the statistics had made her risks appear higher than they were. EHealth information resources should ensure statistics are clearly explained to ensure unnecessary confusion and distress does not occur, see Table 5-8.

5.4 RQ3: What are the Primary Information Resources for Medical and General Tasks during the Antenatal and Postnatal Periods?

Research question three (RQ3) identifies the primary health-related information resources accessed by P10 for medical and general tasks. The longitudinal nature of the study affords the opportunity to identify P10's preferences at four different points in time (both antenatal and postnatal). Identifying P10's primary health-related information resources at various points in time allows the researcher to highlight any changes in P10's preferences. This information can be used to add context to the design guidelines produced in RQ1. Of particular interest is understanding any fluctuations in P10's preferences for eHealth resources.

5.4.1 P10's Primary Information Resources

Figure 5-15 illustrates the information resource types that P10 reported accessing during general tasks. Each information resource type was counted once for every general information-seeking episode that P10 reported accessing the resource type. The number of times that P10 accessed an information resource did not factor into the count. Figure 5-15 is split into each of the four study periods so changes in P10's information resource preferences can be observed.

Online information-resources were the primary information-resource for general tasks in the antenatal period, see Figure 5-15. The most common general task category during the antenatal period involved researching products prior to purchase. This was the type of task where P10 tended to value online information resources most. In the first and second postnatal periods, other general task types became more popular, for example, weaning and parenting strategies. For these tasks, P10 relied more on the advice of expert, personal or print information resources. No general information-seeking was reported in the last postnatal period, see Figure 5-15. P10 attributed her drop in information-seeking to a lack of time and a lack of interest. However, it could also be explained by P10's habit of relying on previous experience instead of information-seeking for general tasks.

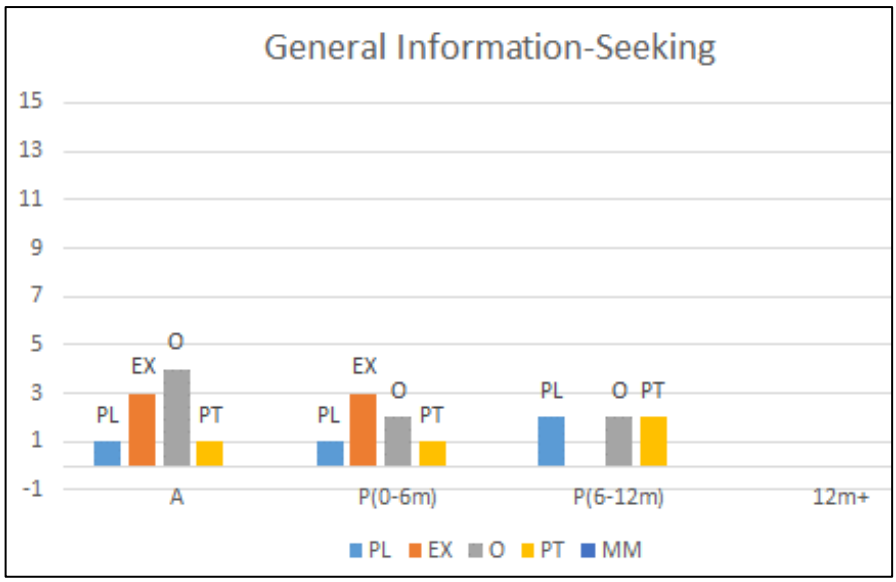


Figure 5-15 Information Resources Accessed for General Information-Seeking (P10)

Figure 5-16 illustrates the number of information-seeking episodes involving each type of information resources for medical tasks for P10. Expert information resources were the sole primary information resource in the antenatal period, see Figure 5-16. In the three postnatal periods, there was no sole primary information resource. Out of the eight medical tasks reported by P10 during the study, there was only one which did not involve expert information resources. No other information resource was accessed that often by P10 for medical tasks. The lack of one primary information resource for medical tasks can be explained by the complexity of the later tasks which drove P10 to seek more information, for example, the migraine information-seeking episode.

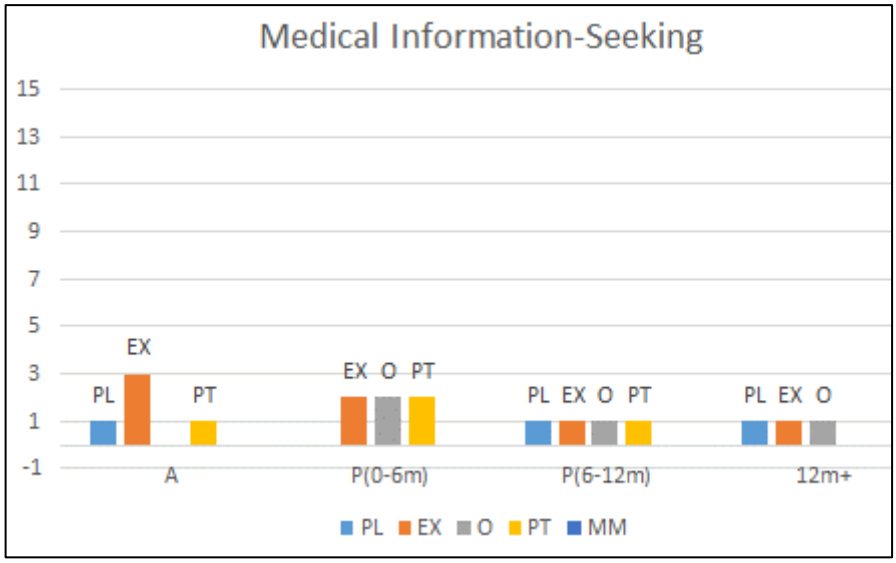


Figure 5-16 Information Resources Accessed for Medical Information-Seeking (P10)

Figure 5-17 illustrates the changes in the frequency of P10's general and medical information-seeking across the four study periods. The antenatal period saw the most general information-seeking and was dominated by investigations into products before purchase. In fact, all bar one of the general tasks in the antenatal period involved information-seeking before purchase. Research into product purchases remained a feature in the first and second postnatal periods but did not dominate. Other general tasks such as weaning, childcare and sleep also featured. For general tasks, P10 often relied on her previous experience. This along with a reported lack of time may help explain the lack of general information-seeking reported in the final postnatal period, see Figure 5-17.

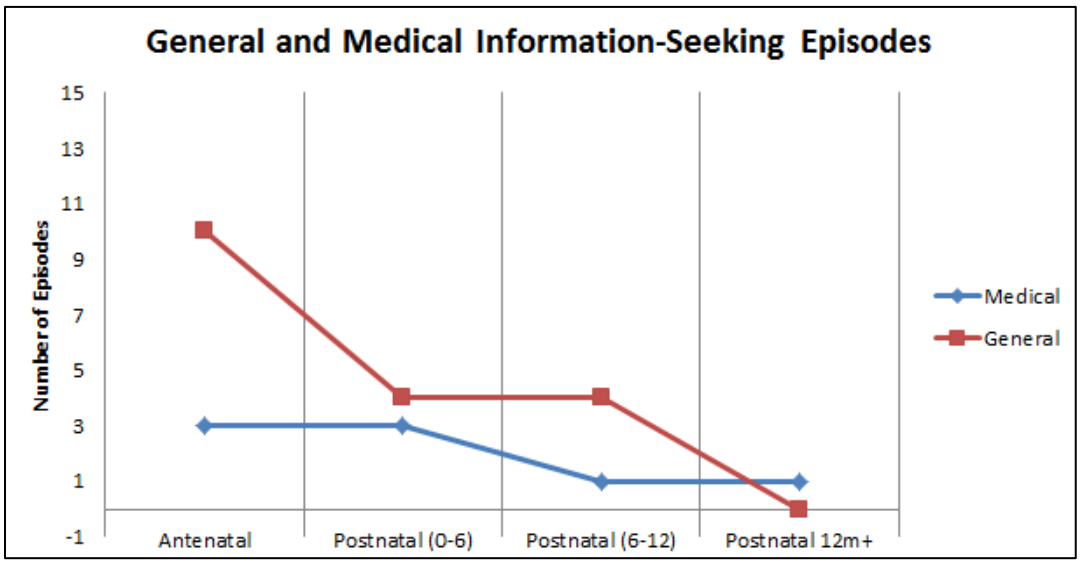


Figure 5-17 General and Medical Information-Seeking Episodes (P10)

Similar to her general information-seeking, P10's medical information-seeking ended the study at a lower level than it began, see Figure 5-17. However, P10's medical information was less than her general information-seeking in every period bar the final postnatal period. P10 did not report any medical information-seeking involving her son, as her son was healthy throughout the course of the study. This could help to explain the low levels of medical information-seeking. P10 also expressed how she relied on her husband for medical information. It is possible that she sometimes received information from him within the course of normal conversation that would make an information search unnecessary.

5.4.1.1 *Antenatal period*

The antenatal period is the busiest for general information-seeking. P10 was nesting. She investigated and purchased a range of baby products including, cots, baby monitors, and car seats. The only general task that was not product related involved P10 researching what she should bring with her to the hospital. P10 was interested in learning *"the way things are being done now versus six years ago"* (P10) when she had last given birth. The primary information resource for general tasks was online information resources.

This was also one of P10's busiest periods of medical information-seeking. P10's medical information-seeking occurred primarily towards the start of the antenatal period. The pregnancy had not been planned, and P10 was concerned about the impact her age might have. The primary information resource of medical tasks was expert resources.

5.4.1.2 *Postnatal period (0-6m)*

As illustrated in Figure 5-17, there was a significant drop in general information-seeking between the antenatal and postnatal (0-6m) periods. Expert information resources were the primary information resource for general tasks during this period. P10 consulted subject matter experts in areas of weaning, childcare and when purchasing a high chair.

Medical information-seeking remained at a similar level to the previous period. However, the primary information resource was now a combination of expert, online and print. Each information resource type was consulted in two out of three of the information-seeking episodes. Although online and print information resources may be the more convenient option, it was clear that P10 found experts the most credible information resource, particularly next to online information resources. During the fatigue information-seeking episode, P10 stated that she took the online information she found with a *"grain of salt"* (P10).

5.4.1.3 *Postnatal period (6-12m)*

General information-seeking remained stable during this period, while medical information-seeking declined. P10 reported her lack of information-seeking was

caused "*in part by a lack of time, and part of it was that there was nothing [she] wanted to look up*" (P10). P10 was not a person who enjoyed browsing online without a purpose; her information-seeking tended to be very task specific.

P10's general information-seeking involved weaning, sleeping issues in infants and investigations into products before purchase. There was no single primary information resource for general tasks. Instead, online, personal and print information resources combined to form the primary information resource.

There was only one medical information-seeking task this period, the postnatal depression information-seeking episode. This was one of P10's longest information-seeking episodes, likely due to her feelings of uncertainty and anxiety. Four types of information resource were accessed during that task, so they combine to form the primary information resource, personal, expert, online and print.

5.4.1.4 *Postnatal period (12m+)*

In the final postnatal period, P10 reported zero general information-seeking and only one medical information-seeking episode. Time continued to be a concern for P10. She stated that she *"[did not] really have a lot of spare time and she tended to look things up on a need-to-know basis"* (P10).

The medical information-seeking episode this period was migraines. This episode involved seven searches and three types of information resources. The length of the episode was determined by P10 first requiring a diagnosis and then deciding to investigate the condition. As this episode involved personal, expert and online information resources, those three together combine as the primary medical information resource for this period.

5.4.2 Discussion

The aim of RQ3 was to identify the primary information resources used by P10 for medical and general tasks. The previous section examined P10's primary information resources for each of the four antenatal and postnatal periods. Reference was made to the influence of context, such as time. This section will

examine this information in relation to the design guidelines identified for P10 in RQ1.

Table 5-9 provides a summary of the frequency of P10's information-seeking in the different periods, combined with the primary information resource. For P10, in most instances, there was no single primary information resource. However, expert information resources were used in all bar one of the medical tasks, which could make them the overall primary information resource for medical tasks. Online information resources were used across a variety of general and medical tasks, see Table 5-9. However, P10 appeared to find online information resources most credible when researching and purchasing products.

	Medical		General	
	Number of Episodes	*Primary Resource*	*Number of Episodes*	*Primary Resource*
Antenatal	3	Expert	10	Online
Postnatal (0-6)	3	Expert, online, & print	4	Expert
Postnatal (6-12)	1	Personal, expert, online, & print	4	Personal, online and print
Postnatal 12m+	1	Personal, expert, & print	0	n/a

Table 5-9 P10's Primary Information Resources for Both Medical and General Tasks

Table 5-10 provides a summary of the design guidelines for eHealth resources that were identified as part of RQ1. Although P10 accessed online information resources, they are only the primary information resources in one period, see Table 5-9. P10 did not trust the information provided by online information resources to the same degree as she did expert, personal or print information resources.

The design guidelines in Table 5-10 propose increasing the credibility of eHealth information resources by demonstrating the credentials and experience of the contributors to the site. P10 could not trust information unless she could verify the author of the information and their expertise. These guidelines aim to provide that verification.

Type	Criteria	Design Guideline
EHealth Information Resource	Convenience	Provide easy home delivery options for commercial sites.
		Reduce the amount of input required by users.
	Credibility	Clearly display the credentials of contributors to the site.
		List experience (professional and/or personal).
	Rank on Search List	Optimise website design to improve search engine rankings
	Usability	Test website features to ensure that they all function as expected.
EHealth Information Content	Complete	Include a range of topics that interest your target audience.
		Include a mix of personal stories and expert opinions.
	Currency	Information should be reviewed and updated regularly.
		Clearly state the last date information was updated.
	Use of Language	Use authoritative language; avoid the use of slang and colloquialisms.
	Relevance	Highlight key points from articles and personal stories.

Table 5-10 Design Guidelines for eHealth Resources for P10

During the antenatal period the one general task P10 reported involved investigating what she should bring with her to the hospital. P10 was interested in learning what had changed since she had her last baby. It is proposed in Table 5-10 that eHealth information resources should state the date that information was last updated. EHealth information resources could also highlight the changes made between versions to engage the interest of mothers who already have children. This way they can witness how advice had changed. P10 opted not to search online for weaning information although she was aware some of the advice had changed. Instead, she chose to stick with the books that had worked for her previously. P10 stated she was conscious of the conflicting information that surrounded breastfeeding and weaning advice. If an article demonstrated how opinion had evolved, it might reduce some of the conflicts.

Chapter 6: Analysis of Participant Five

P5 was under 35, married and had one child when the study began, see Figure 6-1. P5 stated that she searched for more information during this pregnancy than she did during the last pregnancy. During the last pregnancy, P5 kept her information-seeking to a minimum based on the advice of her GP. During this pregnancy, P5 felt she was more aware of potential complications and would prefer to be prepared.

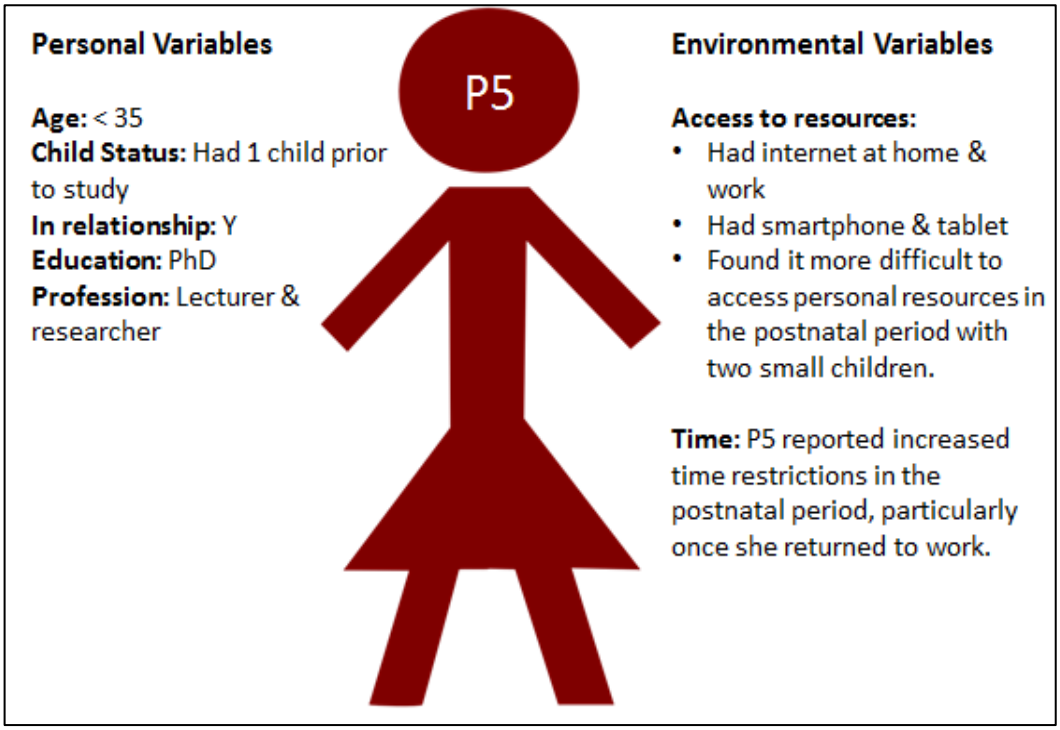


Figure 6-1 Characteristics P5

P5 has a Ph.D. and works in research. This influenced how she evaluated information resources. P5 was conscious of the speed of change in medical research. She was, therefore, particularly interested in the currency of medical information. P5 was also aware of web design standards which made her distrustful of online resources which did not conform to those standards.

Figure 6-2 illustrates the changes in P5's general and medical information-seeking. Medical information-seeking was at its peak during the antenatal period. There was a small decline in the first postnatal period, before a larger drop and a levelling off. During both the antenatal and the start of the postnatal period P5 had to deal with

high-stress medical situations, where she was unsure of the solution. This explains the higher levels of information-seeking.

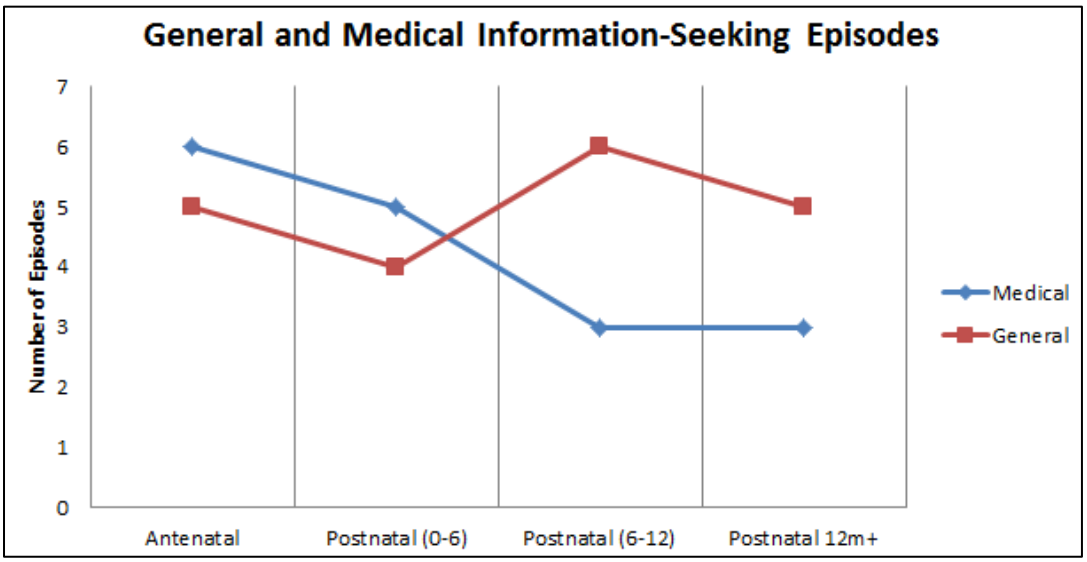


Figure 6-2 P5's General and Medical Information-Seeking

P5's general information-seeking experienced its peak in the postnatal period (6-12m) period. The peak in general information-seeking was caused by a convergence of tasks, weaning, birthday presents and P5 preparing to return to work. Other than the peak, P5's general information-seeking followed a very similar pattern to her medical information-seeking, see Figure 6-2.

During the postnatal period with two small children, time was a factor for P5. Her older son was a toddler, so it was also more difficult to leave the house. This made online information resources a convenient method for accessing information. Once P5 returned to work, her time became more limited. P5 sought information as tasks arose. Her information-seeking was usually time restricted either in work or on the iPad in front of the television. Any browsing that had occurred in the antenatal or early in the postnatal period now ceased.

6.1 Information-Seeking Episodes (P5)

This section analyses information-seeking examples to provide insight into P5's information behaviour. This section includes an analysis of seven medical information-seeking episodes. These episodes are a mix of medical information-seeking for P5 and medical information-seeking for her son. They are the richest medical information-seeking examples and highlight P5's preferences for medical

information resources. Four general information-seeking examples were also included, the first involves P5 purchasing a double stroller. This episode was selected as it offers insight into several subjective criteria. The other three general information-seeking episodes involve different stages of weaning. This is a topic that every participant sought information on and is, therefore, interesting to compare.

Figure 6-3 is a timeline which illustrates all the information-seeking episodes that are analysed in this section. From the timeline, it is evident that this section includes both medical and general examples. The information-seeking episodes also represent each of the four time periods under analysis. This allows the researcher to comment on any changes that were observed in P5's information-behaviour over time. Any episodes that are connected using arrows in Figure 6-3 are directly related to each other, for example, the three weaning information-seeking episodes. As a result, those episodes are discussed under one sub-section. Otherwise, the information-seeking episodes are discussed in chronological order of occurrence over time.

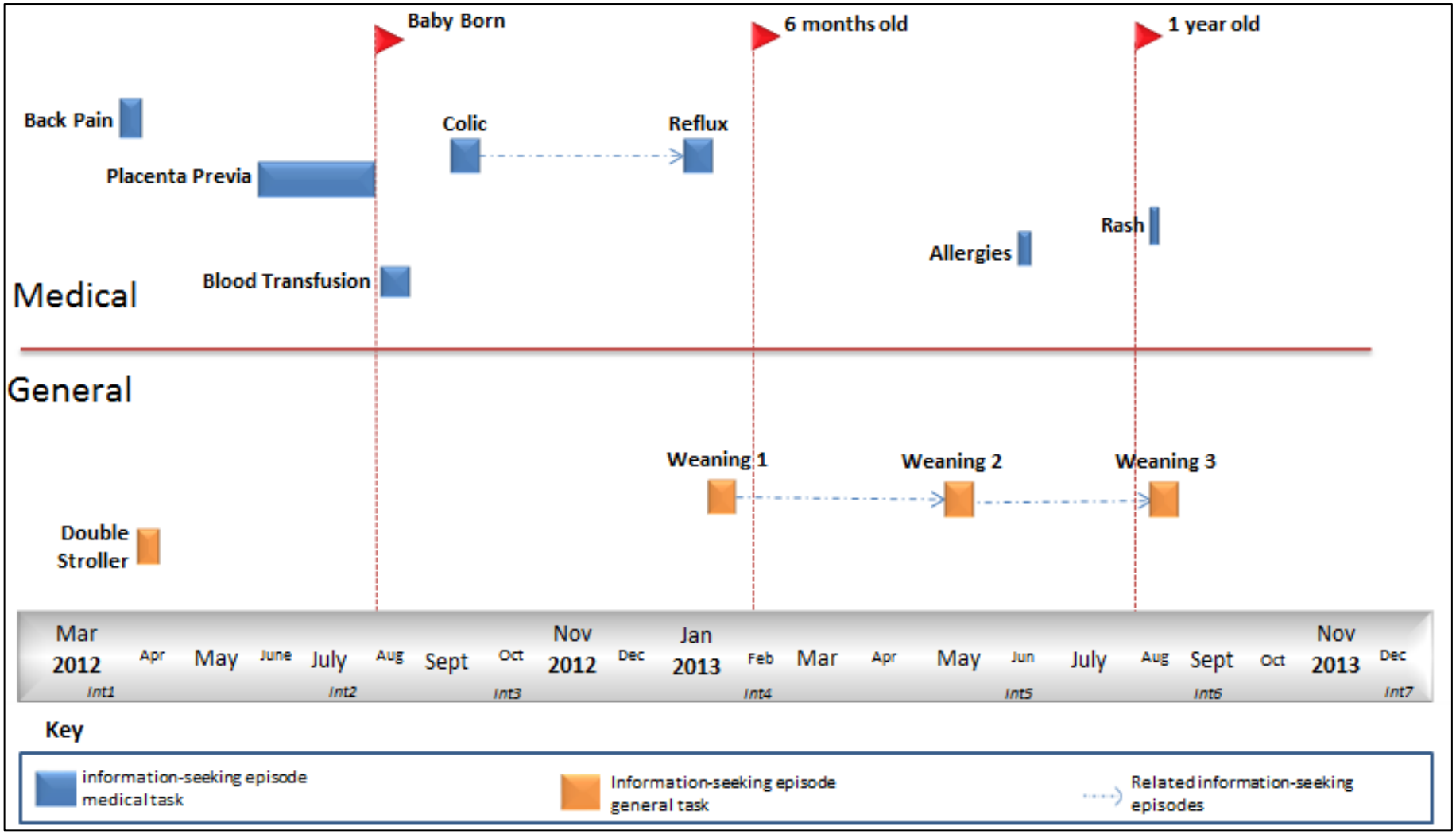


Figure 6-3 Information-Seeking Timeline P5

6.1.1 Back Pain (Antenatal)

The medical information-seeking episode depicted in Figure 6-4 occurred during the antenatal period. The episode contained three medical tasks, seven searches and a mix of online, personal and expert resources. During the antenatal period, P5 experienced two peaks in information-seeking. This episode occurred during the first peak. The first peak started because P5 was feeling sicker than she had during her previous pregnancy. It was further exacerbated by a miscarriage scare during the first-trimester. For P5, this set "*the tone*" (P5) of her information-seeking for the remainder of the antenatal period. P5 began the episode feeling anxious and uncertain, partly because of the severe back pain and partly because this experience was so different from the previous pregnancy. P5 was cautious where she got advice at this stage. This episode demonstrates that during the antenatal period, P5 judged credibility based on the information resources personal experience of the task and their expertise. P5 found medical expertise particularly credible.

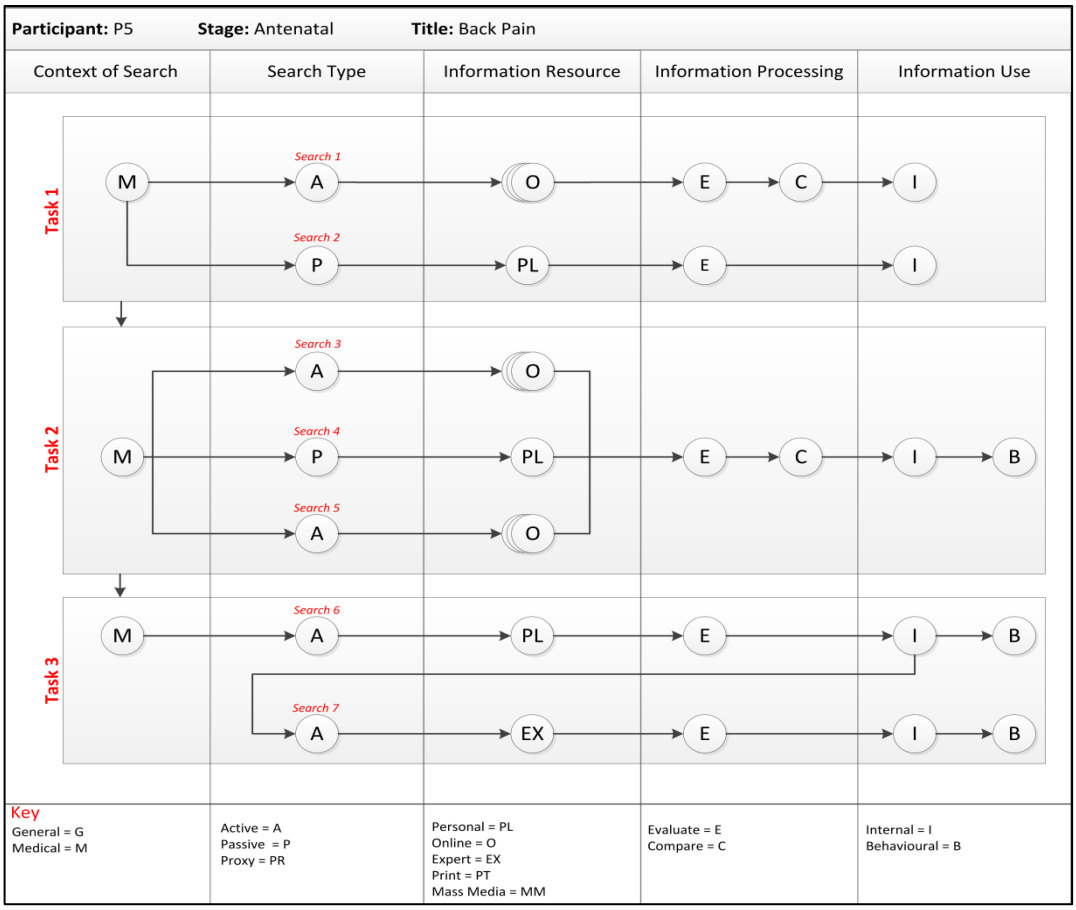


Figure 6-4 P5 - Back Pain IBAT

The aim of the first task was to find a method to relieve P5's back pain. For the first search, P5 accessed online resources, see Figure 6-4. However, P5 was cautious and ultimately did not take any of the advice on board. The second search was a passive search. A colleague noticed that P5 was walking stiffly, and this led to a discussion about her back pain. The colleague suggested that P5 try a heat patch and gave her one he had in his office.

P5 was uncertain about using the heat patch; she was particularly nervous about their ingredients and the potential impact it could have on her pregnancy. The advice to use it had come from a colleague, a man who had no experience with heat patches related to pregnancy. This uncertainty led to a change in task, see Figure 6-4. P5's aim was to verify the safety of heat patches during pregnancy.

There are three searches in task two, two online active searches and one passive personal search. The three searches are evaluated and compared in parallel because P5 was conducting an online search that was interrupted by a call from her mother. During that call the topic came up in conversation, making it a passive search. Once the call was over, P5 returned to her online search.

Based on the information P5 found online, and her mother's input P5 decided not to use the heat patch. P5's mother had pointed out that P5 was *"normally quite careful about these things"* (P5), so it might not be worth the risk. On the forums, P5 had found somebody identifying themselves as a midwife who suggested that a couple of paracetamol and a hot water bottle might be safer than the heat patch.

After P5 decided against the heat patch, she went back to investigating all safe back pain solutions. This is illustrated as the third task in Figure 6-4. The next resource P5 accessed was a personal resource. P5 spoke to a female colleague who had children, see search six in Figure 6-4. The colleague recommended going to a physiotherapist. The physiotherapist could provide P5 with advice and could provide acupuncture which her colleague had found beneficial. The physiotherapist provided several sessions of acupuncture and advised P5 that she should attend prenatal yoga as a method of strengthening her back and improving flexibility. P5

took the advice offered by the physiotherapist and attended the prenatal yoga class.

6.1.2 *Double Stroller* (Antenatal)

The general information-seeking episode depicted in Figure 6-5 occurred during the antenatal period. The episode contained one task, four searches and a mix of personal, online and expert resources. Unlike the majority of information-seeking episodes, the experts discussed in this episode are not medical experts. In this episode, P5 was investigating double strollers, and the experts refer to individuals in the speciality shops. In this episode, we gain insight into a number of assessment criteria that were important to P5, particularly for online resources. These include complete and relevant information, along with an attractive format and usable design. Format and design issues are a bigger problem for P5 if she does not already know and trust the brand.

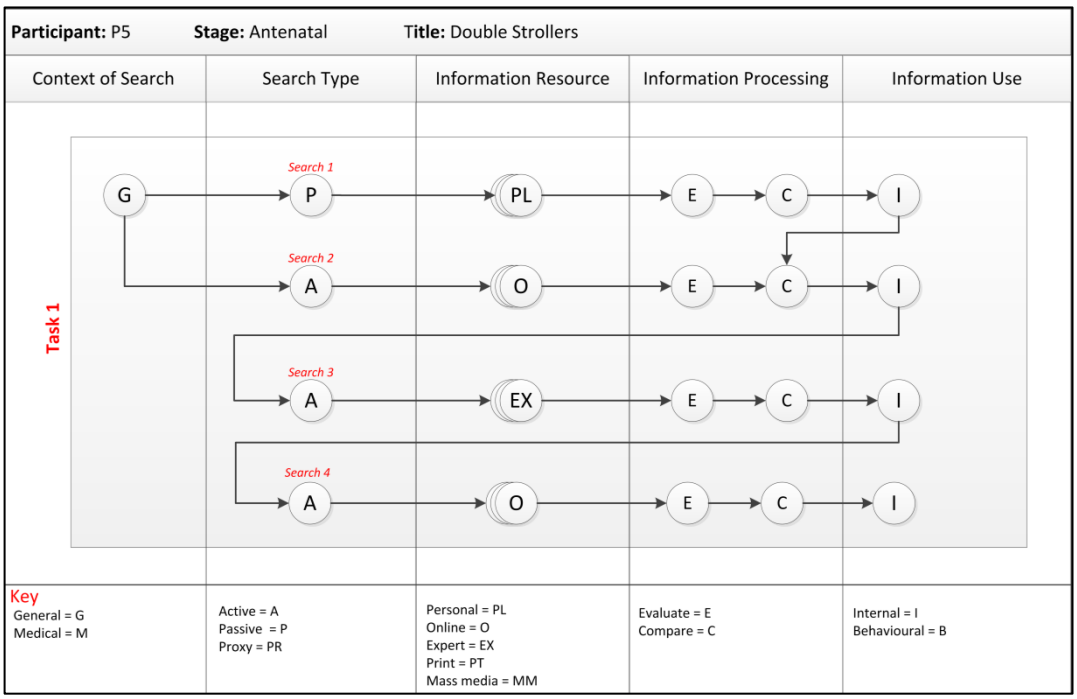


Figure 6-5 P5 - Double Stroller IBAT

This first search illustrated in Figure 6-5 involved P5 consulting a number of different friends who had children the same age as P5 had. They were able to offer relevant insight as they were also in the market for double strollers. P5 had met these friends after having her first son and the group regularly shared information and advice. P5 valued their opinion because they could offer personal experience.

The second search in Figure 6-5 involved P5 researching online. P5 was interested in investigating different makes and models and comparing the prices, along with the "*reviews of other users"* (P5). However, P5 was not satisfied with her search. She found it difficult to find a complete information resource, with "*all of the information, pricing and reviews*" (P5). P5 commented that although the larger chain stores had "*reasonable designed, consistent websites*" *(P5)*, many of the smaller sellers had sites that were "*not designed as well as they could be"* (P5). P5 stated that the lack of brand awareness combined with bad design and usability issues made her nervous to make such a large purchase on their site.

The third search in Figure 6-5 involved P5 physically visiting the shops, this search was prompted by the difficulty P5 had in finding suitable information online. P5 felt that it would speed up the process because otherwise, it would have taken *"quite a long time on the internet to actually gather, assess and evaluate"* (P5) the information. Although P5 did find it inconvenient to spend all weekend going to the shops, she did state that the practical information available from the shops was quite useful.

The last search in Figure 6-5 is when P5 took the information she had gathered from the shops and conducted a final online search. Although P5 did go back online to gather additional information, she eventually purchased the stroller from a local nursery store. The poor quality of many of the websites she found, combined with the high cost of the product, meant that she did not trust purchasing it online.

6.1.3 *Placenta Praevia* (Antenatal)

The medical information-seeking episode described in Figure 6-6 occurred in the antenatal period. The information-seeking episode contained one task, four searches and a variety of information resources. The episode describes P5's information-seeking after she was diagnosed with placenta praevia. When P5 was diagnosed with placenta praevia, it marked the second information-seeking peak of the antenatal period which continued until the end of the antenatal period. P5 searched for a broad range of information on the condition not only to fill a cognitive gap but also in an attempt to solve her affective needs. This was the one

episode where P5's husband acts as a proxy. This was for two reasons; firstly P5's husband had access to relevant information resources. Secondly, this was an information-seeking episode with high levels of uncertainty and stress.

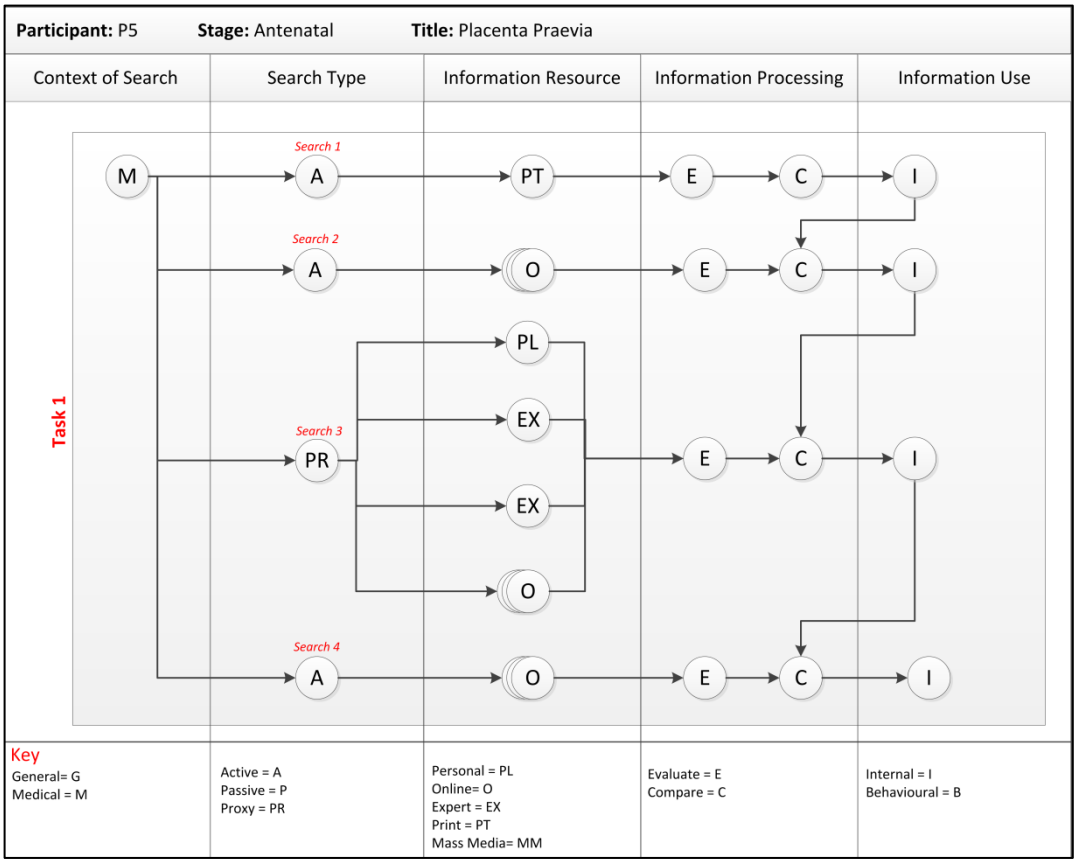


Figure 6-6 P5 - Placenta Praevia IBAT

The first two searches conducted by P5 involved online and print resources, see Figure 6-6. The print resource was a book, called 'What to Expect When You're Expecting.' This is a book that P5 regularly used throughout both her pregnancies. When P5 searched online, she visited a mixture of medical sites and forums to gather information. One thing that stood out for P5 from her initial search was that she *"couldn't have done anything to make things better"* (P5). P5 stated that she found it reassuring to know that she had not done anything to cause the condition, that she had just been "*unlucky*" (P5).

The third search involved P5's husband acting as a proxy, see Figure 6-6. Both P5 and her husband were particularly worried about the condition. P5's husband spoke to his boss who had experience with placenta praevia in two of her pregnancies. His boss was able to provide insight based on her personal experience, which P5 found

useful. However, the encounter also had another outcome. The boss was very surprised that P5 had not been admitted to the hospital already because of the risks associated with the condition. Both P5 and her husband were already concerned about this because of the distance from their house to the hospital. When his boss expressed such surprise and concern, this exacerbated their anxiety on the issue. The other resources that P5's husband consulted during the search were two occupational therapy nurses that he worked with and several online resources.

Throughout the remainder of her pregnancy P5 continued to search online for additional information. They only time P5 stopped was for a brief period after she was admitted to hospital at 36 weeks. P5 does not like hospitals or medical interventions. At that point, she was "*nervous about having the caesarean section*" (P5) and just decided to stop searching for a couple of days. Up to this, she had searched continuously as a method of coping, now she tried avoiding information. However, this did not last long. P5 did go back to searching about placenta praevia right up to the point she gave birth.

6.1.4 Blood Transfusion (Postnatal 0-6m)

The medical information-seeking episode described in Figure 6-7 is the first episode to occur in the postnatal period. The episode involved three medical tasks, six searches and a combination of online and expert information resources. The first two tasks in this information-seeking episode involved stress, uncertainty, and frustration. In the first task, P5 first found it difficult to find information resources with sufficient and relevant information to make a time-sensitive decision. While in the second task, P5 was faced with conflicting information that did nothing to resolve her uncertainty. The final task in Figure 6-7 differed from the previous two as it was focused on cognitive needs alone.

The first medical task depicted in Figure 6-7 involved P5 having to decide if she wanted to accept a blood transfusion. P5 was still in hospital and recovering from a C-section. The doctors informed P5 that her iron levels were low and that she could get a blood transfusion to help get her levels back up or she could take iron tablets and rely on an iron rich diet. P5 stated that she is "*very squeamish*" so her "*initial*

reaction was no" (P5). However, she decided that she needed more information and decided to search online.

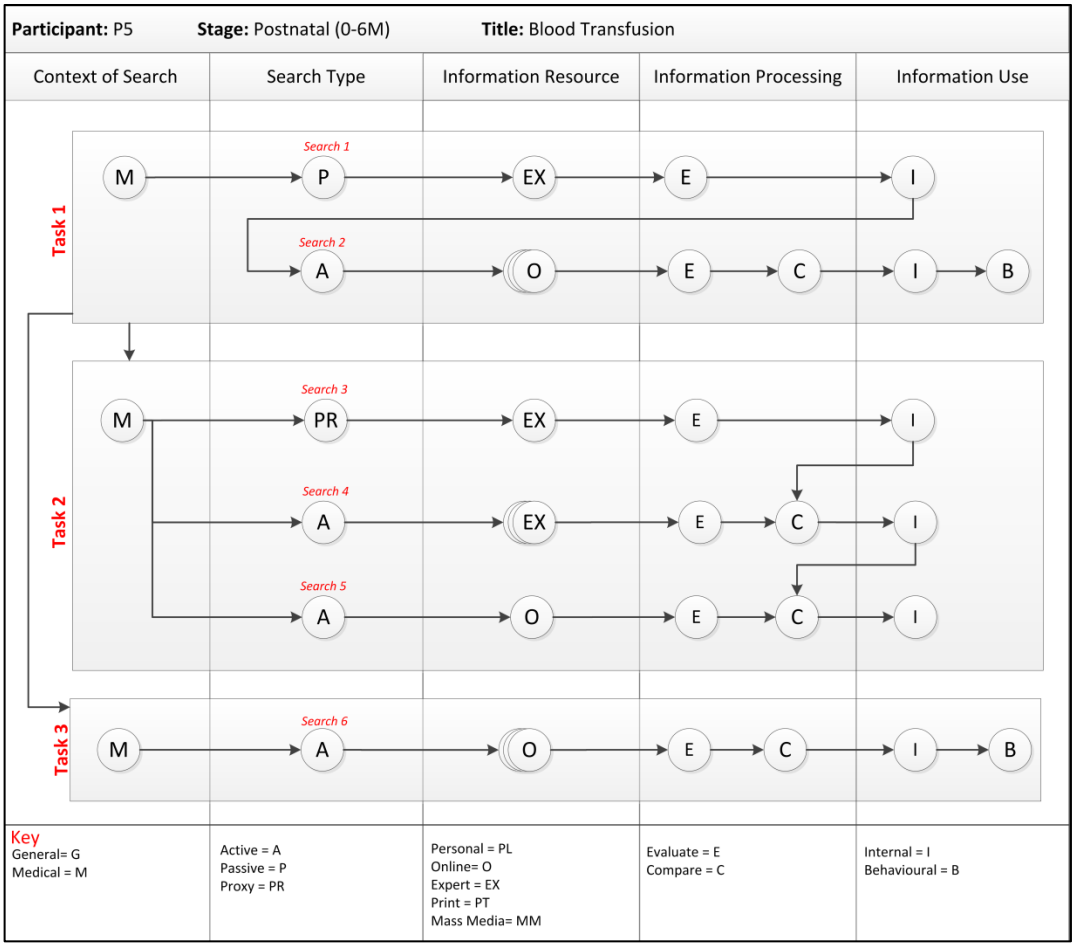


Figure 6-7 P5 - Blood Transfusion IBAT

P5 found she was dissatisfied with the information online. P5 found it difficult to find detailed information, specific to her situation and Ireland. Although P5 found certain aspects of the NHS website useful, she felt that the fact that the information was based on a different healthcare system to be *"a bit disconcerting"* (P5). In all her searching, P5 found no information that reassured her that blood transfusion was the best course of action, so she decided to rely on the iron tablets and to alter her diet.

The results of task one influenced both task two and task three, as illustrated in Figure 6-7. Task two, also a medical task involved P5 continuing to search for information on blood transfusions after she had made her decision not to have one. This highlights that P5 was not confident with the decision she made. This might

have been different if either the medical professionals or the eHealth sites she had visited had provided information that met P5's assessment criteria.

P5 continued to search to get more information and ultimately reduce her uncertainty over her decision. P5 again searched online, she spoke to some nurses, and she employed her mother as a proxy. Her mother gathered information from a relative who is a hospital consultant in the UK. From this search, P5 was given conflicting information. The hospital consultant suggested she was better off not taking the transfusion due to the length of time it would have taken her body to absorb the new blood. However, the nurses agreed that she would have rebounded quicker after her C-section if she had taken the transfusion. In the end after comparing the information, P5 was left just as unsure as she had been at the start of the search.

The third task occurred as a direct result of P5 not taking the transfusion. This was a simpler task in comparison to the previous two. As P5 had decided to alter her diet, she needed to investigate iron-rich diets. P5 searched a variety of websites before deciding on the adjustments she would need to make to her diet to increase her iron levels.

6.1.5 Colic to Reflux *(Postnatal 0-6m)*

Within this section, two information-seeking episodes, occurring in the postnatal period (0-6m) have been grouped together. The two episodes have been grouped together because they relate to the same medical condition. In the first task, P5 believed her young son to have colic and used a combination of information-seeking and experience to help reduce his symptoms. In the second information-seeking episode, P5 had come to the conclusion that her son had something more than colic. In this information-seeking episode, P5 sought information from other parents to help her find a solution. The experience of other parents was a source of information that P5 valued highly.

6.1.5.1 Colic *(Postnatal 0-6m)*

The medical information-seeking episode illustrated in Figure 6-8 occurred in the postnatal period (0-6m). The episode contained one medical task, four searches and

a combination of online and expert resources. The goal of the task was to find methods for improving her son's colic. P5 used the previous experience that she had gained when with her older son had the same condition. P5 felt that this was something that her child would grow out of. However, she found it difficult just to sit back and watch such a small child in distress. Searching online and looking for possible solutions that may lessen the symptoms made P5 feel like she was at least doing something.

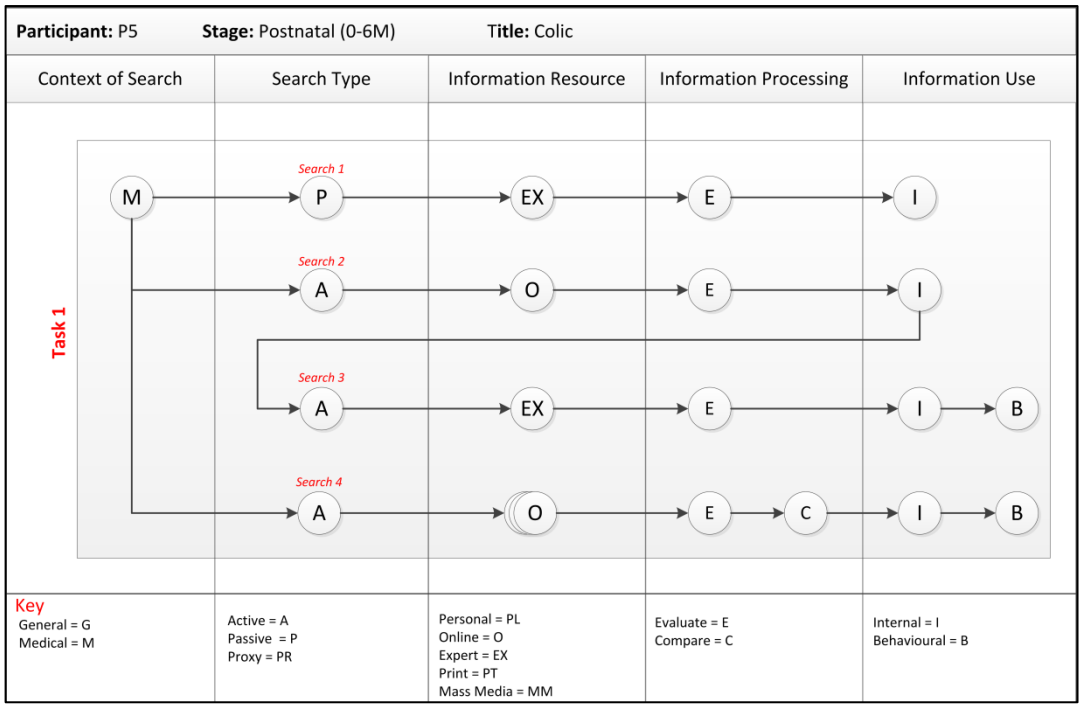


Figure 6-8 P5 - Colic IBAT

The first search included in Figure 6-8 was a passive search. While visiting the GP with her older son, the subject of her youngest son's colic arose. Based on previously experience, P5 did not think the information the GP provided was useful.

P5 had found the osteopath helpful when her older son had colic. She considered going down the same route this time but first did some research online. P5 wanted more information on what type of services were offered. Once she was satisfied P5 booked an appointment, search three Figure 6-8. P5 stated that she was more inquisitive during this visit that she had been previously. P5 commented that she asked more questions of the osteopath that she had during the visit with her older son. In P5's opinion, her ability to question the osteopath in greater detail was likely a result of her being "*a bit more confident*" than she was as a first-time mother.

During the fourth and final search, P5 consulted several websites. These sites were found through putting *"different keywords into Google and looking at possible alternatives"* (P5). Based on her search, P5 found several useful resources, some fact-based and some based on the experience of other mothers. There were two suggestions that P5 discovered during her search that led to behaviour changes. The first was information on baby massage which can aid digestion. The second was information on alternative ways to make up formula bottles. P5 was particularly surprised at the number of different options for making up bottles. She stated that the variety was *"amazing"* (P5).

When interviewed P5 was hopeful that her son's colic appeared to be improving. P5 was unsure if any improvements could be attributed to her behaviour changes or if it was just her son getting older. However, P5 did state that the act of information-seeking made her feel like she was *"doing a better job"* (P5).

6.1.5.2 *Reflux* *(Postnatal 0-6m)*

The medical information-seeking episode depicted in Figure 6-9 occurred in the postnatal period (0-6m). The episode contained one medical task, four searches and a mix of expert, personal and online resources. P5's son had not grown out of the colic as she had hoped. As he continued to have digestive problems, P5 began to suspect that there was something else wrong. P5 had previously spoken about an increased confidence when dealing with healthcare professionals, and this was also evident here. When P5 was dissatisfied with the treatment prescribed by her GP, she conducted her own investigation to find an alternative. P5 was satisfied she had discovered a viable alternative; she presented it to the GP as something she wanted for her son.

The behaviour changes that P5 had adopted in the previous episode had offered a degree of improvement; however, they were only ever meant as a stop gap until the child grew out of the suspected colic. When this did not happen, and the child continued to have digestive discomfort, P5 took the child to the GP, see search one in Figure 6-9. After two visits to the GP, the GP suggested P5 try Infant Gaviscon. P5 agreed and gave this to the child.

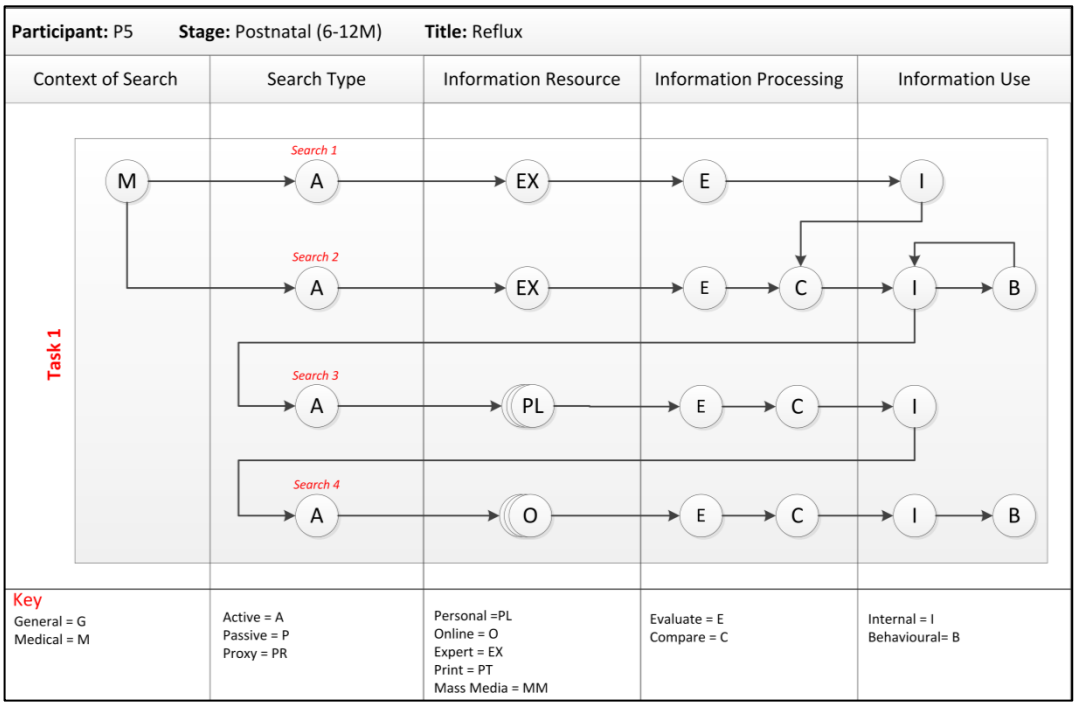


Figure 6-9 P5 - Reflux IBAT

P5 found, however, that the Infant Gaviscon did not seem to agree with her son, as it "*was making him feel kind of unwell, and he wasn't able to dirty his nappies at all*" (P5). P5 decided to speak to other parents who had experience with the issue to get their advice. During the "*many discussions with parents who had children with reflux*" (P5), she was advised to try Zantac as it had worked well for others. P5 decided to research online to see what other people were saying about Zantac for infants.

After searching several sites, P5 felt that Zantac was the right choice. The online information had confirmed what other parents had told her. As a result, P5 went to the GP and asked for Zantac for her son. The Zantac was a success; P5 described her son as a "*different child*" (P5) afterward. As a result, the child was "*eating anything, dealing with bottles and sleeping better at night*" (P5).

6.1.6 Allergies *(Postnatal 6-12m)*

The medical information-seeking episode illustrated in Figure 6-10 took place in the second postnatal period, 6-12m. The episode contained three medical tasks, four searches and a mix of personal, online and expert resources. During this

information-seeking episode, P5's son had an allergic reaction. As it was at the weekend and her own GP was closed, P5 consulted a GP she was unfamiliar with. P5 was very satisfied with her interaction with this GP because of the quantity of information the GP provided her with during the consultation. However, P5 still choose to verify some of the advice that the GP provided, using friends and colleagues. This was because P5's youngest son was allergy prone and P5 felt the need to be extra cautious.

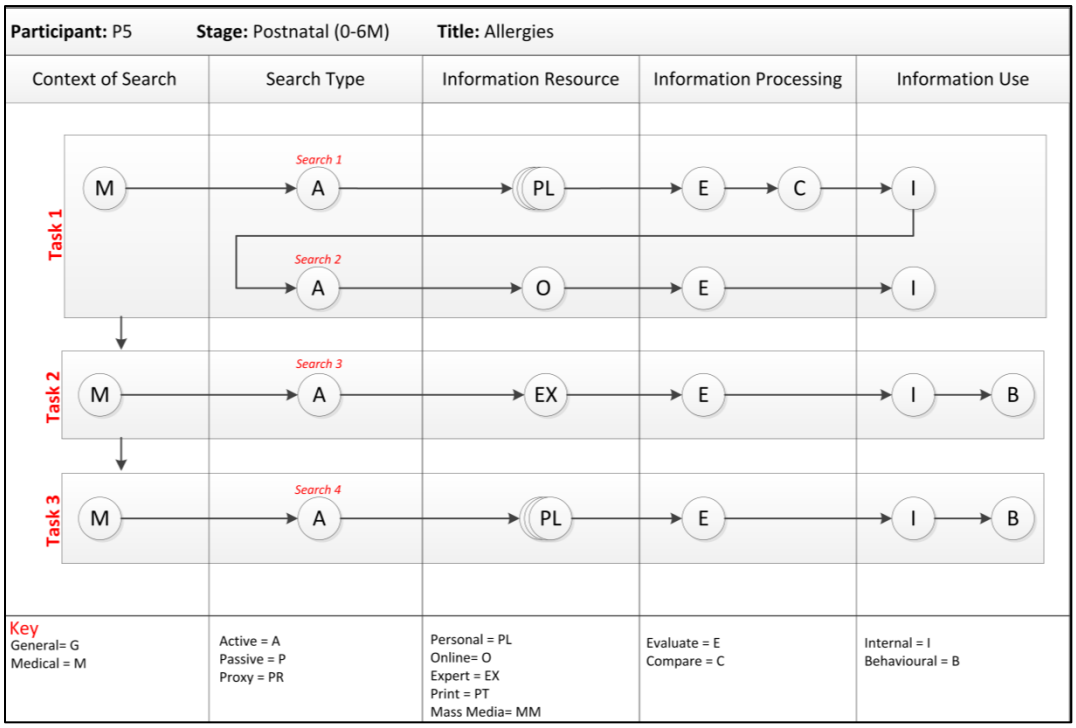


Figure 6-10 P5 - Allergies IBAT

Not long after P5 returned to work, she was asked to provide her son's crèche with sunscreen because the weather had gotten sunny. On the Saturday morning of a bank holiday weekend, P5 awoke to find her son's *"eyes actually closed, and his face was very sore and red and spotty"* (P5). P5 wished to bring her son to see the doctor, but her GP was not open on a Saturday. Usually, when the children were sick, and the GP was closed P5 would take them to SouthDoc. SouthDoc is an out of hours GP service for her area. However, P5 felt that the GPs working there were "*very reluctant to treat with any kind of aggressive medication because generally, the patient is presenting for the first time*" (P5). P5 was hoping for something that would help her son fast.

The first task in Figure 6-10 depicts P5 researching alternative options to SouthDoc. P5 spoke to friends who lived in the area to discover if they knew about any GP practices that may be open. From her friends P5 heard of one possible clinic that might be open. This led P5 to investigate the clinic online. P5 found that it was open and decided to get an appointment with them instead of going to SouthDoc.

The second task in Figure 6-10 describes P5's encounter with the GP. The GP confirmed that the issue was an allergic reaction. P5 had not been sure if the reaction was due to the sunscreen or if was a food allergy. P5 had given her son cow's milk in Weetabix for the first time. Due to P5's own intolerance to dairy, she suspected that could be the cause. The GP, however, was confident that the reaction was because of the sunscreen. P5 found the GP to be "*a wonderful resource"* (P5). The GP offered advice on a sunscreen that had fewer chemicals. The GP also offered tips for the child's diet and an inhaler to help his wheezing, which had not been the primary focus of the visit. Overall P5 stated that GP was *"very informative, very thorough in her approach and really was quite efficient in terms of diagnosing"* (P5). P5 decided to adopt a number of the GP's suggestions; however, she felt the need to verify the sunscreen advice with her peers.

The final task in Figure 6-10 involved P5 discussing the advice she had received from the GP with peers and colleagues. P5 used these discussions both to share the information she had learned but also to enquire as to what sunscreens other mothers were using. P5 was cautious because her son was allergy prone, and wanted to ensure that she bought the right product for him. P5 received verification of the GP's advice from a colleague. The colleague's son had sensitive skin and her doctor had recommended the same sunscreen.

6.1.7 Weaning *(Postnatal 0-12m+)*

These three information-seeking episodes span the three postnatal periods. They are grouped together because they all cover different aspects of the weaning process. While they each have things in common, for example, they are all general information-seeking episodes and they all involve P5 leveraging her previous weaning experience to aid her information-seeking and decision-making. They also

have differences, for example, the second two episodes involve a greater degree of uncertainty than the first weaning information-seeking episode.

6.1.7.1 *Weaning 1* *(Postnatal 0-6m)*

The short general information-seeking episode depicted in Figure 6-11 occurred in the first postnatal period. It is the first of three weaning episodes included for P5. The episode involved one general task, two active searches and a combination of personal and print resources. During this episode it is clear that P5 not only compares different information resources against each other but also compares the information she finds against her past experience. P5 does this at various stages throughout the postnatal period, such as during the colic information-seeking episode. During this episode her past weaning experience also informs the aim of the task, as P5 wants her youngest son to have a more varied palate than her older son.

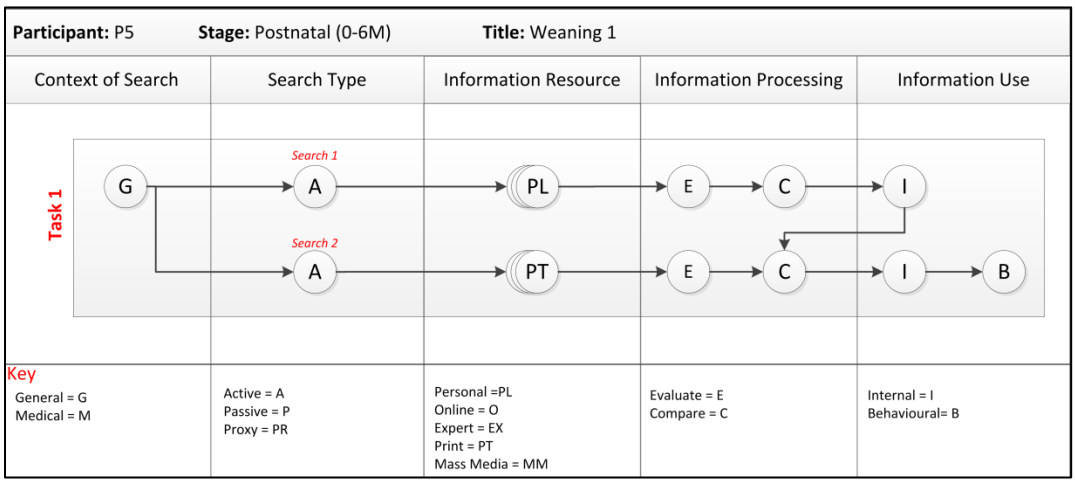


Figure 6-11 P5 - Weaning 1 IBAT

The first search in Figure 6-11 involved personal resources. When P5 was weaning her older son, she had made everything from scratch. Although she attempted to vary his diet during the process, P5's older son became a picky eater. P5 wanted to avoid this with her younger son. This is what motivated her to consult with her mother and friends to enquire about their experiences. P5 stated that she had a number of friends who also had second children around the same age as her son. Partly because of time restraints some of her friends had told her that they were *"mixing it up a bit more"* (P5) this time around, using both homemade meals and store bought jars.

P5 consulted weaning books that she had bought when weaning her older child and also purchased a new Annabel Karmel book. The books advocated making homemade meals, however, they were not against using premade meals that were additive free. After considering the advice from the books and her friends, P5 decided to include a mix of jars and homemade meals in her son's diet. The deciding factor had been P5's previous experience with her older son. P5 felt that adding the jars to the weaning strategy was the best option for her. It was P5's opinion that jars offered a "*more complex flavour"* (P5) profile than could be provided by home cooked food.

6.1.7.2 *Weaning 2* *(Postnatal 6-12m)*

The general information-seeking episode depicted in Figure 6-12 occurred several months after the first weaning episode, in the second postnatal period (6-12m). This information-seeking episode contained two general tasks, four searches and a mix of expert, online, personal and print resources. Similar to the previous episode, P5 leveraged her previous experience of weaning her older son. This episode involved more uncertainty than the first weaning episode, as is evident by the increased number and variety of information resources accessed by P5 during the episode, see Figure 6-12. The uncertainty in this episode stems from P5's own food intolerances and a public health nurse providing P5 information on research that was so recent that P5 found it difficult to verify.

The first general task involved P5 consulting a public health nurse on diet and nutrition for babies and toddlers. P5 was informed that a number of foods such as eggs, certain cheeses and kiwi fruit, that P5 had previously been told not to give to children until after the age of one, were now okay to give prior to twelve months. The nurse informed P5 that "*research indicates that if your child has an allergy they are going to have an allergy anyway"* (P5).

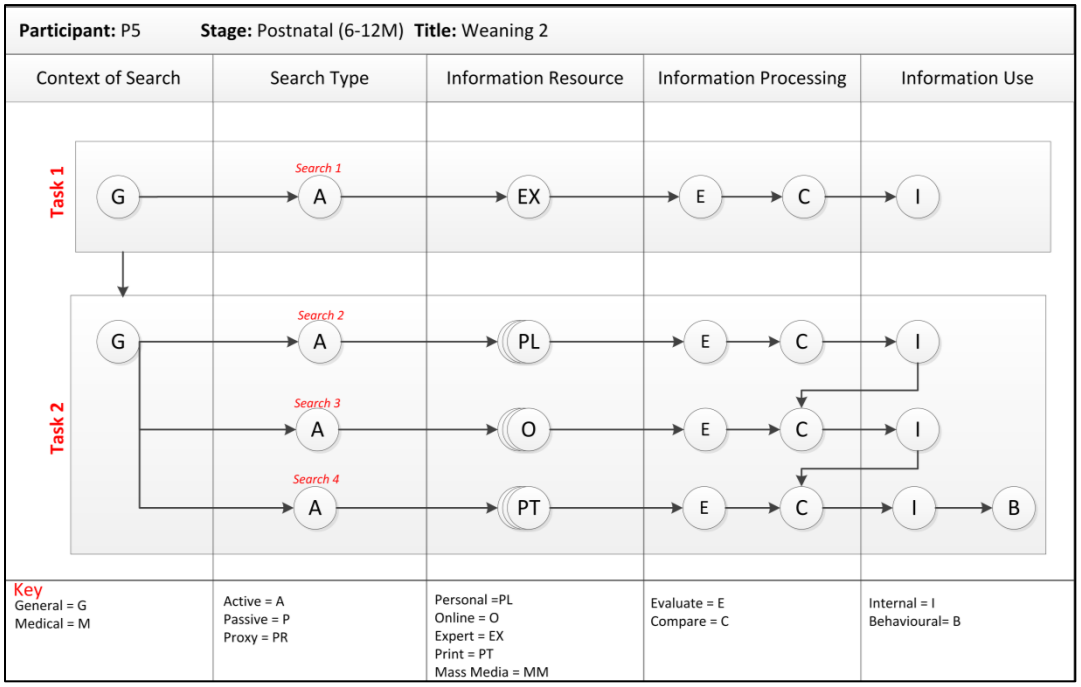


Figure 6-12 P5 - Weaning 2 IBAT

P5 is intolerant to dairy and this had made her "*nervous of food*" (P5). The conversation with the public health nurse left P5 uncertain as it conflicted with information P5 had previously been told. Other than dairy, P5 perceived a number of the foods that the nurse had mentioned, such as nuts to be "*a bit risky*" (P5). However, as previously mentioned P5 was eager to expose her younger son to wide variety of foods in the hope of expanding his palate. As a result P5 decided to research the issue further.

The second task in Figure 6-12 involved P5 investigating the claims made by the public health nurse. P5 stated that she did not consult directly with her friends on the issue but observed what they gave their children. P5 commented on one friend who was "*quite adventurous and quite progressive*" (P5) with the types of food she gave her children. P5 also discussed another friend who made the effort to incorporate foods such as fish, even though she did not like fish herself, so as not to limit her children's' tastes.

P5 stated that she could not find reference to the information that the public health nurse had provided during her online search or in her books. Her books were mostly two years old, so she felt that could be the reason. She felt that it also might take a while for recent research to filter through online. In the end, P5 decided to

introduce some of the foods the public health nurse had mentioned earlier than she had introduced them to her older son. P5 stated that the "*information had changed some of the dinners*" (P5) she was providing her son. P5 also commented that the search had resulted in her introducing "*some of the finger foods much sooner*" (P5). However, the one food group P5 did hold back on was dairy. P5 stated this was for two reasons; the first was that her intolerance to dairy made her nervous and the second was the fact that the child was prone to skin rashes and ear infections, and she was fearful that dairy would exacerbate the issue.

6.1.7.3 *Weaning 3* *(Postnatal 12m+)*

The final weaning information-seeking episode occurred just as the child turned one. Like the previous two weaning information-seeking episodes, it is a general episode. It included one general task, four active searches, and a mix of personal, print and online resources, see Figure 6-13. As with the previous episode, this information-seeking episode included a degree of uncertainty for P5. The reason for this is because this episode describes P5 introducing cow's milk. This was difficult for P5 for two reasons, firstly, her own intolerance of dairy made her nervous of dairy products, and secondly, her older son had always refused to drink cow's milk.

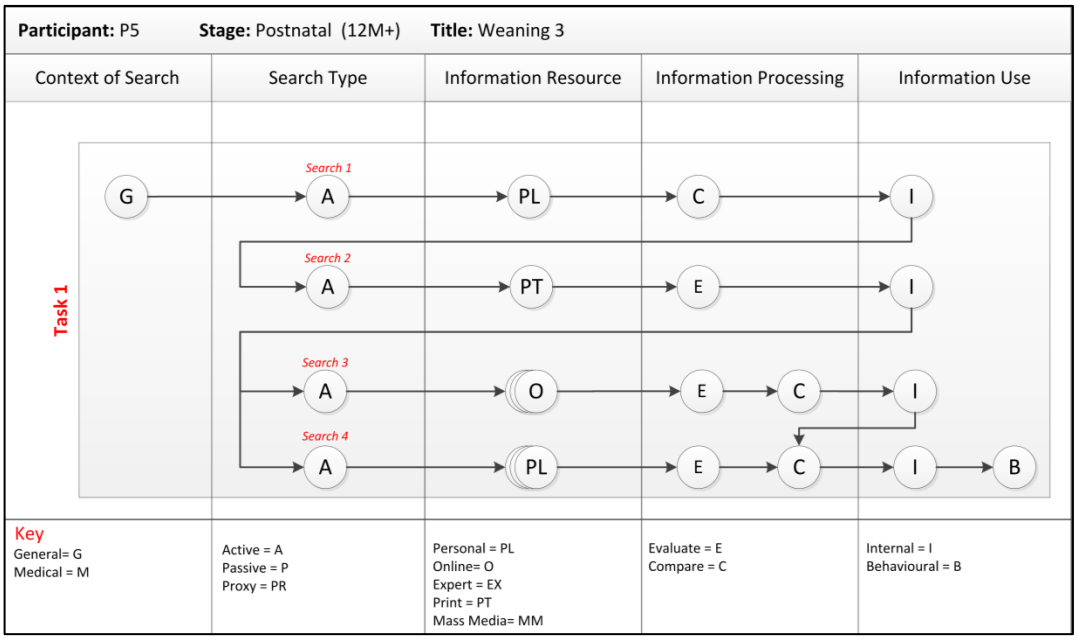


Figure 6-13 P5 - Weaning 3 IBAT

The first search described in Figure 6-13 involved P5 speaking to a friend about introducing cow's milk into her son's diet. Her friend suggested that she should

introduce the milk slowly over five days by mixing it with formula, reducing the formula each day until the last day there is only milk. P5 thought this sounded interesting as, with her older son, she had gone with "*a big-bang approach and giving him a bottle of cow's milk*" (P5) straight away and that had been unsuccessful.

P5 decided to keep searching to see if she could find a different strategy or find other people who had used the one her friend had suggested. She was afraid that mixing the milk with formula "*would taste awful*" (P5) and her son would not drink it.

P5 searched a variety of sources, including online, print and personal. The first of these, the print resource did not provide P5 with a strategy for introducing dairy. However, the book helped to *reduce [her] uncertainty*" (P5). *It achieved this by confirming that* twelve months is the correct time to introduce a full milk bottle. Once P5 felt more confident she progressed to consulting online and personal resources. P5 found support for her the strategy her friend had suggested among mothers on the forums and from her peers. Comparing multiple resources had the effect of "*reducing [her] uncertainty*" (P5)*,* which led to P5 implementing the strategy suggested by her friend.

P5 later stated that the strategy worked well for her, and the child was happily drinking milk. P5 felt own intolerance to dairy had impacted her "*decision-making around dairy products*" (P5) and if it was not for her friend having success with the exact same strategy she would have been unlikely to implement it herself.

6.1.8 Rash *(Postnatal 12m+)*

The medical information-seeking depicted in Figure 6-14 occurred in the postnatal period (12m+). The episode contained two medical tasks, four searches and a mix of online, personal and expert resources. This episode involved high levels of uncertainty. Initially, P5 was worried that her son's rash was something more sinister. Once those fears were assuaged, P5 found that she required additional resources to verify some of the advice offered by her GP. P5 was extra cautious when it came to products for her youngest son, because he was particularly allergy

prone, and the product the GP recommended was particularly cheap which made her doubt its efficacy.

The first task depicted in Figure 6-14 describes P5's information-seeking after her youngest son developed "*a rash all over his body along with a couple of other symptoms"* (P5) which caused her to worry. P5 decided to search online in order to compare the rash and decide how critical it might be. P5 found that although some of the images she saw were *"kind of frightening*" and "*quite gruesome*" (P5), the search itself was reassuring because she was able to rule out meningitis which was her primary concern.

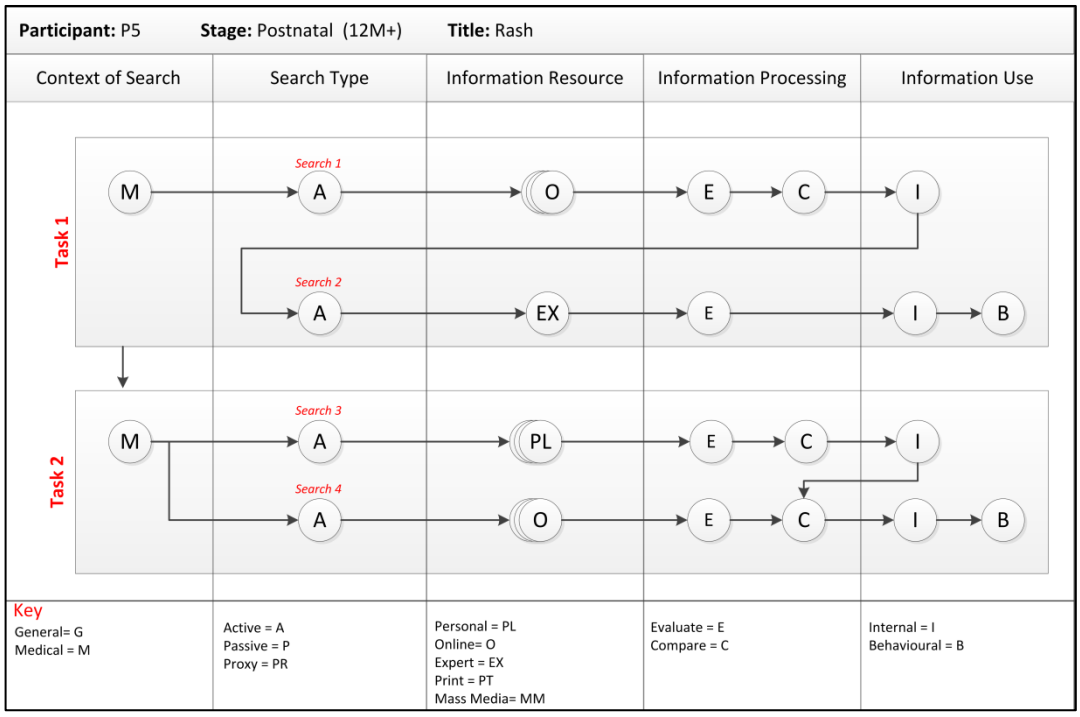


Figure 6-14 P5 - Rash IBAT

After P5 had out ruled meningitis, she decided to take the child to the GP, see search two in Figure 6-14. The GP informed P5 that her son had a chest infection. The GP gave P5 a prescription for an antibiotic to give to the child. The GP also recommended an emollient for the child's skin that could be applied directly to the skin and also used in the bath. P5 gave the child the antibiotics and decided to investigate the emollient.

P5's investigation of the emollient forms the basis for the second task. During the second task, P5 consulted friends with children and online resources. P5 had used

the product on her older son but because her younger son appeared more allergy prone she felt the need to "*double- and triple-check [her] sources"* (P5). P5 was partly concerned because the emollient was cheap compared to other products on the market. P5's friends informed her that they had also been told avoid certain popular brands if their children were prone to rashes as they have too many chemicals. P5 found references to the emollient on a number of forum posts. Based on her investigations, P5 decided to purchase the emollient and use it on her son.

6.2 RQ1: What Subjective Assessment Criteria Are Used During Information Processing?

The purpose of this question is to identify and discuss the subjective assessment criteria used by P5 during information processing. In Chapter Three, information processing was described as the process of evaluating and comparing information resources. Evaluation is concerned with assessing the quality of individual information resources. Whereas comparison is concerned with contrasting information resources against other information resources, this can also include previous experience or beliefs. The aim of this process is to find information that meets the individual's information needs.

6.2.1 Subjective Assessment Criteria (P5)

This section explores the subjective assessment criteria that P5 used to judge the quality of individual resources. The subjective assessment criteria are divided into those used to appraise information resource and those used to assess the information. Summary tables are used to demonstrate the subjective assessment criteria discussed by P5. For each criterion, there are illustrative quotes which demonstrate the criterions meaning to P5. An X is used to indicate the type or types of information resources that P5 was referring to in the illustrative quote. Lessons are taken from P5's perceptions of all types of information resources to identify design guidelines at the end of the section. The subjective assessment criteria for information resource are explored first, see Table 6-1.

The first information resource assessment criterion is **convenience**, see Table 6-1**.** It was mentioned by P5 both as a reason for not attending mother and baby groups

like she did after her first child was born and as one of the reasons for her accessing online resources. P5 stated that having two small children made it more difficult to leave the house, so it was, therefore, easier to consult online resources.

Criteria	Information Resource					Quotes
	PL	EX	O	PT	MM	
Convenience	X		X			*"I've two very small children, so actually getting out is not as easy as it was. I think that's possibly one of the main reasons why I'm reverting to some of these forums, instead of attending these groups, it is because I just can't get to them."*
Credibility			X			*"I'm not saying that the HSE website isn't well designed. It's still okay; it may not follow to the 'T' the really best practice design guidelines. However, it's recognisable and that creates connotations in my mind around expertise."*
			X			*"I think if you arrive at a website that is an information based website, and it has that amateur feel, you're less inclined to trust the information that's available there. I think particularly in the realm of health information, even more importantly, the health of your baby. I think if it doesn't look professional, to be honest, I'd move away from the site fairly quickly."*
			X			*"With a different set of symptoms I suppose it has just led me to look for more reassuring information and also for more accounts from other people who are in the same position as myself."*
	X					*"At the moment, I have different groups of friends for different questions."*
Format			X			*"It's a very well designed site. It uses a lot of plugins in terms of visual illustrations to support the work they do."*
			X			*"EUMom they have some nice diagrams in terms of baby's development."*
			X			*"The clean look and feel of a professional site like EUMom, for example. While there are lots of ads etc., it's well designed."*
			X			*"The amateur website tends to have a very poor colour scheme, maybe flashing images or images that don't appear or too many images. Maybe text that's too small or too big or in capitals, you know just going in the face of your principles of good website design."*
Rank on Search List			X			*"I generally pick out the top ranked ones amongst that – well the top 10, so the first page of say Google search."*
			X			*"I key in search terms to Google and look at the top three or four, five things. So maybe those sites do have the support that I'm looking for, but they're not being ranked as having it."*
Usability			X			*"I suppose it is a real turn off to arrive at a site, and links don't work, and buttons don't work, and the search engine doesn't work as it should, so if you are spending seven, eight hundred euro on a pushchair, you prefer to use technology that works for you "*

Table 6-1 P5 Information Resource Subjective Assessment Criteria

When it came to **credibility** P5 valued experience, expertise, and brand awareness, see Table 6-1. P5 valued the personal experiences of individuals who have been through similar situations. P5 mentioned how she had divided her friends depending on their experiences. During the information-seeking episodes, there was evidence of P5 accessing this type of information from both personal and online resources. Health professionals are considered credible because of their expertise. P5 discussed that if she was uncertain over a medical issue, she brings the children straight to doctor.

The brand awareness aspect of credibility has an interesting relationship with another criterion, formatting. P5 is knowledgeable about website design and spent some time commenting on the importance of formatting, see Table 6-1. This issue was discussed both for medical and general information, for example during the Double Stroller information-seeking episode. P5 was particularly aware of issues such as font size, the use of images and colour. P5 commented on the influence of good **formatting** on trust. Website design clearly impacts the credibility of a website and its associated brand. However, if the brand is strong enough, the website can have poorer design than a site with little or no awareness. P5 commented that although the HSE website did not follow the "*best practice design guidelines"* (P5) she already associated the brand with expertise, so the design did not influence her decision in accessing the site.

"Then you have the single, private shops, in Ireland who maybe are not designed as well as they could be. But you don't really know them, and the site doesn't look as slick as you expect I suppose in terms of web 2.0 technologies, you don't feel that it is the right place for you to shop." (P5)

Usability was another issue that impacted P5's trust in a site. P5 stated that if the simple features did not work it made her less likely to make a purchase, particularly a high value one. P5 often used a websites **rank on a search list**, particularly Google to decide if the site contained relevant information. P5 would choose sites from the first page, and often just from the first five sites listed. It was P5's opinion that filtering search results by their rank on the search list was an efficient and effective

way to search, particularly when her time was limited in the postnatal period. P5 found that it was a means of cutting down the time it took to search. P5 had previously found that results that were further down the search rankings were often either "*rubbish*" or from "*much older discussion forum conversations*" (P5).

The subjective assessment criteria for information are listed in Table 6-2. The first and most mentioned information assessment criteria for P5 was **Complete**, see Table 6-2. P5 discussed using multiple online resources to give herself a complete picture, or "*unified view*" (P5) before she went to talk to the sales people in the shops during the double stroller information-seeking episode. However, during the same episode P5 articulated the difficulty in gathering that information. There was no one online resource that provided all the information she needed. Instead, P5 had to visit multiple sites to gather the information.

The lack of a "*one-stop-shop*" (P5) was also an issue for P5 in the postnatal period. P5 perceived that none of the sites available were strong in all the areas that she required, for example, nutrition, illness, development, etc. This is why she found herself moving between "*four or five different resources*" (P5).

P5 has not always received sufficient information from expert resources. During the blood transfusion information-seeking episode, P5 was driven to search online because of a lack of information provided by the doctors in the hospital. At a later stage, when her son was getting tests done, P5 found that the doctors were hesitant to provide all the information on what might be wrong. The aim was not to worry P5 unless they found something but the lack of information just made P5 more worried. This led P5 to highlight the importance of experts providing parents with a complete picture of what they are looking for when they conduct tests. Otherwise, this can cause unnecessary uncertainty and anxiety in the parents. These negative feelings can then drive parents to search for alternative sources of information.

Criteria	Information Resource					Quotes
	PL	EX	O	PT	MM	
Complete			X			*"I think that the web has provided me with a more unified view of what is on offer and it has enabled me to make a more informed decision before I go to the store and hear the sales line if you like."*
			X			*"There really isn't one portal that I have found that has really met all my needs in terms of providing all of the information, pricing, and reviews that I could honestly recommend to somebody else."*
			X			*"The cases, they provide a lot of detail and the referees really provide support, it's a very complete information source is what I would say about it."*
			X			*"There really is no one-stop-shop source of information that can provide all of these things that as a mother you're looking for in terms of developmental, in terms of diet, in terms of nutrition, in terms of health, that I find myself almost flitting between four or five different resources. If one is strong for maybe diet and nutrition, I perceive that they maybe wouldn't be strong in terms of information around illness."*
		X				*"I think these measurements, what they mean and what they may suggest, should actually be better explained to parents."*
Currency			X			*"I have discounted older material from blogging because research has changed, technology has changed. You know anything after two years old I think in terms of the area of antenatal information is actually quite outdated."*
			X	X		*"Thinking about my books. I suppose interesting then, the book that I have been reading is a 2007 or 2008 publication. 'What to expect what you are expecting,' so that is a bit older. But when I look for online information resources I tend not to trust anything that is more than 12 or 18monts old. I think that is generally my rule of thumb."*
Relevant			X			*"I haven't found anywhere really that's offered me actually particularly products that can be purchased in Ireland. You can go online and find a really nice stroller and actually it's not shipped from the US or it's not shipped from Spain for example."*
			X			*"It's funny the blood transfusion stuff, maybe because I was so stressed. I couldn't find anything very useful on an Irish site, and I was relying on NHS information primarily. That was a bit disconcerting."*
			X			*"I would be more aligned with the UK version in terms of standards. I think their views would be more similar to ours in terms of a cultural perspective. Whereas the US is slightly different, there is definitely a different perspective."*
						"I wouldn't look to the U.S. for commentary on that type of stuff. I don't know why. Maybe I perceive maybe the lifestyle is a bit different, the products that are available are different so that we wouldn't be comparing like with like.
Reliable			X			*"I couldn't say I've gone to one website that I perceived to be reliable and followed a click through. I've more taken the approach to put different keywords that are related to Google and looked at possible alternatives."*

Table 6-2 P5 Information Assessment Criteria

P5 employed definite rules about the **currency** of online health information, see Table 6-2. P5 stated that anything over two years for antenatal information was "*quite outdated*" (P5). This rule may have been influenced by P5's experience in academia. P5 was less strict when it came to books, as her copy of 'What to Expect When You are Expecting' is from approximately 2007. Although not entirely clear, the difference in requirements may be because of the reputation of the book or because of positive experience during her last pregnancy.

Localisation was important for P5 for judging if the information was **relevant**. P5 stated that for certain medical information, such as guidelines she had a preference if the information came from an Irish or UK website. This was because of similar systems and culture. For other medical information, P5 required the information to be even more local, such as during the blood transfusion information-seeking episode. For general information-seeking, it was important to be able to find information on products that were available for sale in Ireland, for example, the double stroller information-seeking episode. However, localisation was not always a factor. P5 was aware of cultural and language differences between American and UK and Irish sites for other general tasks, but this did not make the sites less relevant for general tasks, or impact her preferences.

Reliability was not an assessment criterion that P5 discussed in detail. This was because her search strategy was based on keyword searches in Google and then accessing the top ten search results. P5 perceived that this was the best method to get the most relevant online resources for her task given a limited amount of time. However, if time was further limited and P5 did not have time to read all of the top ten results, then she would filter the results based on her familiarity with sites. P5 would choose the site she perceived to be the most reliable from the list.

6.2.2 Design Guidelines

This section discusses the design guidelines that were identified based on P5's subjective assessment criteria discussed above. As with the subjective assessment criteria themselves, the design guidelines have been separated into guidelines that

are focused on eHealth information resources and guidelines that are focused on eHealth information.

Table 6-3 contains the design guidelines for eHealth resources that were identified for P5. Each guideline attempts to highlight a feature that P5 valued or to address an issue that P5 identified. The first criterion in Table 6-3 is convenience. P5 stated that she accessed online resource more in the postnatal period than she had after her first child was born because of the difficulty of going out with two small children. The design guideline for convenience takes advantage of the idea that online resources are easier to access and suggests that designers ensure that they are available on a wide range of devices.

The second set of guidelines in Table 6-3 fall under credibility. As previously discussed, P5 was concerned with professional expertise, personal experience, and brand awareness. These are reflected in the designed guidelines. It is suggested that eHealth resources list the credentials of contributions along with both their professional and personal experience. P5 had previously stated that she had selected information resources based on their previous experience. P5 has also demonstrated that she is more tolerant of issues with other criteria such as formatting if she already knows the brand. Therefore it is suggested that an eHealth resource should focus on increasing brand awareness among its target audience.

Criteria	Design Guideline
Convenience	The site should be accessible on a wide range of devices.
Credibility	Clearly display the credentials of contributors to the site.
	List experience (professional and/or personal).
	Increase brand awareness.
Format	Consider the size, number, and placement of multimedia.
	Ensure that text is readable by considering the font and colour.
	Use of multimedia to enhance a user's understanding of a topic
Rank on Search List	Optimise website design to improve search engine rankings
Usability	Test website features to ensure that they all function correctly

Table 6-3 Design Guidelines - eHealth Information Resources (P5)

Formatting can enhance or detract from an eHealth resource. P5 found that poor formatting decisions impacted how much she trusted an eHealth resource, more so if she did not know the brand. This is reflected in the design guidelines in Table 6-3, which propose that designers should ensure that text is readable and consider their use and size of multimedia. The last guideline under this criterion highlights that

multimedia can be used to enhance a user's understanding of a topic. For example, images of the different stages of development in the womb.

P5 stated that she selected websites from the top of the search engine rankings. P5 assumed that the sites at the top of the rankings were more relevant to her needs and that the forum entries would be more current. This demonstrates the importance of optimising website design to improve search engine rankings, see Table 6-3. The final criterion in Table 6-3 is usability. Similar to formatting, P5 stated that usability influenced her trust of information resources, particularly for higher value purchases. This highlights the importance of testing website features to ensure that the function properly.

Table 6-4 provides a list of the design guidelines identified for eHealth information for P5. These are grouped under three subjective assessment criteria: complete, currency and relevance. Four guidelines are included under the first criterion, complete. The first guideline is concerned with the depth of coverage for each topic. On multiple occasions, for both medical and general tasks P5 had difficulty finding one information resource that provided her sufficient information to meet her needs. The second guideline is concerned with the breadth of topics covered, see Table 6-4. P5 stated that she found it difficult to find one information resource that was *"strong" (P5)* in all the areas she was interested in. P5 found that an information resource might cover one area such as nutrition well, but then may not cover health at all or may not cover it in sufficient detail.

Criteria	Design Guideline
Complete	Topics should be covered in as much detail as possible
	Include a range of topics that interest your target audience
	Provide a personal folder to allow users to save their own notes, media, and links.
	Include a mix of personal stories and expert opinions
Currency	Information should be reviewed and updated regularly
	Clearly state the last date information was updated
Relevance	Localise information for different regions

Table 6-4 Design Guidelines - eHealth Information Content (P5)

In Table 6-4, the third guideline under complete suggests that users could be provided with a personal folder where they could save their material. P5 often liked to verify information by accessing multiple information resources. Those would turn

this eHealth resource into the user's primary gateway. The final guideline under complete proposes that personal stories and expert opinion could be used to complement each other. P5 spoke about patient stories on medical websites helping to provide a more complete picture.

The next criterion in Table 6-4 is currency, which was an important criterion for P5, particularly for eHealth information. For example, P5 stated that any medical information for the antenatal period should be no older than two years old. As such it is suggested that information should be reviewed and update regularly. Articles should also include that last update date so that users can now the age of the information. The final criterion in Table 6-4 is relevance. P5 found that for certain topics she had a preference for localised information, for example, medical guidelines and product availability. This highlights the need to create localised material.

6.3 RQ2: What are the Information Use Outcomes?

The purpose of this question is to identify and discuss the information use outcomes for P5. There are two stages of information use outcomes these are internal and behavioural. Internal use outcomes involve changes to an individual's cognitions or affective state as a result of information-seeking. Behavioural use outcomes refer to changes in behaviour as a result of information-seeking. It is the assumption of our operational definition that information use begins at the point of cognitive use. This may involve a new opinion/belief or it could information a confirmation or change to an existing opinion/belief.

6.3.1 Information Use Outcomes for P5

Figure 6-15 is the Information Use Pattern Outcome Diagram (IUOPD) for P5. The IUOPD provides an illustrative analysis of all the information use outcomes of the information-seeking episodes discussed in the first part of this chapter. The numbers represented a frequency count of each time that particular information use outcome occurred in one of the information-seeking examples. Each of the different paths represented in the IUOPD are discussed in detail below the diagram, using summary tables. However, from the first review of Figure 6-15, it is evident

that the most common information use outcomes for P5 as described in the information-seeking examples are cognitive use resulting in behaviour use (A2) and cognitive use resulting in information-seeking (A1). Cognitive use resulting in either negative or positive use was also a common outcome for P5, see Figure 6-15.

The summary tables below include five columns which allow traceability back to the IUOPD and to the original information-seeking episodes where the data came from. The columns are: (1) the code which is visible in the IUOPD diagram, (2) the longer description of the information use outcome, (3) the information-seeking episode title, (4) the task number, and (4) the search number. Some searches had more than one outcome and will, therefore, appear more than once, for example, an encounter with a medical professional may result in a participant taking medication and seeking further information.

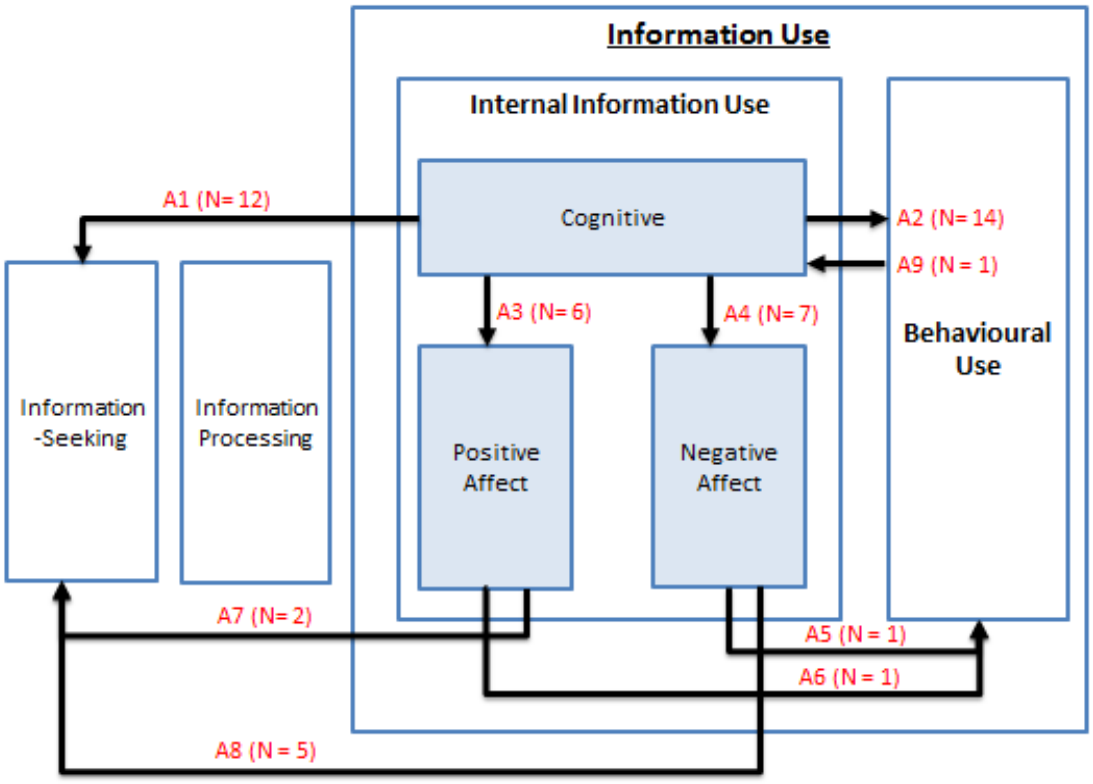


Figure 6-15 Information Use Outcome Pattern Diagram (P5)

Table 6-5 contains information use outcomes for P5 where the only internal use outcome was cognitive, i.e. there was no affective use outcome at that particular stage. The first two outcomes in Table 6-5 starts with cognitive use and progress

either to information-seeking (A1) or to behaviour use (A2). The third outcome was seen only once for P5; it starts with behavioural use and results in cognitive use.

The first information use outcome in Table 6-5 is cognitive use resulting in information-seeking. This was the second most common information use outcome for P5 based on the analysis of information-seeking episodes. Cognitive use primarily resulted in information-seeking in cases where P5 wanted verification from another information resource or where P5 wanted additional information. Where P5 sought verification, she tended to seek a different type of information resource. For example, when her GP recommended the emollient in the rash information-seeking episode, P5 sought the opinion of other mothers.

Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking	Back Pain	2	3,4,5
		Back Pain	3	6
		Double Stroller	1	3
		Colic	1	1
		Reflux	1	2
		Reflux	1	3
		Allergies	1	1
		Allergies	1	2
		Allergies	2	3
		Weaning 1	1	1
		Weaning 3	1	1
		Rash	1	2
A2	Cognitive use resulting in behavioural use	Back Pain	2	3,4,5
		Back Pain	3	6
		Back Pain	3	7
		Blood Transfusion	1	6
		Colic	1	3
		Colic	1	4
		Reflux	1	2
		Reflux	1	4
		Allergies	2	3
		Allergies	3	4
		Weaning 1	1	2
		Weaning 2	2	2,3,4
		Rash	1	2
		Rash	2	3,4
A9	Behavioural use resulting in cognitive use	Reflux	1	2

Table 6-5 P5's Information Use Outcomes - A1, A2 & A9

Cognitive use can also involve opinions about information resources. As such, another reason P5 sought information after cognitive use was when P5 decided that an information resource was potentially useful. This can be observed during

the colic information-seeking episode when P5 researched for information on services provided by an osteopath and then decided to make an appointment.

The second information use outcome in Table 6-5 was the most popular for P5, cognitive use resulting in behavioural use. This outcome was observed during both medical and general tasks. For decisions related to medication, P5 tended to rely solely on the advice of expert resources.

For decisions related to diet changes or treatment options, P5 used a wider range of information resources. For example, during the weaning 2 information-seeking episode P5 decided to implement some of the public health nurses advice after observing friends and consulting online and print resources. The reason P5 used a greater variety of information resources during diet and treatment decisions could be because they tended to be less time sensitive than medication decisions. However, it could also be because P5 experienced higher levels of uncertainty during those decisions. For example, P5 accessed a variety of information resources at the start of the back pain information-seeking episode because she was unsure about the safety of heat packs. Later in the episode, P5 changed her behaviour as a result of each information resource she encountered, because she was more confident with their advice.

The final information use outcome in Table 6-5 is behavioural use resulting in cognitive use. In this example, P5 gave her son medication that was advised by her GP. However, she found that the medication did not suit her son. This realisation resulted in further information-seeking.

Table 6-6 contains information use outcomes for P5 that include positive affect. The first information use outcome is cognitive use resulting in positive affect. The other two outcomes in Table 6-6, start with positive affect and progress from there, either to information-seeking or behavioural use. There are five different entries under the first outcome in Table 6-6, and they all provided P5 with positive affect in different ways. Information-seeking was not going to provide P5 with a solution during the placenta praevia information-seeking episode. However, what it did was reassure P5 that she was not at fault, that the condition was the result of bad luck.

P5's aim during the second task of the blood transfusion information-seeking episode was to find reassurance that the decision she had already made was correct. P5 received that reassurance from a credible expert information resource during the third search Table 6-6. Unfortunately, as discussed in the next section, that reassurance was short lived.

Code	Description	Episode	Task Num	Search Num
A3	Cognitive use resulting in positive affect	Placenta Praevia	1	1,2
		Blood transfusion	2	3
		Weaning 3	1	2
		Weaning 3	1	3,4
		Rash	1	1
A6	Positive affect resulting in behavioural use	Weaning 3	1	3,4
A7	Positive affect resulting in information-seeking	Weaning 3	1	2
		Rash	1	1

Table 6-6 P5's Information Use Outcomes – A3, A6 & A7

As part of the weaning 3 information-seeking episode, there were two instances of information use resulting in positive affect, see Table 6-6. In both these cases, P5 received reassurance that she was making the right decision. However, that reassurance resulted in two separated impacts in the first case, P5 continued information-seeking because she now knew she was on the right track but required more information. In the second case, she decided to implement the behaviour change because she now felt confident after listening to the personal stories from a mix of personal resources and forum posts. The final cognitive use resulting in positive affect also led to further information-seeking. During the rash information-seeking episode P5 searched for eHealth resources that provided images of rashes so that she could rule out her primary concern, meningitis. In this example, images were able to provide P5 with reassurance in a way that text alone could not. Once meningitis was ruled out, P5 decided to take the child to the doctor to discover what was wrong. The online resources were able to give P5 an immediate answer to a pressing concern.

Table 6-7 contains information use outcomes for P5 that include negative affect. The first outcome in Table 6-7, involves cognitive use resulting in negative affect. The other two information use outcomes start with negative affect and progress

from there, either to information-seeking or behavioural use. For P5, the primary response to negative was to seek additional information in an attempt to relieve it, Table 6-7.

Code	Description	Episode	Task Num	Search Num
A4	Cognitive use resulting in negative affect	Back Pain	1	2
		Double Stroller	1	2
		Placenta Praevia	1	3
		Blood Transfusion	1	1
		Blood Transfusion	1	2
		Blood Transfusion	2	4
		Weaning 2	1	1
A5	Negative affective resulting in behavioural use	Blood Transfusion	1	2
A8	Negative affect resulting in information-seeking	Back Pain	1	2
		Double Stroller	1	2
		Blood Transfusion	1	1
		Blood Transfusion	1	2
		Weaning 2	1	1

Table 6-7 P5's Information Use Outcomes – A4, A5 & A8

The blood transfusion information-seeking episode appears in Table 6-7 several times. It is a good example of the issues which have resulted in P5 experiencing negative affect. This is because P5 was never confident of which decision to make. P5's uncertainty was only exacerbated by the difficulty she experienced finding a relevant and complete information resource and conflicting advice from expert information resources. P5 did make a behaviour change as a result of negative affect during the blood transfusion information-seeking episode. Without a quality information resource to convince her otherwise, P5 went with her gut and decided to go with the iron tablets over the transfusion.

6.3.2 Discussion

The previous section examined P5's information use outcomes based on the example information-seeking episodes. Based on the discussion it was clear that some of the subjective assessment criteria discussed in RQ1 influenced P5's information use outcomes. This section explores how this information can be applied to provide further detail to the associated design guidelines for P5 that were identified in RQ1, see Table 6-8.

Negative affect such as anxiety and uncertainty was exacerbated when P5 found it difficult to find complete or relevant information resources. Sometimes, the difficulty finding information resources was the cause of the negative affect, for example, the double stroller information-seeking episode. When information resources did not meet P5's standard for detail or relevance, she sought additional information elsewhere. To satisfy users, it is important to provide the level of detail that they require. During both the double stroller and blood transfusion information-seeking episodes, P5 had difficulty locating information relevant to Ireland. Designers of eHealth information resources need to consider which topics need to be localised to different areas to increase their relevance Table 6-8.

Type	Criteria	Design Guideline
EHealth Information Resources	Convenience	The site should be accessible on a wide range of devices.
	Credibility	Clearly display the credentials of contributors to the site.
		List experience (professional and/or personal).
		Increase brand awareness.
	Format	Consider the size, number, and placement of multimedia.
		The appropriate use of multimedia can be used to enhance a user's understanding of a topic
		Ensure that text is readable by considering the font and colour.
	Rank on Search List	Optimise website design to improve search engine rankings
	Usability	Test website features to ensure that they all function correctly
EHealth Information Content	Complete	Topics should be covered in as much detail as possible
		Include a range of topics that interest your target audience
		Provide a personal folder to allow users to save their own notes, media, and links.
		Include a mix of personal stories and expert opinions
	Currency	Information should be reviewed and updated regularly
		Clearly state the last date information was updated
	Relevance	Localise information for different regions

Table 6-8 Design Guidelines for eHealth Resources for P5

When P5 wished to verify information, she did so by accessing a different type of information resources. For example, P5 has combined expert information resources with personal information resources. Combining personal stories and expert opinions in one eHealth information resource makes the eHealth information resource more complete, see Table 6-8. This may negate the need for users to seek additional information.

In the rash information-seeking episode, an online information resource with images of rashes was able to provide P5 with the immediate reassurance that her son did not have meningitis. The images provided P5 with a better understanding of the topic than text could have on its own. The use of multimedia, such as images and video can be an effective tool to enhance message delivery Table 6-8.

6.4 RQ3: What are the Primary Information Resources for Medical and General Tasks during the Antenatal and Postnatal Periods?

Research question three (RQ3) identifies the primary health-related information resources accessed by P5 for medical and general tasks. The longitudinal nature of the study affords the opportunity to identify P5's preferences at four different points in time (both antenatal and postnatal). Identifying P5's primary health-related information resources at different points in time allows the researcher to highlight any changes in P5's preferences. This information can be used to add context to the design guidelines produced in RQ1. Of particular interest is understanding any fluctuations in P5's preferences for eHealth resources.

6.4.1 P5's Primary Information Resources

Figure 6-16 illustrates the information resource types that P5 reported accessing during general tasks. Each information resource type was counted once for every general information-seeking episode that P5 reported accessing the resource type. The number of times that P5 accessed an information resource did not factor into the count. Figure 6-16 is split into each of the four study periods so that changes in P5's information resource preferences can be observed. Online information resources were the primary information resource for general tasks in every period except the first postnatal period, which saw print resources as the primary information resource. This was the period when P5 had the lowest quantity of general information-seeking episodes.

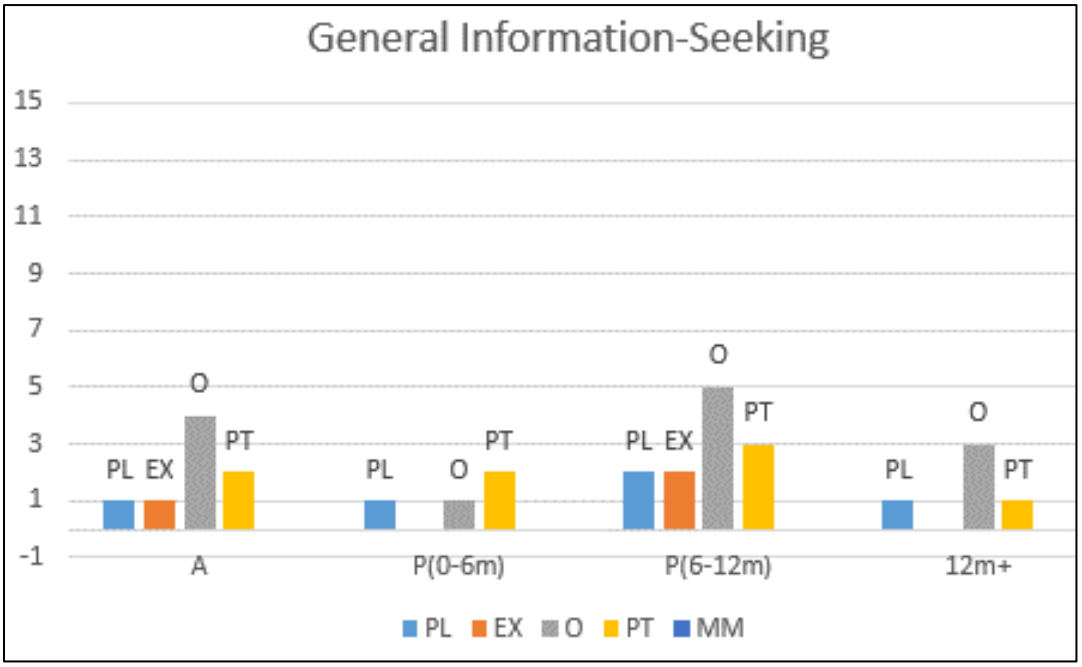


Figure 6-16 Information Resources Accessed for General Information-Seeking (P5)

Figure 6-17 illustrates the number of information-seeking episodes involving each type of information resources for medical tasks for P5. As with general tasks, online resources were the sole primary information resource in three out of four of the study periods. In the second postnatal period, online resources and expert resources were the joint primary information resource. Although it might appear surprising that expert information resources were not the sole primary information resource for medical tasks during any of the periods, it reflects P5's preference for using multiple information resources to verify information. Expert information resources were reserved for situations where treatment or medication may have been required. Other information resources were accessed in a greater variety of situations. When P5 sought verification, she tended to prefer mixing different types of resources to provide a more complete picture. For example, P5 has verified expert advice with personal stories from forums. P5's preferences for multiple information resources could reflect her research background.

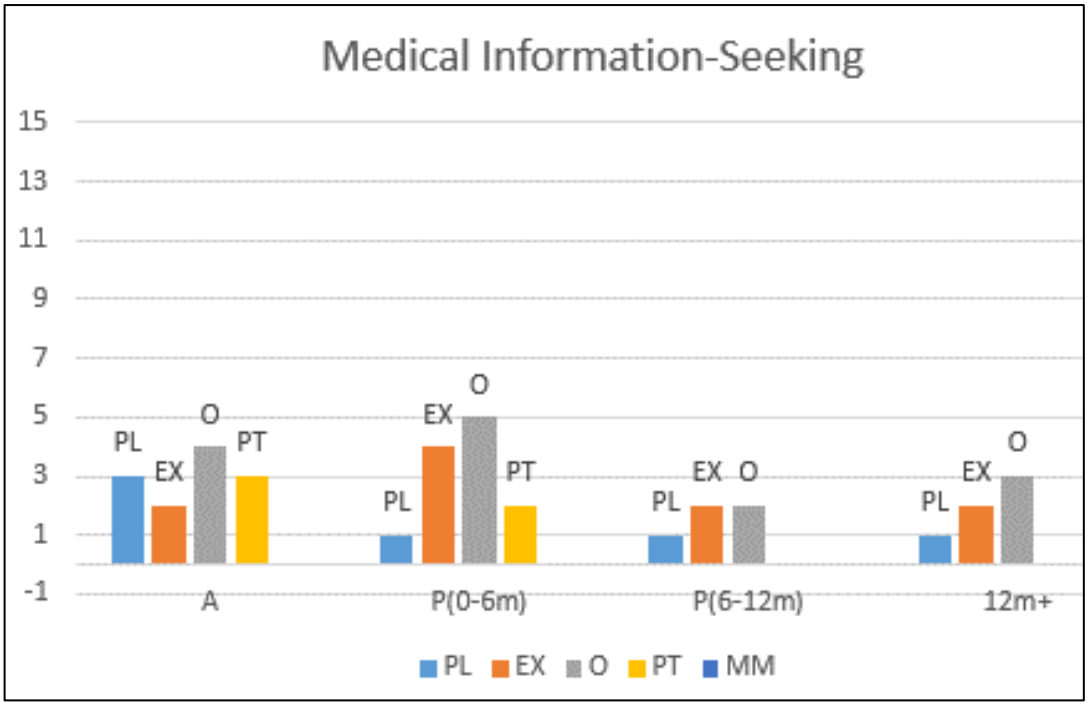


Figure 6-17 Information Resources Accessed for Medical Information-Seeking (P5)

It should be noted that while P5 multi-media does not appear in either Figure 6-16 or Figure 6-17, P5 did report watching the reality TV documentary 'One born every minute' during the antenatal period. It is not included in either figure because P5 did not attribute the documentary to any particular task. P5 stopped watching the documentary after the antenatal period because the program reminded her of her time in the hospital and having a C-section. This was something that P5 did not want to be reminded of.

Figure 6-18 illustrates the changes in the frequency of P5's general and medical information-seeking across the four study periods. Medical information-seeking was at its highest in the first two study periods, the antenatal and postnatal (0-6m). During the antenatal period and the start of the first postnatal period, P5 experienced several high stress, high uncertainty events that fuelled her information-seeking. This can be observed in the placenta praevia and blood transfusion information-seeking episodes. Medical information-seeking dropped going into the second postnatal period and then remained steady.

P5's general information-seeking followed a different pattern to her medical information-seeking Figure 6-18. However, there were similarities to how P5 approached both types of tasks, particular in the postnatal period when her time

was more limited. P5 stated that she did not have the time for browsing in the postnatal period, so all information-seeking was targeted. As a result, the spike in the third postnatal period (6-12m) was the result of specific tasks, such as weaning and investigating childcare.

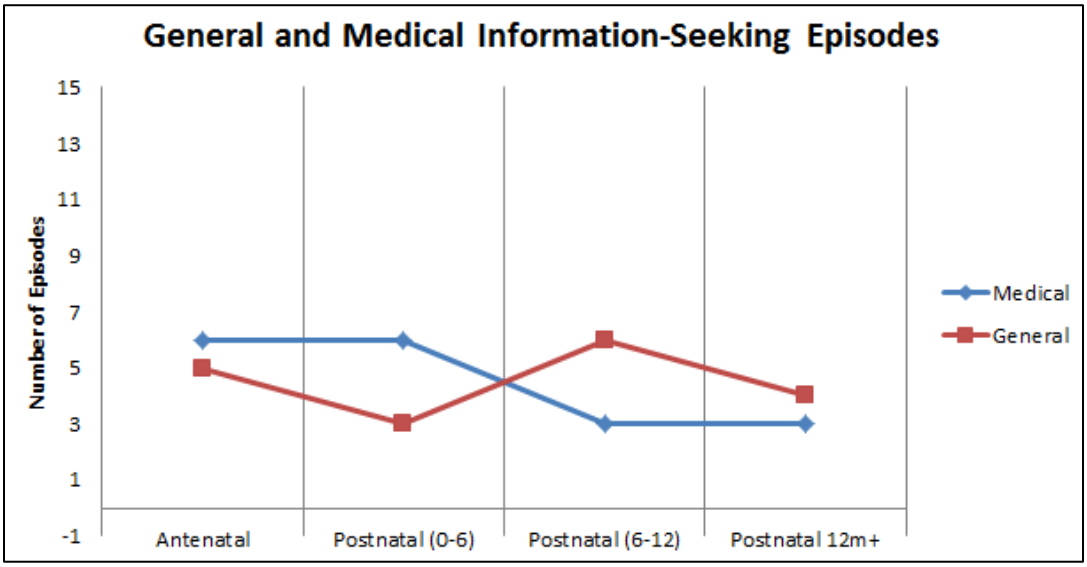


Figure 6-18 General and Medical Information-Seeking Episodes (P5)

When the pattern of P5's information-seeking in Figure 6-18 is compared against the types of information resources accessed for general (Figure 6-16) and medical (Figure 6-17) tasks, a pattern emerges. A higher frequency of information-seeking in a period tended to coincide with a greater variety of information resources.

6.4.1.1 *Antenatal period*

When medical and general information-seeking are examined together, this period contained more episodes than any other. Individually, it was also one of P5's busiest periods for both medical and general tasks, see Figure 6-18. Online information resources were the primary information resource for both medical and general tasks.

P5 stated that she conducted more information-seeking during this pregnancy than she had during first. During her first pregnancy, P5 had listened to her GP's advice to limit her information-seeking. However, during this pregnancy P5 perceived herself to be "*an expert*" (P5) in her own right, able to determine her own information needs. It was P5's opinion that "*information is power*" (P5). P5 found that having gone through pregnancy and labour, she was more conscious of the

possible complications and wanted to be prepared. These feelings were only amplified by her experiences in the first trimester. Early in the first trimester P5 had experienced a miscarriage scare. P5 also found that she felt sicker than she had during her first pregnancy. P5 found that those early experiences set both the "*tone and the frequency*" (P5) of her information-seeking for the remainder of the antenatal period.

There were two information-seeking peaks during the antenatal period. The first started from about the time of the miscarriage scare and lasted until approximately week eighteen. During this period, P5 experienced back pain, nausea, fatigue, and had a concerning hospital scan. Once these issues resolved, P5 found that her information-seeking declined. This lasted until she was diagnosed with placenta praevia in week thirty-one. From P5's perspective, her information-seeking "*went up exponentially*" (P5) from that point until her son was born.

P5 was very aware of the currency of information during this period. It was her opinion that the research on foetal development and antenatal health was constantly changing. P5 found that once she started to research the area she found it difficult to stop, she was "*constantly on the look for new publications and new information"* (P5). It was P5's opinion that this drive to continue to investigate an area with so many "*unknown variables*" (P5) may be partly driven by her work in academia.

Another issue which P5 attributed to her work in academia was her avoidance of Facebook. Although P5 valued reading personal stories on forums or testimonials on medical sites, P5 did not use Facebook. P5 stated the idea of students trying to befriend her had turned her away from the site.

During this period, we gained insight into some of P5's assessment criteria for online resources. It became evident that design and format were very important to P5 for both health and general websites. However, if P5 trusted the brand, then she was more willing to overlook issues with the site. For example, although P5 felt the HSE website had issues with formatting, the name created "*connotations in [her] mind around expertise*" (P5). Other important information assessment criteria

included Complete and relevance, both of which were lacking during the double stroller information-seeking episode.

P5 felt that online resources had the advantage of being easily accessible and convenient. The same could not always be said for expert information resources during this period. Although P5 did have a good relationship with her GP, it was different at her hospital appointments. P5 found that the health professionals there were "*under increasing pressure*" (P5), which meant long waiting times and the appointment itself often felt "*very limited and rushed*" (P5).

6.4.1.2 *Postnatal (0-6m) period*

Medical information-seeking remained higher during this period, while general information-seeking declined. Online information resources were the primary information resource for medical tasks. However, print information resources were the primary information resource for general tasks.

P5 relied more on online resources than she had after her first child was born. P5 now had two small children, so she found it more difficult to leave the house and meet up with friends or attend baby massage class. It also took P5 several weeks to recover from her C-section as her iron levels were low. When P5 went online, she accessed a mixture of user generated content and information pages, as she had during the previous period. Although P5 liked to visit forums she was not an active contributor.

During the antenatal period, P5 had a couple of favourite parenting websites that she would browse looking for relevant parenting information. However, P5 no longer had time for that. Her searches had "*become more specific*" (P5). Now, when P5 had a query, she conducted a Google keyword search and would then choose between the top ranked sites.

P5 continued her preference for accessing multiple information resources during medical information-seeking episodes. In fact, P5 accessed multiple information resources in all bar one of the medical information-seeking episodes this period, baby immunisations. P5 stated that she was driven to search for information by

"*heightened uncertainty, heightened stress and the lack of one discrete solution*" (P5). As P5 would have had experience with immunisations with her older son, it makes sense that she would have felt less of a need to search for additional information.

6.4.1.3 *Postnatal (6-12m) period*

Medical information-seeking saw a drop this period. General information-seeking, on the other hand, saw an increase, driven by tasks such as weaning and teething. Online information resources were the primary information resource for general tasks while online and expert information resources together were the primary information resource for medical tasks.

P5 went back to work during this period. Online resources became more convenient because P5 worked with a computer all day and had an iPad available to her in the evenings. P5 stated that going back to work and having two small children meant that "*browsing was not a luxury [she could] afford*" (P5). P5 would search for five or ten minutes at work or in front of the television when she had a problem.

Medical tasks saw a sharp decline this period. However, P5 still described her son's health as "*being a bit up and down*" (P5). P5 stated that her son's health was negatively affected by the delay in him getting his teeth. Medical information-seeking during this period focused on allergies, inhalers, and ear infections.

6.4.1.4 *Postnatal (12m+) period*

Online resources were the primary information resource for both medical and general tasks this period. Medical information-seeking remained low while general information-seeking began to decline again. The tasks that had driven the increase in general information-seeking during the previous period were now finished or finishing. P5 had returned to work and finished weaning her son just as this period began. The general tasks during this period centred on child development, nutrition and Christmas presents.

P5 found that as her youngest son got older, the differences between her two sons began to diminish. By the time her youngest was sixteen months both sons had a similar routine. P5 found that once her youngest son had finished weaning, information-seeking into food became *"more of an ongoing thing as opposed to an emergency*" (P5). When P5 sought information on diet and nutrition, she now searched for recipe ideas for both of her sons.

6.4.2 Discussion

The aim of RQ3 was to identify the primary information resources used by P5 for medical and general tasks. The previous section examined P5's primary information resources for each of the four antenatal and postnatal periods. Reference was made to the influence of context, such as time. This section will examine this information in relation to the design guidelines identified for P5 in RQ1.

Table 6-9 provides a summary of the frequency of P5's information-seeking in the different periods, combined with the primary information resource. It is clear from a review of Table 6-9 that online information resources are a popular choice for P5 for both medical and general information-seeking. Although there were exceptions, P5 often found online information resources could provide easy access to detailed, credible information.

	Medical		**General**	
	Number of Episodes	*Primary Resource*	*Number of Episodes*	*Primary Resource*
Antenatal	6	Online	5	Online
Postnatal (0-6m)	6	Online	3	Print
Postnatal (6-12m)	3	Expert & Online	6	Online
Postnatal 12m+	3	Online	4	Online

Table 6-9 P5's Primary Information Resources for Both Medical and General Tasks

Table 6-10 provides a summary of the design guidelines for eHealth resources that were identified as part of RQ1. In the antenatal period, P5 had a variety of parenting websites that she liked to browse through. P5 felt that there was not one site that covered all the topics she was interested in, at least not sufficient detail. When time became limited in the postnatal period, P5 switched to targeted searching. She used keyword searches in Google, selecting the sites from those at the top of the search ranking. This highlights two issues. Firstly, if an eHealth site

wishes to keep an individual user for a prolonged period, then it is important to cover a wide range of topics in detail, see Table 6-10. Secondly, as P5 selected sites from the top of the search ranking, eHealth sites should be cognisant of the importance of optimising design for improving their place in the search rankings, Table 6-10.

Currency was particularly important to P5 during the antenatal period. P5 felt that the research in foetal development and antenatal health was fast paced. As a result, P5 would have paid particular attention to the date that an article was published. This demonstrates the importance of reviewing information regularly and displaying the last update date, see Table 6-10.

Type	Criteria	Design Guideline
EHealth Information Resources	Convenience	The site should be accessible on a wide range of devices.
	Credibility	Clearly display the credentials of contributors to the site.
		List experience (professional and/or personal).
		Increase brand awareness.
	Format	Consider the size, number, and placement of multimedia.
		The appropriate use of multimedia can be used to enhance a user's understanding of a topic
		Ensure that text is readable by considering the font and colour.
	Rank on Search List	Optimise website design to improve search engine rankings
	Usability	Test website features to ensure that they all function correctly
EHealth Information Content	Complete	Topics should be covered in as much detail as possible
		Include a range of topics that interest your target audience
		Provide a personal folder to allow users to save their own notes, media, and links.
		Include a mix of personal stories and expert opinions
	Currency	Information should be reviewed and updated regularly
		Clearly state the last date information was updated
	Relevance	Localise information for different regions

Table 6-10 Design Guidelines for eHealth Resources for P5

Having had a child previously P5 was more aware of the potential complications that can occur during pregnancy and labour. P5 wanted to be more informed during this pregnancy than she had during her first. This desire was only increased by the medical complications she experienced during the antenatal period. P5 searched through a variety of online information resources, from medical journals to forums. P5 often appreciated combining both expert opinion and personal stories from

other parents. This preference continued in the postnatal period and is observable in the allergies information-seeking episode.

Once P5 returned to work in the postnatal (6-12m) period, her information-seeking was mostly restricted to short five to ten minute bursts. P5 either searched on her work computer or at home on her iPad. This raises this issue that for P5 to rate an eHealth resource highly on convenience, format or usability, the site must be designed to load quickly and correctly on any device that she may use to access it, see Table 6-10.

Chapter 7: Analysis of Participant Four

At the start of the study P4 was a first-time mother, under the age of 35, see Figure 7-1. In P4's opinion being a first-time mother made the first year postnatally more difficult because of the steep learning curve. P4 felt that she would be more relaxed with a second child. P4 suggested that the volume of her information-seeking would likely be less on a second child.

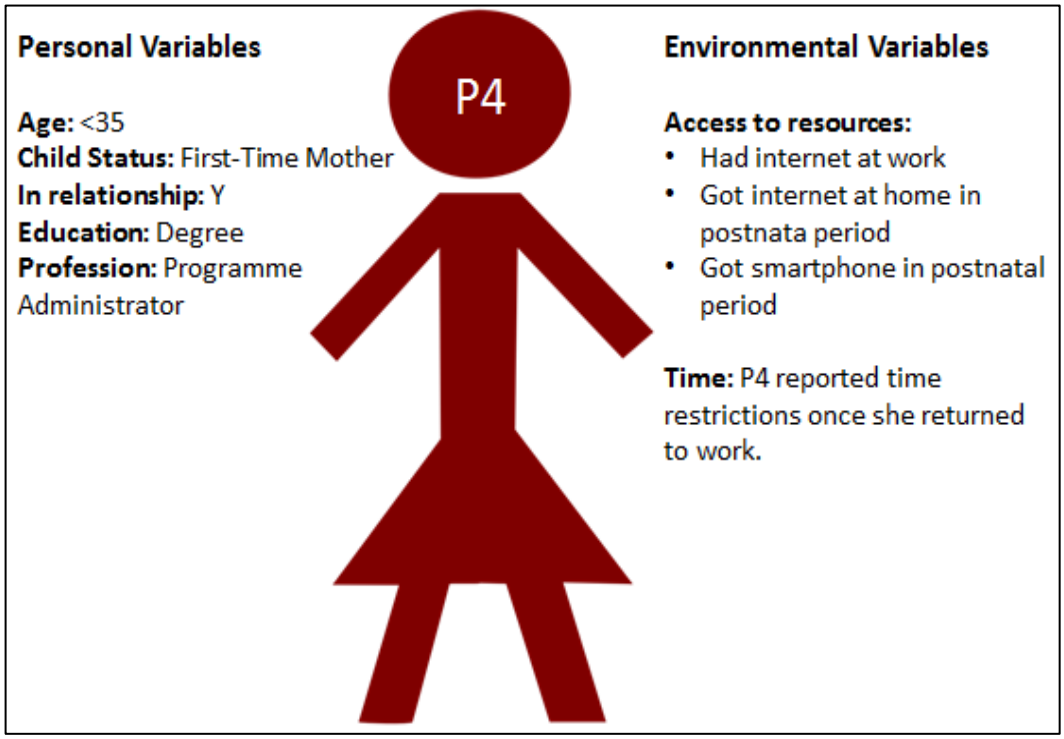


Figure 7-1 Characteristics P4

P4 did not have the internet at home or a smartphone during the antenatal period, see Figure 7-1. However, she was able to access online information resources at work. Online information resources were the primary information resource for P4 during the antenatal period. P4 felt that pregnancy was a very individual experience and preferred the anonymity of online information resources.

During the postnatal period, P4 got a smartphone and internet access at home. Online information resources continued to be a popular choice for P4. She also included an app as one of her preferred weaning information resources. During the postnatal period, P5 found the experience of other mothers to be more valuable. This was true whether she found it online or through family and friends.

Figure 7-2 illustrates the frequency of P4's information seeking across both the antenatal and postnatal periods. The highest volume of information seeking occurred in the first two periods, the antenatal period and the first six months postnatally. P4's general information-seeking was at its highest during the antenatal period, see Figure 7-2. The quantity of general information-seeking steadily declines through each subsequent period. P4's medical information-seeking increased in the first postnatal period when compared with the antenatal period. The quantity of medical information-seeking then experienced a sharp decline in the second postnatal period, before levelling off, see Figure 7-2.

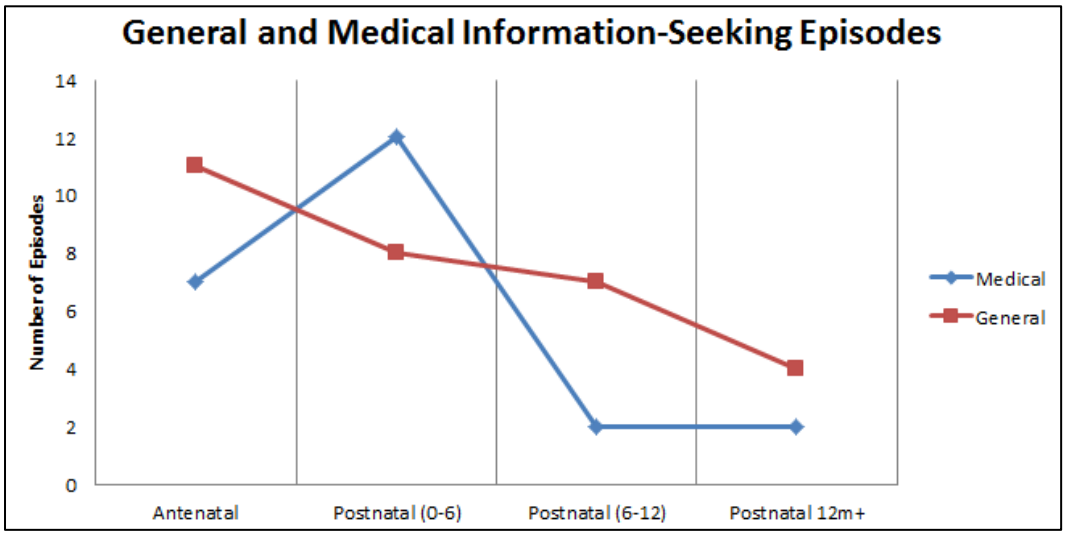


Figure 7-2 P4's General and Medical Information-Seeking

During the antenatal period, P4's prenatal care was managed by High-Risk Clinic for because she had previously had a blood clot. Her GP was wary of offering advice during this period, preferring to leave the decision up to the doctors at the clinic. Unless an issue was particularly serious P4 had to wait weeks between clinic appointments. This made P4 very conscious about researching online to prepare for appointments so she did not waste time and she could ask any important questions when she had the opportunity.

The increase in medical information-seeking in the first postnatal period illustrated in Figure 7-2 can be partly explained by P4's son's reflux. This was a source of anxiety for P4, particularly for the first six months. Part of the anxiety stemmed for the uncertainty over when the issue would resolve, it did not resolve until the child

was ten and half months old. P4 stated that it impacted a number of other general information-seeking topics, including investigations into weaning.

P4 found that everything started to become easier after six months and that by twelve months things had begun to feel normal. P4 stated that at that age it was more fun. The child was less dependent on her and she was more relaxed. P4 stated that returning to work had helped; it had given her something else to focus on. She found that when issues arose she did not get as worried as she had when her son was younger, so she did not need to do as much information-seeking.

7.1 Information-Seeking Episodes (P4)

This section analyses information-seeking examples to provide insight into P4's information behaviour. The section includes an analysis of seven medical and seven general information-seeking episodes. The medical information-seeking episodes in the antenatal period concern P4, while the episodes in the postnatal period relate to her son. The general information-seeking episodes contain a mix of tasks focused on diet changes and purchase decisions.

Figure 7-3 is a timeline which illustrates all the information-seeking episodes that are analysed in this section. From the timeline, it is evident that this section includes both medical and general examples. The information-seeking episodes also represent each of the four time periods under analysis. This allows the researcher to comment on any changes that were observed in P4's information-behaviour over time. Any episodes that are connected together using arrows in Figure 7-3 are directly related to each other, for example, the three weaning information-seeking episodes. As a result, those episodes are discussed under one sub-section. Otherwise, the information-seeking episodes are discussed in chronological order.

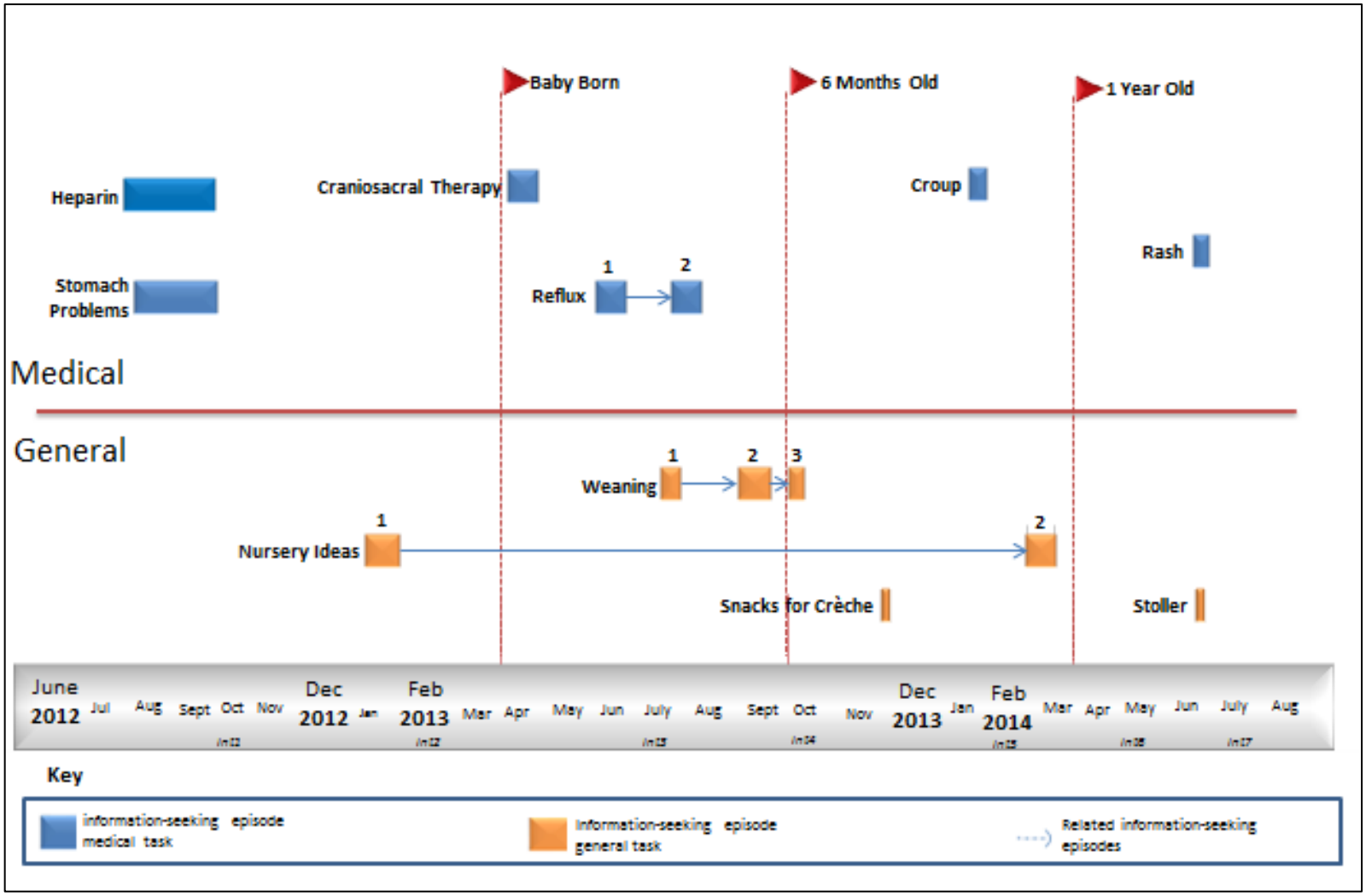


Figure 7-3 Timeline for P4

7.1.1 Heparin (Antenatal)

The medical information-seeking episode depicted in Figure 7-4 occurred at the beginning of the antenatal period. The episode contains one task, five searches, and a mix of online expert and personal information resources. P4's encounter with the GP in the first task was the driver of most of the information-seeking in the second task because the GP did not have all the information to answer P4's questions. However, P4 still choose to change her behaviour and take the medication advised by the GP before searching for additional information. This demonstrates two things, (1) the time-sensitive nature of the decision, and (2) the perceived credibility of the information resource.

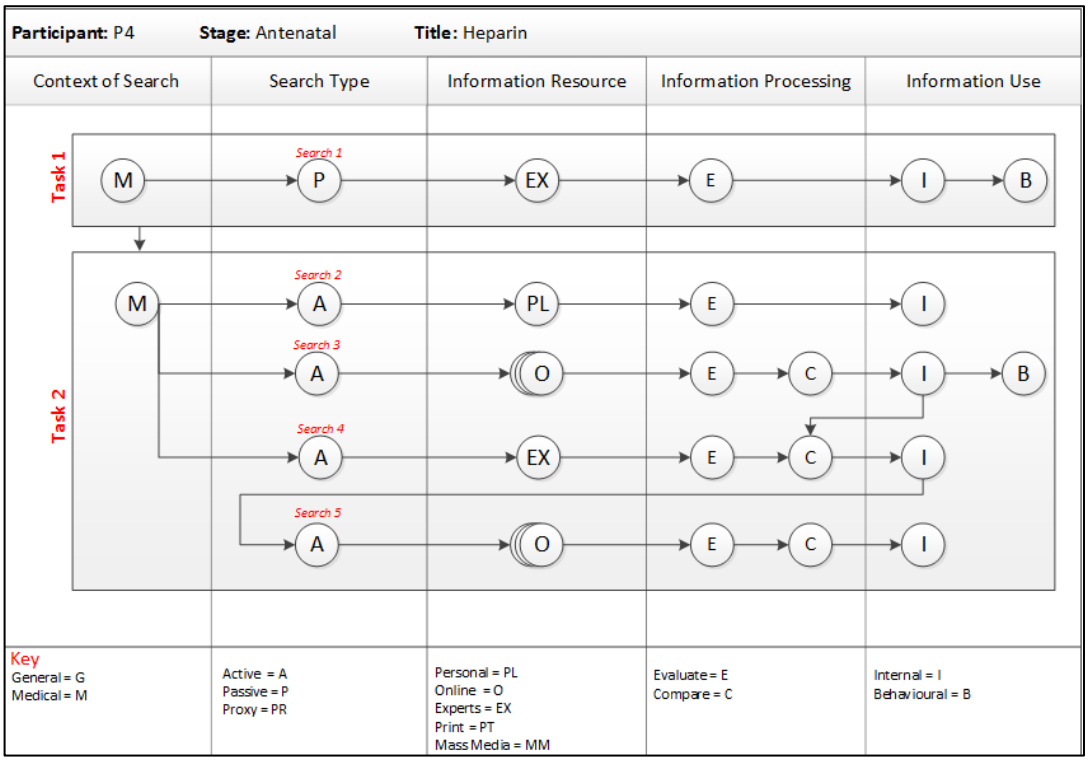


Figure 7-4 P4 - Heparin IBAT

P4 attended the High-Risk Clinic at the hospital for all her antenatal appointments. This is because P4 had previously had a blood clot. Shortly after P4's first visit to the High-Risk Clinic P4 received a phone call from a GP at the practice she attended, her own GP was away, see search one in Figure 7-4. The GP informed P4 that the consultant from the High-Risk Clinic had sent a letter to the practice requesting that P4 be placed on Heparin because of her medical history. The GP was unable to give

P4 additional information, such as how long she would be on the medication. Despite the GP not being able to answer all her questions, P4 decided to take the medication.

P4 knew that she had another appointment with the High-Risk Clinic in a couple of weeks. However, P4 had questions and she did not want to wait to get the answers. The incomplete information provided by the GP and the cognitive gap it created was what prompted the creation of the second task in Figure 7-4. The aim of the task was to learn more about Heparin and DVT (deep vein thrombosis) during pregnancy.

While waiting for the appointment with the High-Risk Clinic P4 also spoke to a work colleague, search two in Figure 7-4. P4's colleague had taken Heparin for a month after she gave birth. P4 discounted most of the information. She did not find it relevant as her colleague's experience was different to her own. However, she still found it useful to talk it over with her colleague.

P4 searched online resources for information on both Heparin and DVTs during pregnancy. She was particularly interested in how long people usually stayed on Heparin. P4 had originally intended on ringing her own GP when the GP returned from holidays. However, she was satisfied with the information she had found online and decided she could wait until her appointment at the High-Risk Clinic. P4 liked to ensure that when she had questions to ask during an appointment that she had prepared by researching online beforehand. That way, P4 was using the experts as verification and she was optimising her limited time at the High-Risk Clinic.

The fourth search in Figure 7-4 was when P4 attended the High-Risk Clinic. During the appointment, the consultant informed P4 that she would be on Heparin for the duration of the pregnancy and for perhaps two or three months afterwards. P4 asked the consultant questions about coming off Heparin for labour. Although the consultant answered all P4's questions, P4 started to panic leaving the appointment. P4 was worried about the implications of being on a blood thinner if she went into early labour. P4 was also worried about how it would work with an epidural.

After the appointment, P4 searched a number of different online resources, including forums and blogs. P4 found that initially, information-seeking made her feelings of panic worse but after a while, she found reading other people's experiences calmed her. At this stage, P4 was clearly looking for reassurance and this may have influenced her evaluation of information.

"Maybe you are just looking for something positive on it but there is always going to be something negative so you are going to have to disregard some of those things as well." (P4)

7.1.2 Stomach Problems (Antenatal)

The medical information seeking episode described in Figure 7-5 occurred during the antenatal period. It included one task, five searches, and a combination of expert, print and online resources. Like the Heparin information-seeking episode, this episode involved P4 information-seeking while waiting for an appointment with the High-Risk Clinic, although in this episode that cycle occurs twice. This episode differs from the previous episode as P4 did not feel the same level of concern. As such she did not experience the same level of negative affective when faced with uncertainty.

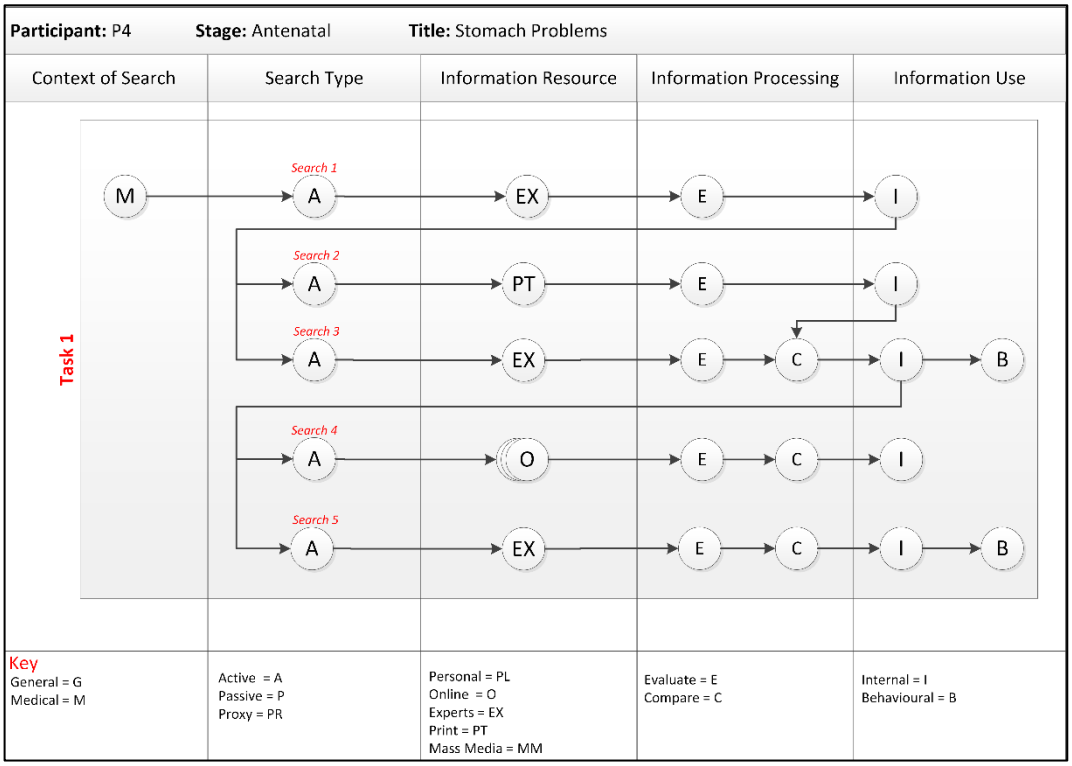


Figure 7-5 P4 - Stomach Problems IBAT

The goal of P4 during the task in Figure 7-5 was to find relief for the stomach problems that she had started to experience from week six of the antenatal period. The first search that P4 conducted involved consulting her GP. However, P4 found that the GP was hesitant to provide information and would not commit to any kind of prescription. It was the GP's opinion that the High-Risk Clinic should be responsible for all medical decisions for P4 during her pregnancy.

While P4 was waiting for her next appointment with the High-Risk Clinic she looked up her baby book, 'What to Expect When You Are Expecting'. P4 had purchased this book on the recommendation of her GP. P4 eventually bought another baby book later in the antenatal period because she was dissatisfied with certain aspects of 'What to Expect When You Are Expecting'. In particular, she found the book too "*text heavy*" and a "*little bit boring*" (P4). However, during this episode it contained the relevant information that she required. P4 felt that the book was a good preparation for the High-Risk Clinic appointment. Although the book did not offer a solution to her problem it did explain that stomach problems are a common occurrence during pregnancy, which P4 found reassuring.

The third search in Figure 7-5 refers to P4 attending the appointment at the High-Risk Clinic. P4 explained how she was feeling and that, because she had problems with her stomach prior to her pregnancy, she was prescribed medication. After the appointment, P4 began taking the medication. Unfortunately, P4 did not find the medication effective; instead it felt if she was "*popping Smarties*" (P4). P4 had to wait until the next appointment at the High-Risk Clinic to discuss alternative treatment options with a doctor. During the interim P4 decided to search online resources. P4 searched for information on stomach problems, particularly stomach acid during pregnancy. P4 also investigated potential natural remedies. However, she did not find anything that she thought would work.

The final search in Figure 7-5 involved P4 returning to the High-Risk Clinic. P4 stated that she found them "*very non-judgemental*" (P4) when she explained that the medication was not working. This choice of phrasing suggests that P4 had been concerned that there would be some form of judgement or complaint from the

doctor when she explained the situation. P4 stated that because she was out of her first trimester they were willing to try her on a stronger medication. The medication that the doctor prescribed was one that P4 had been on before she was pregnant. It was not one that she had found to be very effective, but she decided to give it another try. P4 later commented that the medication was a success. P4 attributed the success to the fact that the medication was a higher dose to what she had previously been on.

7.1.3 Nursery Design *(Antenatal - Postnatal)*

The following are two general information-seeking episodes that both centre on designing the nursery. The first information-seeking episode occurred during the antenatal period. The second information-seeking episode took ideas generated in the first episode which occurred in the second postnatal period (6-12m), shortly before the child turned one.

The majority of P4's information-seeking episodes are medical or practical general information-seeking episodes. These two information-seeking episodes are examples of enjoyable information-seeking for P4. P4 finds this type of information-seeking "*really fun*" (P4). What makes this information-seeking fun is the task and the information resources themselves. P4 values the online resources Pinterest and Etsy for their unusual content and their focus on imagery over text.

7.1.3.1 *Nursery Ideas 1 (Antenatal)*

The information-seeking episode depicted in Figure 7-6 involves one general task and occurred during the antenatal period. During this episode, P4 accessed three different online resources. This was the first information-seeking episode that P4 called enjoyable. P4's online information-seeking was conducted at work during the antenatal period and because of this, it was usually short and to the point. P4's information-seeking during this episode was different. This was because P4 stated that she could easily "*get lost in*" the first two online resources because of their use of images and the novelty of their content.

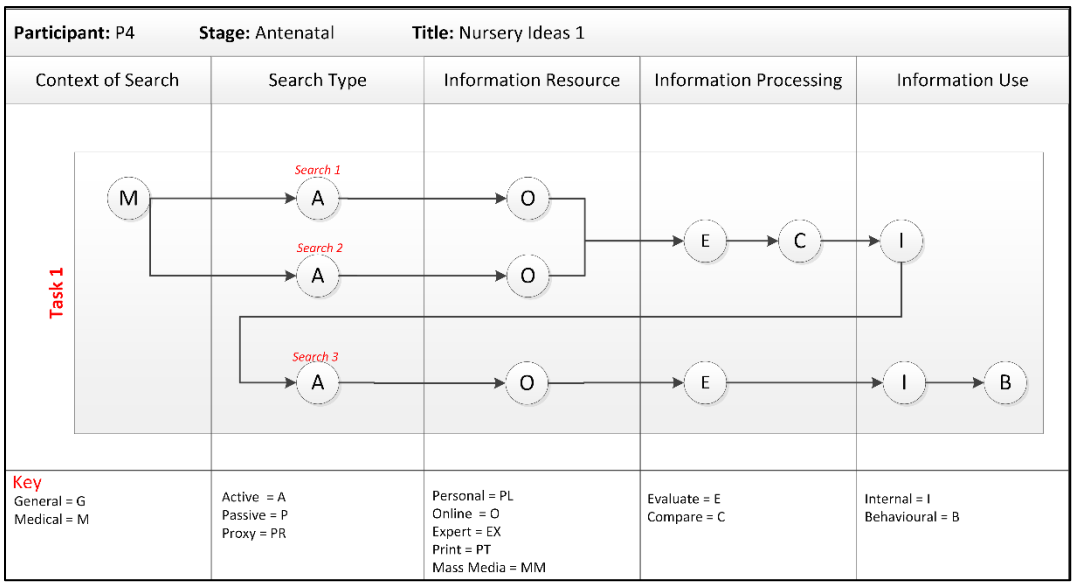


Figure 7-6 P4 - Nursery Ideas 1 IBAT

The task in this information-seeking episode was to come up with ideas for the nursery. The first two searches in Figure 7-6 involved P4 accessing the online resources Pinterest and Etsy. P4 stated that she would go back and forth between the two sites with different ideas. P4's search strategy was to conduct a keyword search of the sites and then scroll through the images. P4 valued the visual aspect of the sites, she liked the fact that she did not have to go "*trawling through words, or people's opinions*" (P4).

P4 stated that she liked some of the ideas on Pinterest and Etsy because they were "*unusua*l" and she was unlikely to find similar products in shops in Cork. Ideas P4 discovered on one of the sites would "*inspire*" a search in the other. When P4 was finished searching and had an idea what she wanted the nursery to look like she moved on to the third search. The third search involved another online information resource, see Figure 7-6. P4 conducted what she termed a "*very, very specific search*" (P4) of the Ikea website. She searched the catalogue for products that matched the vision she had developed for the nursery. When she had created a list of what she wanted, P4 and her partner drove to Ikea to pick up the products. P4 stated that when things were more settled after the baby was born, she wanted to go back to Etsy to get products to put some finishing touches on the nursery.

7.1.3.2 *Nursery 2* *(Postnatal 6-12m)*

The short general information-seeking episode described in Figure 7-7 occurred in the postnatal (6-12m) period. The information-seeking episode includes one task and two searches. During this information-seeking episode, P4 relied solely on online information resources. During this episode, P4 took some of the ideas she had found during her information-seeking in the antenatal period and put the finishing touches on the nursery. P4 had found the first six months of the postnatal period "*very challenging*" (P4), particularly because of her son's reflux. P4 stated that each three-month block since then had become progressively more enjoyable. This episode, which P4 found fun, marked a return to what she termed "*normalcy*" (P4).

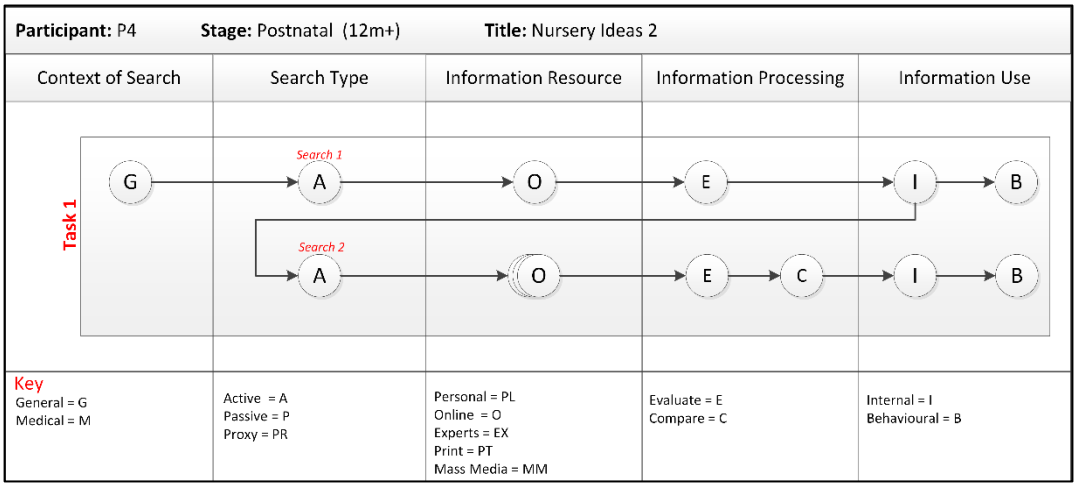


Figure 7-7 P4 - Nursery Ideas 2 IBAT

The aim of this task was to put the finishing touches on the nursery based on ideas P4 had found on Pinterest during the antenatal period. The first search in Figure 7-7 involves P4 accessing Pinterest and reviewing the idea's that she had 'pinned' previously. Pinning is a form of bookmarking on Pinterest.

P4 decided to add two different finishing touches to the nursery based on what she reviewed. The first were cloud designs that would match a clock that was already in the room. For this, she was able to get her father to make it. The second thing she wanted to add to the nursery was bunting. For this P4 conducted the second search in Figure 7-7. P4 wanted to find somebody in Ireland who made customised bunting. After reviewing a number of sites, she found one that she was happy with and placed an order.

P4 stated that this was a search that was "*really fun*" to do (P4). The only other search that P4 appeared to enjoy to this degree was shopping for clothes for her son. It was P4's opinion that designing the nursery was really more for the parents' enjoyment. It was something they could look at and be happy about when they looked in at night.

7.1.4 Craniosacral Therapy (Postnatal 0-6m)

The medical information-seeking episode illustrated in Figure 7-8 occurred in the first postnatal period, 0-6m. The information-seeking episode included two medical tasks, four searches and a combination of both expert and online information resources. This is the first example of an information-seeking episode where P4 received conflicting advice from information resources that she perceived to be credible, medical professionals. In this example, P4 used the information she found online and her own past experience to choose between the conflicting advice supplied by the information resources.

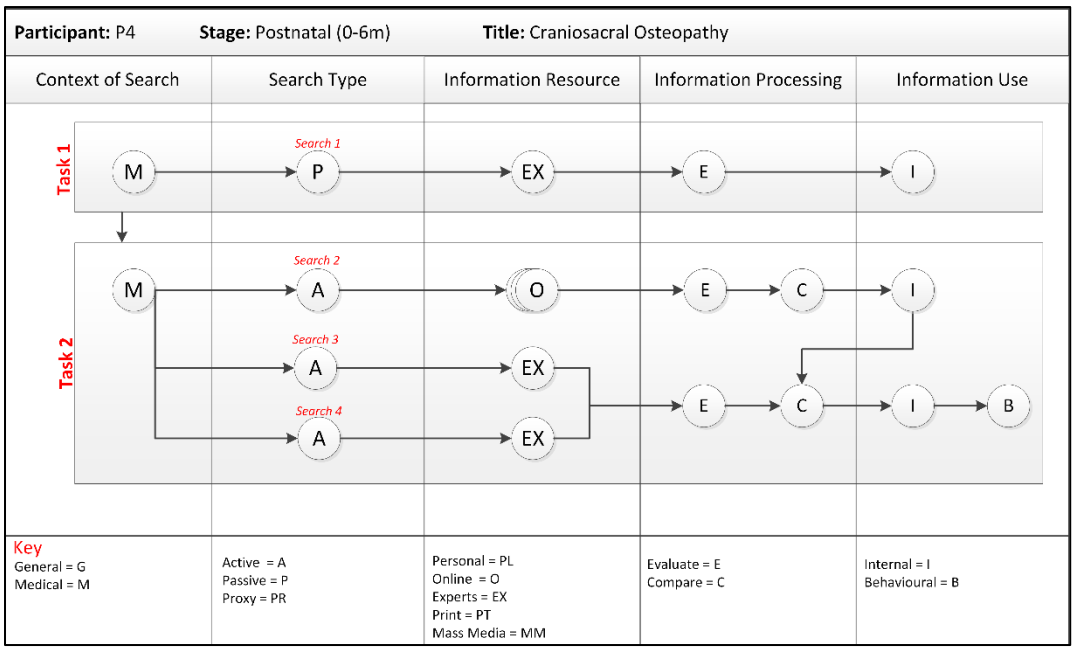


Figure 7-8 P4 - Craniosacral Therapy IBAT

The first medical task in Figure 7-8 includes a passive search. P4 brought her son to a routine check-up with the district nurse. During the check-up, the nurse noticed that the child's head was slightly crooked. The nurse proposed that P4 take the child for craniosacral therapy to correct the issue.

The nurse's discovery and suggestion created the second task. The aim of the second task was to investigate craniosacral therapy to decide if it was something worth doing. P4 first decided to search online, see search two in Figure 7-8. P4 searched a variety of online resources. P4's investigations included an examination of the procedure itself and testimonials from parents who had brought their own children for craniosacral therapy. P4 stated that the information she found online, combined with the nurse's advice, gave her confidence in the procedure.

Shortly after the district nurse recommended P4 take the child to craniosacral therapy, the child had the scheduled two-week check-up with P4's GP. While P4 was there she decided to ask both the practice nurse and her GP about the craniosacral therapy, search three and four in Figure 7-8. P4 felt that neither medical professional was enthusiastic about the therapy. In particular, P4 felt that the GP was attempting to find a nice way not to call the therapy "*hokus-pokus*" (P4). However, the GP's main concern was that P4 continued to rely on the GP practice as her main source of medical advice and did not instead turn to the alternative therapist.

Although the GP had been dismissive of the therapy P4 still decided to bring the child. The district nurse had recommended it and P4 felt confident with the information she had found online, particularly the stories from other parents. It did not worry P4 that the GP was dismissive because P4 had previously had a positive experience with alternative therapy when she was a child. The craniosacral therapist that P4 choose based on her online search was also a trained paediatric nurse. This increased P4's confidence in her decision as it gave the therapist an increased level of expertise.

7.1.5 **Reflux** *(Postnatal 0-6m)*

The following two information-seeking episodes occurred in the first postnatal period (0-6m). Both information-seeking episodes are related to P4's son having reflux. This was an issue with her son from when he was born until he was ten and half months old. The two episodes here come from the first postnatal period because this was when P4 did the majority of her information-seeking into reflux.

This was a distressing issue for P4. P4 found it difficult, not only watching her child get sick so often each day but also having the uncertainty of not knowing when it would stop. P4 once commented that while the baby would smile after getting sick, "*the poor mother is in the corner losing her mind*" (P4).

P4 stated that by the end of the first six months researching "*reflux tends to get very boring*" (P4). However, that did not stop her seeking information every time her son had a flare up or every time her son was close to a milestone. P4 sought information from medical professionals, from personal and online resources. As the time dragged on P4 became particularly interested in the experiences of other parents. Information gleaned from the paediatrician and from forums made P4 aware that certain milestones were potential triggers for reflux to stop. P4 found that as a result that added a "*tinge of disappointment*" for her when each milestone proved not to be the "*wonder fix*" she was hoping for (P4).

7.1.5.1 *Reflux 1* *(Postnatal 0-6m)*

The medical information-seeking episode depicted in Figure 7-9 occurred during the first postnatal period, (0-6m). The episode involved one medical task, three searches and included online, expert and personal information resources. P4's son had problems with reflux since he was first born. Health professionals had previously offered suggestions and his formula had been changed in an attempt to offer relief. During this episode, P4 conducted research online and found an alternative formula which she thought might help her son. However, P4 felt that she needed the input of a medical professional before making the switch.

P4's aim during the medical task in Figure 7-9 was to find a solution for her son's reflux. P4 thought that changing her son's formula might help. The first search involved P4 searching online to find an alternative formula. During her search, P4 wanted to find a formula that was reported to be good for reflux and also to discover any potential problems or side effects.

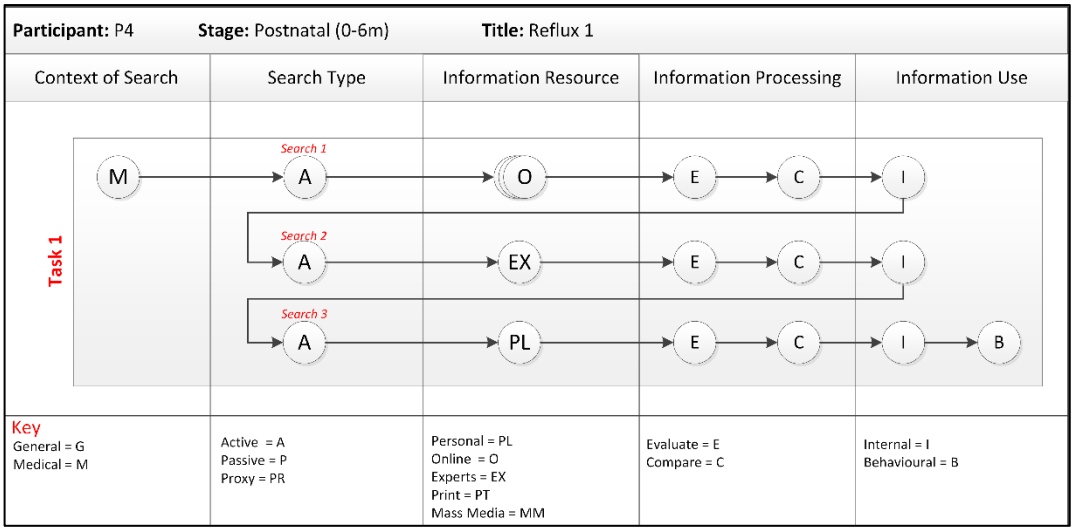


Figure 7-9 P4 - Reflux 1 IBAT

Once P4 found a formula that she thought would work, she arranged an appointment with her GP. P4 was looking for validation from her GP. She was not quite confident enough to make the switch herself. She also wanted to discuss the potential side effects, in particular, constipation. When P4 suggested changing the formula to her GP, the GP suggested the formula that P4 had found online before P4 could say anything herself. P4 was happy that the GP had suggested the same one that she had found. P4 was also happy that she had investigated beforehand because she was now prepared with her list of questions about the potential side effects of the new formula.

The final search in Figure 7-9 is where P4 discussed her findings with her husband, both the potential benefits and issues with switching formula. He agreed that they should try switching, so P4 went ahead with the formula switch.

7.1.5.2 *Reflux 2* (Postnatal 0-6m)

The medical information seeking episode described in Figure 7-10 occurred in the postnatal (0-6m) period. The episode contained one medical task, four searches and a mix of expert and online information resources. This information-seeking follows on from the previous reflux episode. P4 had found that the formula offered some improvement initially, but her son's reflux had gotten worse again around the time he started to teeth. During this episode, P4 found her interaction with experts disappointing because they could not provide a solution and they did not know when exactly the reflux would end.

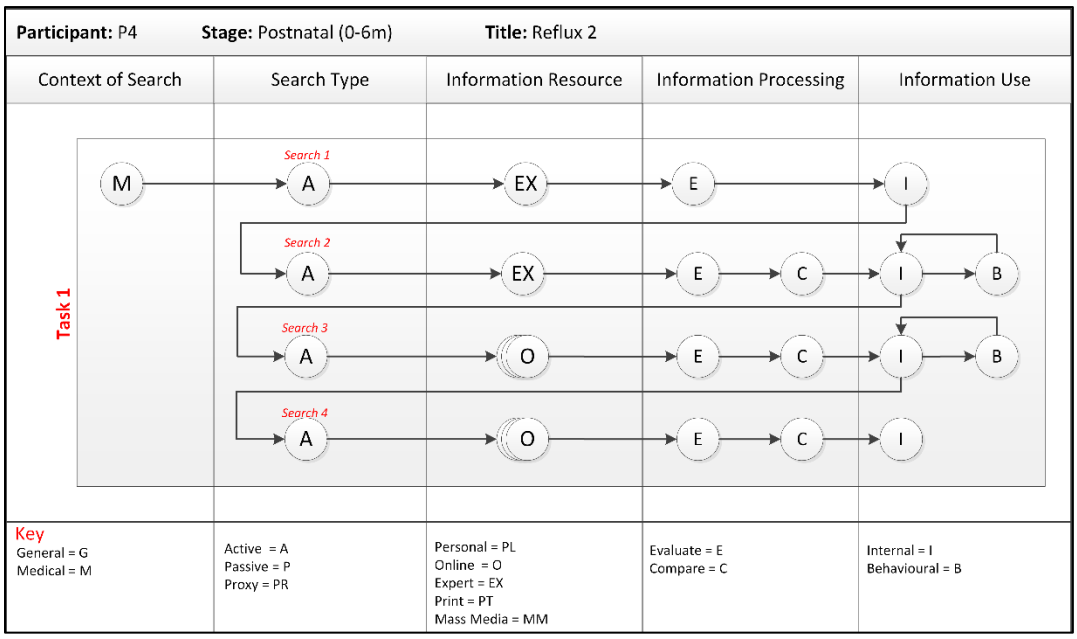


Figure 7-10 P4 - Reflux 2 IBAT

P4's aim in the medical task in Figure 7-10 was to find a solution for her son's reflux. The reflux had gotten worse when her son began to teeth. As a result, P4 brought her son to the GP seeking a solution. The GP decided to refer the child to a paediatrician. P4 hoped that the paediatrician would offer a solution, a "*magic formula that would mean he would never throw up again*" (P4). Instead, the paediatrician said that the reflux was "*a little quirk*" that the child would grow out of, but was unable to be specific about when that would be. P4 stated her husband was able to be more "*philosophical*" about it but she could not help but be disappointed. The paediatrician prescribed an anti-acid medication to ease her son's stomach which was hoped would relieve some of his reflux. The GP had previously placed him on an anti-acid medication hoping for the same result, but this one was stronger.

P4 decided to try the medication hoping that it would offer some relief. Unfortunately, her son's reflux continued to get worse. P4 went online to investigate the situation, see search three in Figure 7-10. During her investigations, she found an Australian article that was written by a hospital, which explained that anti-acid medication prevents the anti-reflux formula that her son was on from working. P4 was surprised by this as she had not found this information anywhere else and neither the GP nor paediatrician had appeared aware of this issue. P4 had

found the formula to be helping for a number of weeks and was unsure how much of the deterioration was now due to the anti-acid medication or the teething. P4 decided to stop giving her son the medication to see what would happen.

P4 found that her son appeared to improve for a couple of days but then had a particularly bad day. After considering the issue, P4 decided to put her son back on the medication but decided to change the time of day he was getting it. Instead of giving him the medication in the morning, which meant it was immediately followed by his bottle, P4 decided to give him the medication at night. This gave her son eight hours to absorb the medication before he had the formula. It was P4's opinion that although the reflux did not resolve itself it did improve after this change.

The final search in Figure 7-10 involves P4 searching online for further information on the interaction between the medication and the formula. P4 was interested in how little awareness there was regarding this interaction, particularly among other parents. P4 stated that she found a number of parents on forums commented that their children had reflux and were on both the medication and the formula, but she found very few that were aware of the issue.

7.1.6 Weaning *(Postnatal 0-12m)*

The three general information-seeking episodes described in this section occurred in the first two postnatal periods. All three information-seeking episodes focus on the weaning process. P4 was eager to start weaning as she was hopeful that it would help her son's reflux. Although it did not work, it did serve another purpose, it gave P4 something else to focus on. P4 stated that weaning was the main topic she researched for two months. Prior to that, the main topic she was researching was reflux, which was frustrating for P4. P4 found weaning to be exciting and "*more cheerful*" to research.

7.1.6.1 *Weaning 1* *(Postnatal 0-6m)*

The general information-seeking episode described in Figure 7-11 occurred in the postnatal (0-6m) period. The episode involved one general task, three searches and a combination of online and expert information resources. This information-seeking

episode describes the information-seeking that was undertaken when P4 was deciding when to wean her son. During this information-seeking episode, P4 was hopeful that weaning might improve her son's reflux but cautious because she did not want to make it worse.

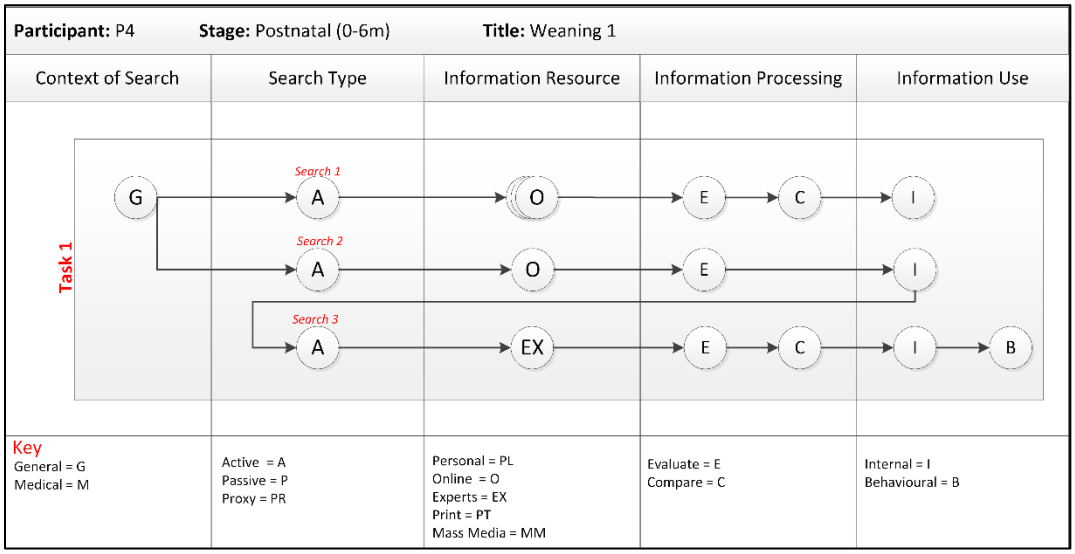


Figure 7-11 P4 - Weaning 1 IBAT

The aim of the first task in Figure 7-11 was to determine at what age P4 should wean her son. P4 was hopeful that weaning might improve her son's reflux. The first search P4 conducted involved searching through forums to investigate other parents' experiences of weaning and reflux. P4 found conflicting information. Some mothers had found that weaning had improved the reflux while others had said that weaning had "*just changed the spew from nice milk to orange or green colour*" (P4).

The second search that P4 conducted was to investigate the EU regulations on weaning. P4 discovered that the regulations advised that seventeen weeks was the earliest that a child should be weaned. P4 also read that it was better not to wait until a child was over six months. P4 decided that she wanted to wean her son as early as possible because she was still hopeful that it might help his reflux. P4 also had a friend who had successfully weaned at that age which increased her confidence.

The third search in Figure 7-11 refers to a discussion with her son's paediatrician. P4 decided to bring the issue up at an appointment to get the doctor's opinion. The

doctor advised that P4 should not wean her son until the child was at least five months. P4 considered what the paediatrician said, along with the warning she had read about not leaving it after six months. P4 decided, therefore, to wean her son at five months.

7.1.6.2 *Weaning 2* *(Postnatal 0-6m)*

The general information-seeking episode depicted in Figure 7-12 occurs in the postnatal (0-6m) period and follows on from the previous weaning information-seeking episode. This episode involved one general task, four searches, and a combination of online, personal and print resources. In the previous episode, P4 determined when she should start weaning her son. The aim of this episode was to develop an initial weaning strategy. During this episode P4 found it difficult to find all the information she required in one resource, instead she found she had to combine different information resources.

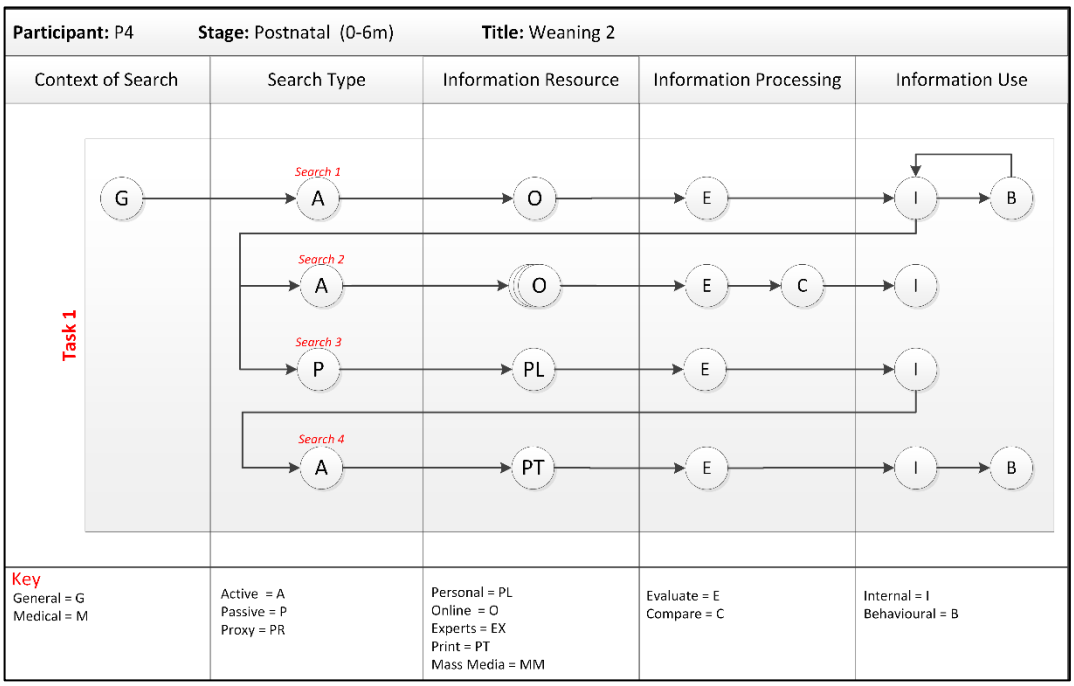


Figure 7-12 P4 - Weaning 2 IBAT

The first search in Figure 7-12 is an app that P4 purchased. P4 liked the app by Annabel Karmel because of its format. P4 commented that it was "*quite nice and colourful*" (P4) and she liked all the pictures with the recipes. P4 stated that she liked the use of visuals because it helped her better visualise what the recipes should look like at each stage. The app also had a timer feature that P4 found "*kind*

of nifty" (P4). The app supplied a separate timer for all the different sub-elements of the recipe.

P4 tried out a number of the recipes and found that it was difficult to determine portion size and the app did not provide any information to help. P4 was particularly concerned with portion size because of her son's reflux. When her son brought up food after she fed him P4 was uncertain if it was because of the reflux or if it was because she had overfed him. P4 decided to search for information on portion size, see search two in Figure 7-12. However, P4 found it difficult to find expert information online. Most of the information P4 could find was anecdotal information, the experiences of other mothers. This information was not helpful for P4 as there were differences between the advice mothers were providing which only added to P4's confusion.

During a conversation P4's sister-in-law recommended Gina Ford's weaning book. Her sister-in-law had experienced similar problems determining portion size using Annabel Karmel and had found the Gina Ford book useful. P4 was hesitant because she had bought one of Gina Ford's other books and had not found it useful. However, based on the recommendation she decided to try it.

The Gina Ford book is the fourth search in Figure 7-12. P4 was surprised by how much she liked the book. The book provided the information on portion size that P4 was looking for. P4 found that the book also provided useful information on what foods should be introduced at certain ages, and explained the logic behind the order. P4 valued the fact that the book explained why foods were being introduced in a particular order. P4 decided that this could be combined with the Annabel Karmel app going forward. The information provided between the two resources made P4 more confident with her weaning decisions.

7.1.6.3 *Weaning 3* *(Postnatal 6 -12m)*

The general information-seeking episode illustrated in Figure 7-13 occurred at the start of the second postnatal period, 6-12m. The information-seeking episode included one general task, three searches and a mix of online and print resources. This episode follows on from the two previous weaning information-seeking

episodes. P4 found herself growing in confidence now that her son had crossed the six-month mark. Although P4 was disappointed that weaning had not improved her son's reflux, she was happy how fast his weaning had progressed. During this information-seeking episode, P4 encountered conflicting information on the order and speed that food should be introduced when progressing through the weaning process. When P4 encountered such conflicts, she preferred to side with guidelines and authors originating from her own geographic region.

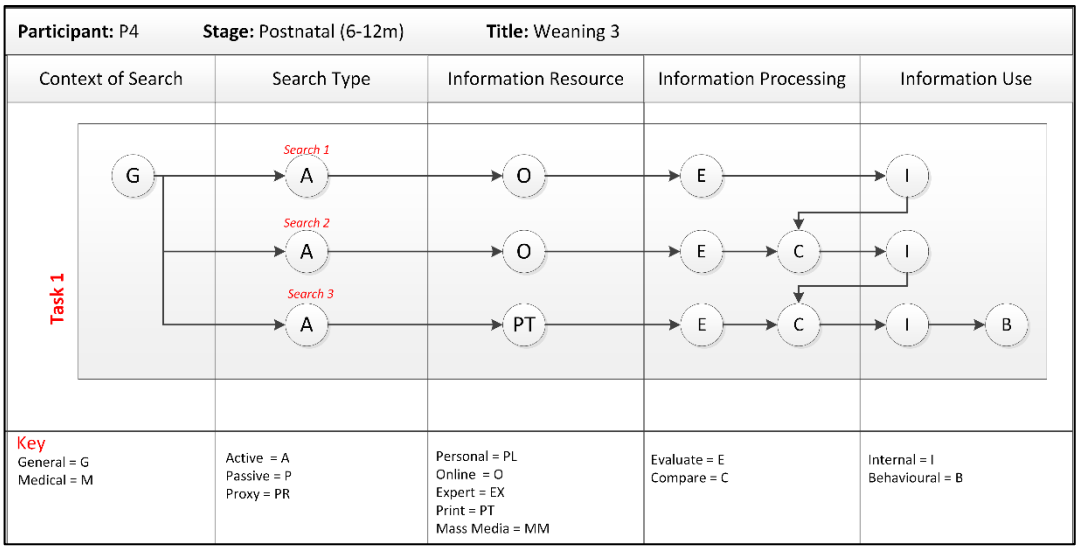


Figure 7-13 P4 - Weaning 3 IBAT

The goal of the task in Figure 7-13 was determining which foods should be introduced in the next stage of weaning. P4 found that she was worried about either going too slowly and risking her son becoming a picky eater or going too fast and aggravating his reflux. However, as the weaning was going well, P4 was beginning to feel "*a little bit braver*" (P4) about introducing new foods.

As P4 progressed through the weaning process P4 continued to access the Annabel Karmel app for recipes, see search one in Figure 7-13. When new foods would appear in the recipes P4 would consult two information resources to check at what age they should be introduced. The first was an American site that provided advice on when certain foods should be introduced to a child's diet, see search two in Figure 7-13. P4 valued the information on the site because it often pointed out when there were differences in American and European guidelines. The second

information resource was the Gina Ford weaning book that P4 had used in the previous weaning episode.

Although P4 found all three information resources to be useful sources of information, sometimes conflicts arose. When this occurred P4 decided to go with the advice provided by the Gina Ford book. Although the website purported to supply European guidelines, Gina Ford was writing from a European perspective and the P4 preferred to "*go with more regional advice*" (P4).

7.1.7 Snacks for Crèche (Postnatal 6-12m)

The general information-seeking episode depicted in Figure 7-14 occurred in the postnatal (6-12m) period. It is a short episode containing one general task, one search, and one online resource. The reason that comparison is included under the information processing column even though there is only one information resource is because that resource was a forum. During her investigation into what snacks other mothers were giving their children going to crèche P4 accessed and processed a number of different posts in the forum. Although P4 did not discover additional snack ideas during this search, P4 did find validation for her own ideas which increased her confidence.

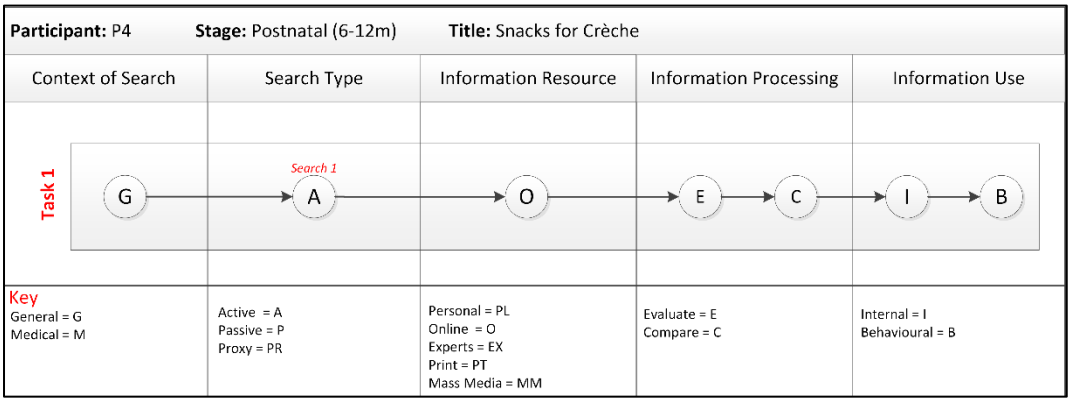


Figure 7-14 P4 - Snacks for Crèche IBAT

The aim of the task in Figure 7-14 was to determine what snacks P4 should be giving her son going to crèche. P4 was preparing to send her son to crèche because she was going back to work. The crèche had informed her that she needed to supply two snacks for during the day. P4 wanted to research what other mothers were giving their children because she found it difficult to come up with enough ideas to allow her to vary the snacks day to day.

P4 stated that she wanted to go to an Irish site to look for ideas. P4 decided that instead of searching through Google she would go straight to a forum she had experience of. The forum WeddingsOnline.ie had come up a few times when P4 had searched for information on babies during the postnatal period. It was also a forum that she had experience of when she was planning her wedding.

When P4 was reading through the forum posts she had to disregard some of the information because it was not relevant as it was for older children. P4 found that the snacks that other mothers were providing for babies were the same as she had thought of. P4 said that it was *"nice to see*" because it meant that she was not "*boring*" (P4). The findings for her search acted as validation for P4's existing ideas. As such P4 decided to just to continue with the snack ideas she had before the search.

7.1.8 Croup *(Postnatal 6-12m)*

The medical information-seeking episode illustrated in Figure 7-15 occurred in the postnatal period (6-12m). The episode included one medical task, three searches and a mix of expert, online and personal resources. This medical information-seeking episode centred on a short-term illness and involved low levels of uncertainty. P4 encountered no conflicting information and was confident in the treatment prescribed by the GP. During this episode, P4 did not seek the personal experiences of other parents either online or in person. She showed little interest when those experiences were volunteered. This can be contrasted with the Reflux information-seeking episode where the personal experiences of other parents were valued. P4 was information-seeking about reflux over a number of months. During those months a number of different treatments were attempted and P4 experienced feelings of anxiety and uncertainty.

The aim of the task in Figure 7-15 was for P4 to find out what was wrong with her son and to find a solution. The first search was to South Doc, an out of office GP service. P4 brought her son to South Doc because her son became sick on a Sunday and her own GP was closed. The GP at South Doc confirmed to P4 that her son had croup. He provided her with a prescription for both steroids and antibiotics. The GP

also told her that steam might help, so she could put a bowl of hot water in his room. However, to P4's mind, this was not the "*primary*" treatment, it was just something extra she might try.

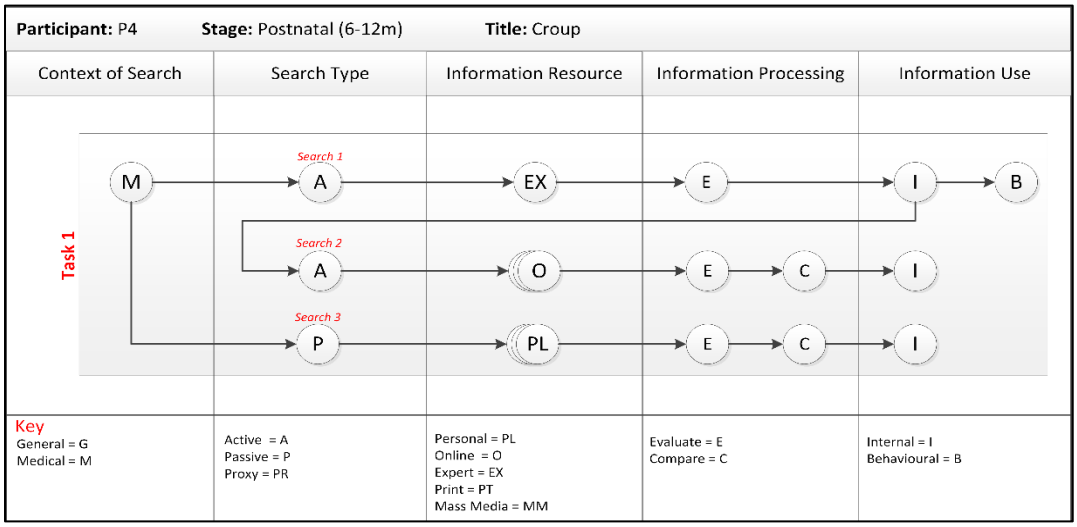


Figure 7-15 P4 - Croup IBAT

P4 filled the prescription for her son and then decided to investigate croup more using her "*friend Google*" (P4), see search two in Figure 7-15. P4 commented that the search was fast because there was no conflicting information on croup. Croup was not an issue that people appeared to have differing opinions on. When P4 returned to work the next day she found her son's croup came up naturally in conversation with colleagues. P4 stated that a number of her colleagues offered her their experiences with croup without her asking. One of her colleagues recommended that she try steam. Her colleague stated that she had found it very beneficial; the colleague had used it when her own child was small. P4 listened to her colleagues, but she did not feel that she needed any additional information. P4 was happy with the medication the doctor had prescribed and she was aware of the steam but only thought of it as an additional treatment option.

7.1.9 Rash *(Postnatal 12m+)*

The medical information-seeking episode depicted in Figure 7-16 occurred in the final postnatal period, 12m+. The information-seeking episode included two medical tasks, five searches and a mix of expert, online and personal resources. P4 searched online for information in the first task. However, P4 was never confident relying on it because "*rashes are so vague*" (P4). It is for that reason that she quickly

moved on to consulting experts. In the second task, P4 wanted to bring her son back to the doctor when he developed a cough and did not seem to be getting better, however, she was afraid that she was overreacting. Once P4's mother also provided the same suggestion, P4 had the validation she needed and brought the child to the GP.

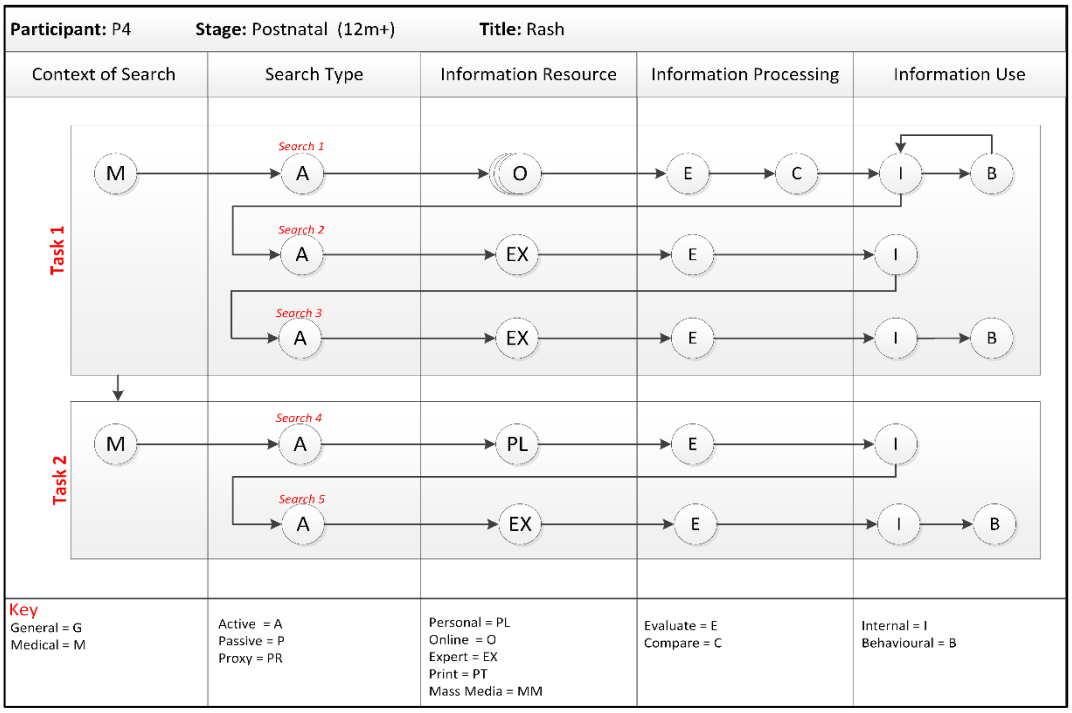


Figure 7-16 P4 - Rash IBAT

The aim for P4 in the first task in Figure 7-16 was to find out what was causing her son's rash and to soothe it. P4 thought it might be heat rash because she was prone to them herself and it was very hot out. However, as her niece had the chicken pox P4 decided to search on "*doctor Google*" (P4) to see if the rash matched chicken pox, see search one in Figure 7-16. Based on Google image search the rash did not look like chicken pox, so P4 decided to put calamine lotion on it to try and soothe it.

P4 was never confident relying on Google images because of the broad range of things that rashes can indicate. So when the calamine lotion did not appear to be working P4 thought she should ask the pharmacist for a second opinion. The pharmacist did not think the rash looked like either chicken pox or heat rash and advised that P4 bring the child to the doctor. P4 took the advice of the pharmacist and brought the child to the doctor. It was after hours, so she had to bring him to

South Doc. The doctor said the child had a viral infection and prescribed an antihistamine, which P4 got immediately.

The second task in Figure 7-16 was a number of days later. P4's son had developed a bad cough and he was not in good form. P4 assumed it was all connected to the viral infection that caused the rash. She tried giving the child Calpol, but it did not seem to help. As she was on holidays from work, P4 was spending time at her parents' house. Her mother advised her to take the child back to the doctor. P4 stated that she had been considering doing so herself, but had been nervous that she was "*overreacting*" (P4). Now that her mother advised the same thing, P4 decided to go. This time, P4 got to see her own GP, who prescribed the child antibiotics. P4 stated that once the child started on the antibiotics he got better within a couple of days.

7.1.10 Stroller *(Postnatal 12m+)*

The short general information-seeking episode illustrated in Figure 7-17 occurred in the postnatal (12m+) period. The information-seeking episode included one general task, one search, and involved P4 accessing online information resources. The goal of the task in this information-seeking episode was to find a stroller to bring on holidays. P4 had particular criteria in mind when beginning her search, including price, brand, and size. P4 appeared to use the criteria to be quite decisive. P4 stated that she did not spend much time on the search, instead, she found a stroller quickly that matched the criteria and purchased it.

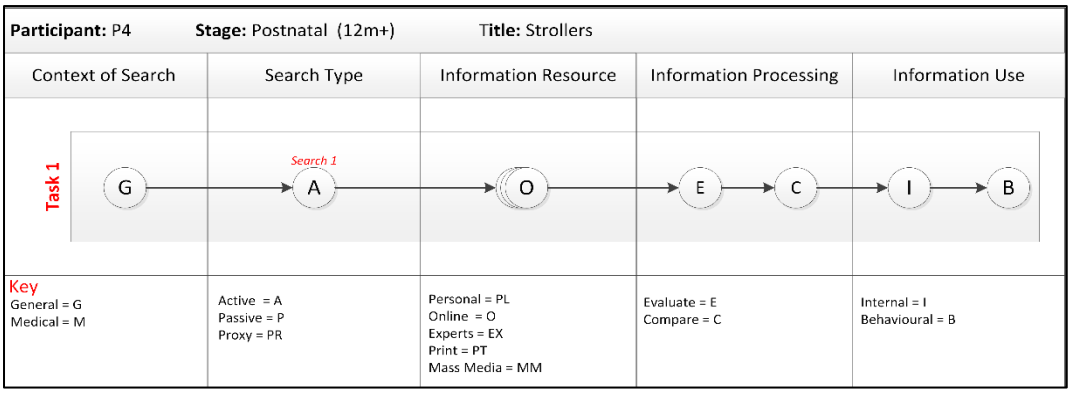


Figure 7-17 P4 - Stroller IBAT

The only search in Figure 7-17 involved P4 accessing a number of online resources in her search for a stroller. As previously discussed, P4 had three main criteria when

searching for the stroller. The main criterion that P4 used when searching was price. P4 stated that she had already purchased an "*expensive*" travel system, so she was looking for something more reasonably priced. The second criterion was brand. P4 preferred to purchase a brand she recognised. The final criterion for P4 also related to the travel system. P4 found that the buggy part of the travel system was so large it took up most of her car boot. She, therefore, wanted the stroller to be smaller in size to allow more room in the car when they went on holidays. When P4 was finished her search she was happy with her final selection as it satisfied the first two criteria. It was "*affordable*" and "*a good make*" (P4). Although it was difficult to judge the size without seeing it in person, P4 decided to purchase it.

7.2 RQ1: What Subjective Assessment Criteria Are Used During Information Processing?

The purpose of this question is to identify and discuss the subjective assessment criteria used by P4 during information processing. In Chapter Three, information processing was described as the process of evaluating and comparing information resources. Evaluation is concerned with assessing the quality of individual information resources whereas comparison is concerned with contrasting information resources against other information resources, this can also include previous experience or beliefs. The aim of this process is to find information that meets the individual's information needs.

7.2.1 Subjective Assessment Criteria (P4)

This section explores the subjective assessment criteria P4 used to judge the quality of different information resources. The subjective assessment criteria are divided into those used to appraise information resource and those used to assess the information. Summary tables are utilised to demonstrate the subjective assessment criteria discussed by P4. For each criterion, there are illustrative quotes which describe the criterions meaning to P4. An X is used to indicate the type or types of information resources P4 was referring to in the illustrative quote. Lessons are taken from P4's perceptions of all types of information resources to identify design guidelines at the end of the section. The subjective assessment criteria for information resource are explored first, see Table 7-1.

From Table 7-1 it is evident that P4 considered a number of different assessment criteria when evaluating information resource. The two criteria which she mentioned most were **credibility** and **format**. Credibility was a criterion which P4 discussed in relation to multiple information resource types, online, personal and expert.

Criteria	Information Resource					Illustrative Quotes
	PL	EX	O	PT	MM	
Convenience			X			"I mean obviously, I look at the Internet quite a bit with things because it's just at your fingertips"
Credibility			X			"I don't tend to go on blogs where women are saying how they are experiencing week sixteen. But for health related things but it is nice to know that other people are going through the same thing. Also, the information tends to be more factual because people are relaying back the opinion of their health professional."
		X				"I am happy to go with what they say at the moment because I do feel that that [the doctors] probably know best."
		X				"I really, really trust my doctor"
	X					"I do trust my mother"
Format			X			"That's the first time I'd say I've ever actually enjoyed going through stuff. It's very visual. It's not like you're trawling through words, or people's opinions. It's actually something that you can see pictures of, and you can actually imagine"
			X	X		"My GP recommended, "What to Expect When You're Expecting." I found it good; I just find it a little bit boring. It's just I think the stuff that you get on the weekly development; I prefer to see them online, through the different websites. Again, they're a bit more visual."
			X			"I bought the Annabel Karmel app right and I really liked it because the app is quite nice and colourful. She has got pictures of the recipes"
Rank on Search List			X			My searching is pretty much keywords in google and what comes up on the first page or the first couple of hits"
Security			X			"I suppose a lot of my information searching is online because it is a private thing as well and I think when you are pregnant you don't necessarily want to be talking about it an awful lot with people or maybe that is me I don't know. So feel there is a bit more privacy in searching for something online"
Usability			X			"The weekly updates app, I find it hard to follow. I say I am week sixteen on Thursday so I look up week sixteen and what is happening whereas the app says you are in the seventeenth week and so has you a week ahead."
Perceived Utility			X			"It's actually a really cool part of the app; she does the recipe in steps with a little clock next to each step. I pressed it one day and it actually counts down, and sets little timers"

Table 7-1 P4 Information Resource Subjective Assessment Criteria

For medical tasks, experts were consistently considered a credible information resource by P4 during both the antenatal and postnatal periods. During the

antenatal period, P4 commented that she found forums and blogs that discussed health issues more credible than standard pregnancy forums. This was because the forums that discussed health issues often including people discussing the information they had received from health professionals whereas on the pregnancy forums, P4 found that people were discussing information that they had received from their mothers. P4 did find her own mother to be a credible resource. However, as with other personal resources, this was an information resource which she accessed more in the postnatal period.

P4 discussed the **format** of both online and print resources, see Table 7-1. Part of the issue with the book 'What to Expect When You Are Expecting' was the quantity of information that was not relevant to P4. However, a major issue for P4 was the format of the book, which was "*quite text-heavy*" (P4) with a lack of visuals. This negatively compared against the online information resources that were available, see Table 7-1. This could be contrasted with P4's perception of the online resources Etsy and Pinterest. P4 stated that searching through those sites was the first time she enjoyed conducting a search. Their use of images activated P4's imagination.

P4 purchased an Annabel Karmel weaning app which she liked because of the format, i.e. the use of colours and images. However, that was not the only criterion for the app which P4 positively evaluated. P4 also perceived one of the features, the time clock to be of particularly **utility**. Another mobile app that P4 reported using was the companion app to the 'What to Expect When You Are Expecting' book. P4 experienced **usability** issues with the app. The app calculated P4 to be one week further along than she was counting, which meant the push information it provided was always a week ahead, see Table 7-1.

Online resources were a popular resource type for P4 during both the antenatal and postnatal period. The popularity was partly fuelled by the **convenience** of online resources, see Table 7-1. However, they became more convenient in the postnatal period when P4 broadband was installed at her home. Previous to that point she was restricted to online information-seeking using her work computer.

P4's primary method of online information-seeking involved using Google and conducting a keyword search. P4 stated that her preference was to select information resources from the first page of search results. Sometimes P4 restricted the selection to the information resources at the top of the **ranking on the search list**, see Table 7-1.

The final subjective criterion P4 used to assess information resources was **security**, see Table 7-1. Included within security is the idea of privacy, which was important for P4 particularly during the antenatal period. During the antenatal period, P4 did not want to discuss her pregnancy with other people because P4 perceived pregnancy to be very personal. Online resources offered P4 the security of knowing she could search for information anonymously.

Table 7-2 illustrates the subjective assessment criteria that P4 used to assess the information provided by information resources. Three subjective assessment criteria were discussed by P4 when referring to the quality of information. Of those, both **currency** and **relevance** were equally popular, while **Complete** was spoken about least, see Table 7-2.

The first criterion from Table 7-2 is **Complete**. In the quote, P4 discussed the problem with the Annabel Karmel app in that it required her to search for additional information. P4 found that without direction on portion size it was very difficult for a first-time mother to know how much food to give. Another example of this is evident at the start of the Heparin information-seeking episode, where P4 receives information from a GP. The GP did not have all the information required to answer P4's questions, this caused a cognitive gap that resulted in P4 searching for additional information.

Currency is a criterion that P4 discussed in relation to information coming from a variety of information resource types, personal, online and print. For personal resources, this criterion was primarily an issue in the antenatal period. This was the reason P4 was not quick to access personal resources during the antenatal period. As previously discussed, P4 considered her mother to be a credible resource, however, the currency of her mother's information was a concern because of the

length of time that had elapsed since her mother had last been pregnant. P4 stated that although she spoke to her friend who was also pregnant, she felt because they were several months apart, her friend had already forgotten some of her experiences, see Table 7-2.

Criteria	Information Resource					Illustrative Quotes
	PL	EX	O	PT	MM	
Complete			X			"The only problem that I find with Annabel Karmel is that she doesn't give the portions and I found as someone starting off, I found it very difficult to know how much am I supposed to be giving him"
Currency	X					"I probably tend to go to the internet first, because while I would talk to my Mother she had me thirty years ago and there are little things that she doesn't really remember. Like little niggly aches and pains here and there, and I suppose a lot of the information wasn't available to her at the time so she wouldn't have taken that much notice of it"
	X					"I suppose the main source as a person would be my best friend who was going through the later stages of pregnancy, but even then I think a lot of the time people tend to forget what maybe happened in their first trimester when they are in their third."
			X			"If you are looking online at something before 2005 or 2006 you think maybe something has changed and you try to get something a bit more recent. "
				X		"The book is the most recent edition. There is no point in getting something older because things do change."
				X		"It was funny because my mum gave me her book, written in the 70s which was an absolute panic. It was like a different world but I read a couple of pages really for just a laugh because it so outdated. A coping tip for morning sickness was to just grin and bear it and to concentrate on the pleasures of becoming a mother."
Relevance			X			So there would be the bias I suppose towards trying to find information that does suit you because you are trying to get appeasement of your worry."
			X			"I would probably tend to look at more English or Irish websites especially Irish because it the same health care system. "
			X			"You can even bring it down to something more local in that if you were curious about something to do with the High-Risk clinic, then I wouldn't necessarily be looking at the High-Risk clinic in Hollis Street in Dublin because even in Dublin things are so much different to Cork."
				X		"I just find with 'What to Expect', a lot of the pages can be formed around things that you are not experiencing, so you're not that interested in reading about stuff that isn't really happening to you. "

Table 7-2 P4 Information Assessment Criteria

When it came to print resources, P4 stated that she had a preference for purchasing the most recent edition. P4 commented that she had a preference for online information dated after 2005/2006. This preference was a method of ensuring she was aware of any changes that may have occurred with treatments or guidelines.

The final criterion from Table 7-2 is **relevance**. P4 referred to relevance in relation to online and print resources. P4 discussed relevance on three different levels. Firstly P4 discussed relevance in relation to her affective information needs. P4 stated that sometimes the aim of an information-seeking episode is to find "*reassurance on something, that everything is okay*" (P4). In these situations, P4 stated that sometimes the aim of her search was to find "*something positive*" and if she found "*something negative*" on the topic she would choose to "*disregard*" it (P4). This demonstrates that P4's needs influenced her determination of relevance.

Secondly, P4 spoke about rejecting information because it was not relevant to her situation or task. For example, P4 unsubscribed to an email newsletter during the antenatal period because she found too many of the tips did not apply to her. P4 also stated that she only read the sections of the book 'What to Expect When You Are Expecting' that referred to issues she was experiencing, see Table 7-2.

Finally, P4 highlighted the importance of localisation for particular tasks. During the antenatal period, P4 commented that she tended to use Irish or UK websites because of the similarities in the healthcare systems. P4 also stated that she avoided some of the American sites during the antenatal period because of differences in culture and use of language. It was P4's opinion that many of them were "*geared towards the Disneyland pregnancy*" (P4). During the postnatal period, P4 found that culture was less of a barrier. P4 stated that "*it makes no difference whether they're in Timbuktu or the UK, so I have no preference over which one I go to"* (P4). However, P4 still displayed a preference for guidelines and recommendations produced in her own region which was evident during the weaning information-seeking episode. This demonstrates that localisation can impact P4's determination of relevance.

7.2.2 Design Guidelines

This section discusses the design guidelines that were identified based on P4's subjective assessment criteria discussed above. As with the subjective assessment criteria themselves, the design guidelines have been separated into guidelines that are focused on eHealth information resources and guidelines that are focused on eHealth information.

Table 7-3 contains the design guidelines for eHealth resources that were identified for P4. Each guideline attempts to highlight a feature that P4 valued or to address an issue that P4 identified. P4 stated that she accessed online resources because they are convenient, the information is "*just at your fingertips*" (P4). To further enhance and compliment this it is proposed that eHealth resources should be designed so that they load quickly. To increase their convenience this quick load should include a range of desktop and mobile devices.

Criteria	Design Guideline
Convenience	Ensure site loads quickly
Credibility	Clearly display the credentials of contributors to the site.
	List experience (professional and/or personal).
Format	Consider the text to image ratio
	Use of multimedia to enhance a user's understanding of a topic
	Consider expanding sections to limit text overload
Rank on Search List	Optimise website design to improve search engine rankings
Security	Ensure privacy of website users
Usability	Consider a level of customisability to make features more user-friendly
Perceived Utility	Add timer function to recipe section of website
	Add the ability to save or bookmark articles of interest

Table 7-3 Design Guidelines - eHealth Information Resources (P4)

Credibility was one of the subjective criteria most discussed by P4. For P4 this included both medical expertise and personal experience. As a result, it is suggested that an eHealth resource should include both types of contributors on their site, medical experts and those with personal experience of the issue, for example, parents. Another method to increase trust in the eHealth resource would be to clearly state the credentials of the contributors, whether professional, personal or both.

The second most popular assessment criteria discussed by P4 in concerning information resources was format. P4 valued a balance between text and images,

finding one print resource in particular 'boring' and 'text-heavy'. In Table 7-3 it is suggested that eHealth resources should consider the text to image ratio. Different topics may require more text than others. However, multimedia can be used to enhance a user's understanding of a topic. A final formatting option to consider is expanding sections. They are a method of preventing text overload by providing a brief introduction to a topic and allowing the user to expand the section if they want to know more.

P4 stated that an advantage of searching online was the privacy it afforded her, particularly in the antenatal period. This highlights how important it is for eHealth resources to ensure that they protect the privacy of users who access their services, see Table 7-3. P4 stopped using the 'what to expect when you are expecting' app because it calculated that her to be a week further along than she believed herself to be. If the app had been more customisable and allowed her to easily adjust the date so that the weeks matched, she may have continued to use the app. This demonstrates the importance of usability and allowing the customer to customise the features to meet their needs. The last group of eHealth information resource guidelines fall under perceived utility, see Table 7-3. Two particular features are highlighted that P4 found useful when accessing information resources.

Table 7-4 provides a list of the design guidelines identified for eHealth information for P4. These are grouped under three subjective assessment criteria: complete, currency and relevance. Included under the criteria complete, is the concept of covering a topic in as much detail as possible. If this eHealth resource provides all the information that the user requires then there is less reason for them to search elsewhere. However, sometimes it is not possible to cover every topic in one information resource. As such, the second guideline is included under complete and suggests allowing users to create a personal folder to save their own material and links. This may increase the chances of the eHealth resources being the user's primary resource for their health information needs.

Currency refers to how old the information provided by the eHealth resource is. This was a criterion that P4 paid particular attention to. As a result, it is suggested

that information on an eHealth resource should be updated regularly to ensure that the research is still current. It is also important to state clearly last update date so that users will be aware that the information is current.

Criteria	Design Guideline
Complete	Topics should be covered in as much detail as possible
	Provide a personal folder to allow users to save their own notes, media and links.
Currency	Information should be reviewed and updated regularly
	Clearly state the last date information was updated
Relevance	Localise information for different regions
	Include information on potential positive and negative outcomes

Table 7-4 Design Guidelines - eHealth Information (P4)

The last guidelines in Table 7-4 are related to the relevance criterion. P4 spoke about relevance in relation to the task and the location. It is, therefore, important to try and localise the information provided on the eHealth resource. Where this is not possible, links can be included to direct users to information in their area. One way to ensure that information is relevant to a user's task is to include information on both positive and negative outcomes. A user may be looking for detailed information to fulfil a cognitive need or they may be looking for reassurance, by supplying all the information you are allowing the user to decide what they want.

7.3 RQ2: What are the Information Use Outcomes?

The purpose of this question is to identify and discuss the information use outcomes for P4. There are two stages of information use outcomes, internal and behavioural. Internal use outcomes involve changes to an individual's cognitions or affective state as a result of information-seeking. Behavioural use outcomes refer to changes in behaviour as a result of information-seeking. It is the assumption of our operational definition that information use begins at the point of cognitive use. This may involve a new opinion/belief or it could information a confirmation or change to an existing opinion/belief.

7.3.1 Information Use Pattern Outcome Diagram for P4

Figure 7-18 is the Information Use Pattern Outcome Diagram (IUOPD) for P4. The IUOPD provides an illustrative analysis of all the information use outcomes of the information-seeking episodes discussed in the first part of this chapter. The numbers represented a frequency count of each time that particular information

use outcome occurred in one of the information-seeking examples. Each of the different paths represented in the IUOPD are discussed in detail below the diagram. However, from a first review of Figure 7-18 it is evident that the most common information use outcomes for P4 as described in the information-seeking examples are a cognitive change which results in behavioural use (A2) and a cognitive change which results in further information-seeking (A1).

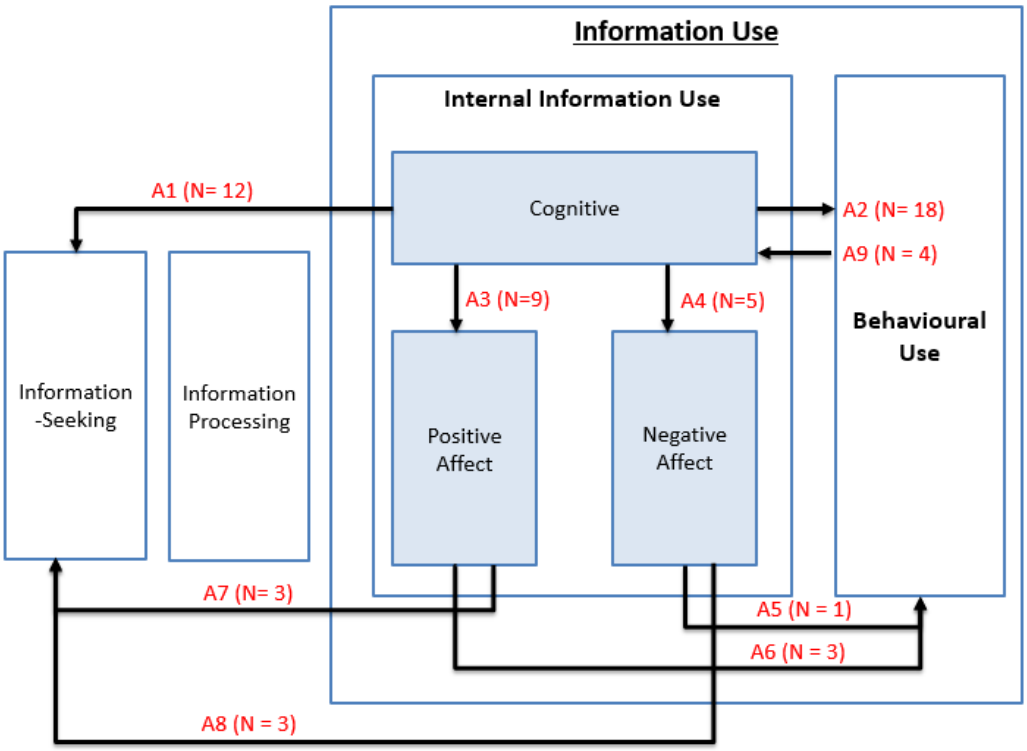


Figure 7-18 Information Use Outcome Pattern Diagram (P4)

The summary tables below include five columns which allow traceability back to the IUOPD and to the original information-seeking episodes where the data came from. The columns are: (1) the code which is visible in the IUOPD diagram, (2) the longer description of the information use outcome, (3) the information-seeking episode title, (4) the task number, and (4) the search number. Some searches had more than one outcome and will therefore appear more than once, for example an encounter with a medical professional may result in a participant taking medication and seeking further information.

Table 7-5 contains information use outcomes for P4 where the only internal use outcome was cognitive, i.e. there was no affective use outcome at that particular stage. The first two outcomes in Table 7-5 start with cognitive use and progress

either to information-seeking (A1) or to behaviour use (A2). These are the most popular information use outcomes for P4. The third outcome starts with behavioural use and results in cognitive use (A9).

Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking	Heparin	1	1
		Stomach Problems	1	1
		Craniosacral therapy	1	1
		Reflux 1	1	1
		Reflux 2	1	1
		Reflux 2	1	3
		Weaning 1	1	2
		Weaning 2	1	3
		Croup	1	1
		Rash	1	1
		Rash	1	2
		Rash	2	4
A2	Cognitive use resulting in behaviour change	Heparin	1	1
		Heparin	2	3
		Stomach Problems	1	3
		Stomach Problems	1	5
		Nursery Ideas 1	1	3
		Craniosacral therapy	2	3,4
		Reflux 1	1	3
		Reflux 2	1	3
		Reflux 2	1	3
		Weaning 1	1	3
		Weaning 2	1	1
		Weaning 2	1	4
		Weaning 3	1	1,2,3
		Croup	1	1
		Rash	1	1
		Rash	1	3
		Rash	2	5
		Stroller	1	1
A9	Behavioural change resulting in cognitive use	Reflux 2	1	2
		Reflux 2	1	3
		Weaning 2	1	1
		Rash	1	1

Table 7-5 P4's Information Use Outcomes - A1, A2 & A9

One reason that P4 engaged in renewed information-seeking was when the information resource did not provide her with the complete picture, for example during the heparin information-seeking episode. P4 also renewed her information-seeking efforts based on the experience she gained from behaviour change, see Table 7-5 (reflux 2, search 3).

High task uncertainty also influenced P4's desire for further information, for example during the craniosacral therapy episode. In cases of high uncertainty P4 looked for information resources she deemed to be credible to confirm information she had found herself, see Table 7-5 (reflux 1 and weaning 1). In the rash information-seeking episode, P4 was unsure if she was overreacting until her mother, an information resource she trusted, voiced the same concerns she was having. This provided her with the impetus she required to return to the doctor.

The majority of the behavioural use undertaken by P4 was medical in nature and involved either herself or her son taking medication. For these decisions, P4 relied on the opinion of credible medical experts. Medical experts are not the only information resource P4 judged to be credible. P4 also valued the experience of other parents. P4 found the testimonials of other parents to be a useful tool in helping her to have confidence in her decision when she had to decide between the conflicting opinions of different health professionals, for example during the craniosacral therapy information-seeking episode.

If P4 valued an information resource and she found the resource was lacking important information, she was more likely to combine it with other information resources rather than abandon it completely. This was observed during the weaning 2 information-seeking episode. P4 initially attempted a recipe from the Annabel Karmel app because she liked the format and found that it had useful features. However, she found that it was missing important information. P4 researched and found another information resource that had the missing information and used the two information resources in combination.

The last type of information use outcome in Table 7-5 is behavioural use resulting in cognitive use. This is when P4 had undertaken a behaviour use and that resulted in an impact to her cognitive state. Three out of four of the examples in Table 7-5 involve instances where medical treatment was not as successful as intended. For example, during the reflux 2 information-seeking example the anti-acid medication prescribed by the paediatrician did not offer relief for P4's son's reflux. P4 then took her son off the medication based on information she discovered online. Although

her son initially appeared to improve without the medication, the improvement did not last long.

Table 7-6 contains information use outcomes for P10 that include positive affect. The first information use outcome is cognitive use resulting in positive affect. This was the most popular information use outcomes for P10. The other two outcomes in Table 7-6 start with positive affect and progress from there, either to information-seeking or behavioural use.

P4 found that the experiences of other parents, either in person or online could be a source reassurance. The heparin information-seeking episode is an example from the antenatal period. P4 found it reassuring reading the experience of women online who had been through the same thing. In the snacks for crèche information-seeking episode, the very fact that P4 could not find additional examples in the forum gave her confidence in her own ideas.

Code	Description	Episode	Task Num	Search Num
A3	Cognitive use resulting in positive affect	Heparin	2	2
		Heparin	2	5
		Stomach Problems	1	2
		Nursery Ideas 1	1	1,2
		Nursery Ideas 2	1	1
		Nursery Ideas 2	1	2
		Craniosacral therapy	2	2
		Reflux 1	1	2
		Snacks for Crèche	1	1
A6	Positive affect resulting in behavioural use	Nursery Ideas 2	1	1
		Nursery Ideas 2	1	2
		Snacks for Crèche	1	1
A7	Positive affect resulting in information-seeking	Nursery Ideas 1	1	1,2
		Nursery Ideas 2	1	1
		Reflux 1	1	2

Table 7-6 P4's Information Use Outcomes – A3, A6 & A7

P4 also expressed that printed or online resources with relevant facts could be reassuring. For example, the book 'What to Expect When You Are Expecting', was able to provide P4 with reassurance by informing her that stomach problems are a common occurrence during pregnancy. During the craniosacral therapy information-seeking episode, online information resources gave P4 increased confidence in the procedure suggested by the public health nurse.

The information-seeking episodes nursery ideas 1 and 2 demonstrate that the pleasure derived from a pleasant task can be increased when the participant enjoys accessing the information resource. P4 commented on her preference for the layout of both Etsy and Pinterest and how it led her to spend more time on those sites. P4 also commented on the utility of the 'pin' function, as she was able to return to her old pins months later. P4 was inspired by ideas she uncovered on Pinterest and Etsy to conduct further information-seeking and to make changes to the nursery (i.e. behavioural use).

Table 7-7 provides a description of the instances of cognitive use resulting in negative affect for P4. Table 7-7 includes three different information-seeking episodes, each of which will be examined individually. In the Heparin information-seeking episode P4 was panicked by an idea that occurred to her at the end a hospital visit. This did not give her enough time to process the issue and to ask questions. P4 decided to search online, specifically on forums. P4 wanted to find information from others who had been through the same experience. P4 commented that she was looking for reassurance, so she was specifically looking for examples of positive stories and was ignoring other examples.

Code	Description	Episode	Task Num	Search Num
A4	Cognitive use resulting in negative affect	Heparin	2	4
		Reflux 2	1	2
		Reflux 2	1	2
		Weaning 2	1	1
		Weaning 2	1	2
A5	Negative affective resulting in behaviour change	Reflux 2	1	2
A8	Negative affect resulting in information-seeking	Heparin	2	4
		Weaning 2	1	1
		Reflux 2	1	2

Table 7-7 P4's Information Use Outcomes – A4, A5 & A8

P4's son's reflux was something that caused her a lot of distress and continued to be a problem for a number of months. It is, therefore, unsurprising that P4 was upset that the paediatrician did not seem to consider it a big issue and was unable to offer a quick solution. This frustration was further increased when the medication the paediatrician prescribed failed to work. This resulted in renewed information-seeking for P4.

The last information-seeking example in Table 7-7 is weaning 2. The negative affect, in this case, is first caused by the incomplete information provided by the app which increased P4's level of uncertainty. This uncertainty is further increased when P4 cannot find information online written by an expert and instead finds conflicting information written by other parents. P4 was eventually recommended a book by her sister-in-law which was able to provide the information that the app did not.

7.3.2 Discussion

The previous section examined P4's information use outcomes based on the example information-seeking episodes. Based on the discussion it was clear that some of the subjective assessment criteria discussed in RQ1 influenced P4's information use outcomes. This section explores how information can be applied to provide further detail to the associated design guidelines for P4 that were identified in RQ1, see Table 7-8.

In RQ1 the researcher identified credibility as the subjective assessment criteria that P4 discussed most in relation to accessing information resources. During the analysis for this research question, it became clear that the credibility of the information resource influenced P4's information use outcomes. During high uncertainty tasks, P4 renewed her information-seeking efforts in order to confirm information she had found with an information resource she deemed to be credible. P4 undertook behaviour changes as a result of the advice of information resources she deemed to be credible, even if they did not provide her with the complete information.

Formatting was another popular subjective assessment criteria for P4 in RQ1. In the analysis for this research question, it was found that formatting influenced the amount of time P4 spent of accessing information resources and encouraged further information-seeking. P4 stated that she could easily "*get lost*" when she was searching through Pinterest and Etsy because she enjoyed the format and novel content. P4 designed her son's nursery based on ideas she found on Pinterest. It could be argued that the formatting of the information resources

influenced the behaviour change, as P4 would not have spent so much time on the sites if she had not enjoyed the format.

Type	Criteria	Design Guideline
EHealth Information Resources	Convenience	Ensure site loads quickly
	Credibility	Clearly display the credentials of contributors to the site.
		List experience (professional and/or personal).
	Format	Consider the text to image ratio
		Use of multimedia to enhance a user's understanding of a topic
		Consider expanding sections to limit text overload
	Rank on Search List	Optimise website design to improve search engine rankings
	Security	Ensure privacy of website users
	Usability	Consider a level of customisability to make features more user-friendly
	Perceived Utility	Add timer function to recipe section of website
		Add the ability to save or bookmark articles of interest
EHealth Information Content	Complete	Topics should be covered in as much detail as possible
		Provide a personal folder to allow users to save their own notes, media and links.
	Currency	Information should be reviewed and updated regularly
		Clearly state the last date information was updated
	Relevance	Localise information for different regions
		Include information on potential positive and negative outcomes

Table 7-8 Design Guidelines for eHealth Resources for P4

Perceived utility is an assessment criterion that was associated with formatting, in the sense that Pinterest and the Annabel Karmel app were information resources that P4 discussed as having good formatting and useful features. Perceived utility was linked to behaviour change in P4. P4 returned to her old pins in Pinterest, selected her favourite options and then went about making changes to her son's nursery based on them. P4 valued the fact that she was able to save her old pins and did not have to go searching through the site again. With the Annabel Karmel app, P4 continued to make the recipes supplied by the app even after initial problems caused by the lack of portion information. P4 elected to augment the app with information from an additional source, instead of replacing it completely because she liked the format and the features.

Complete is a subjective assessment criterion for information. When information resources did not provide enough information it resulted in P4 seeking additional information. In some cases, incomplete information also led to increased

uncertainty. Both relevance to the task and relevance to the location influenced P4 information use outcomes. In the Heparin information-seeking, P4 got to the point where she just needed to be reassured. As a resulted, P4 was looking for the positive experiences of other pregnant women. P4 stated that she discarded information that did not meet her needs at that time. During the weaning 3 information-seeking episode, P4 highlighted her preference for using guidelines specific to her region when making behaviour changes.

7.4 RQ3: What are the Primary Information Resources for Medical and General Tasks during the Antenatal and Postnatal Periods?

Research question three (RQ3) identifies the primary health-related information resources accessed by P4 for medical and general tasks. The longitudinal nature of the study affords the opportunity to identify P4's preferences at four different points in time (both antenatal and postnatal). Identifying P4's primary health-related information resources at different points in time allows the researcher to highlight any changes in P4's preferences. This information can be used to add context to the design guidelines produced in RQ1. Of particular interest is understanding any fluctuations in P4's preferences for eHealth resources.

7.4.1 P4's Primary Information Resources

Figure 7-19 illustrates the information resource types that P4 reported accessing during general tasks. Each information resource type was counted once for every general information-seeking episode that P4 reported accessing the resource type. The number of times that P4 accessed an information resource did not factor into the count. Figure 7-19 is divided into the four study periods, so that changes in P4's information resource preferences can be observed. The primary information resource for general tasks for all four time periods was online resources, Figure 7-19. During each period online resources were accessed by P4 at least twice as often as the second most popular information resource for that period.

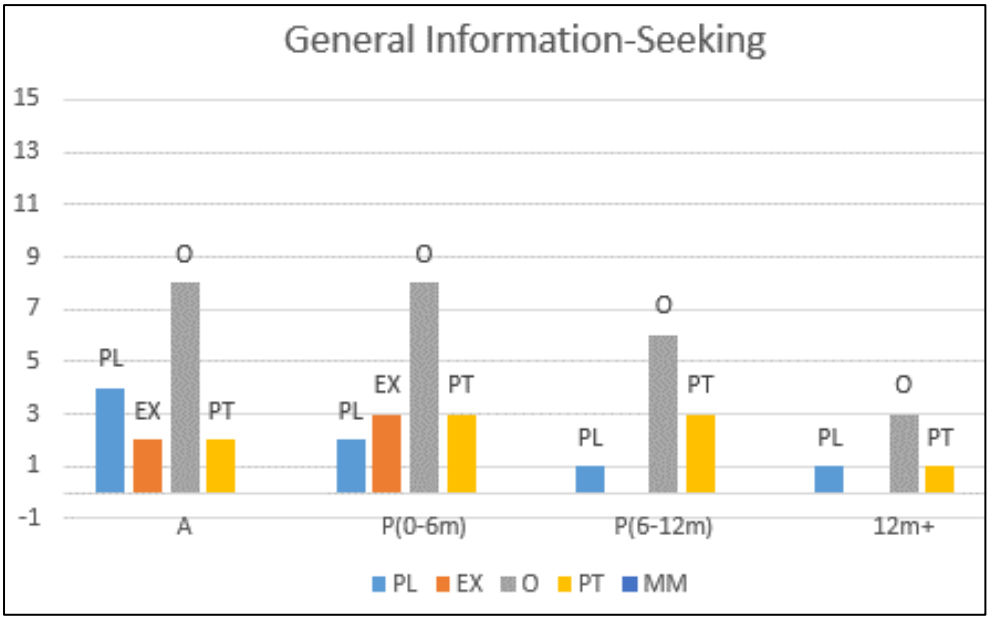


Figure 7-19 Information Resources Accessed for General Information-Seeking (P4)

For medical tasks, experts were the sole primary resource in two time periods, online resources were the sole primary resource in one time period, and they were joint primary resource in one time period, Figure 7-20. P4 considered experts to be credible. P4 valued online resources for their convenience but also considered certain online resources to be credible. It is, therefore, understandable that she would use both resources during medical tasks.

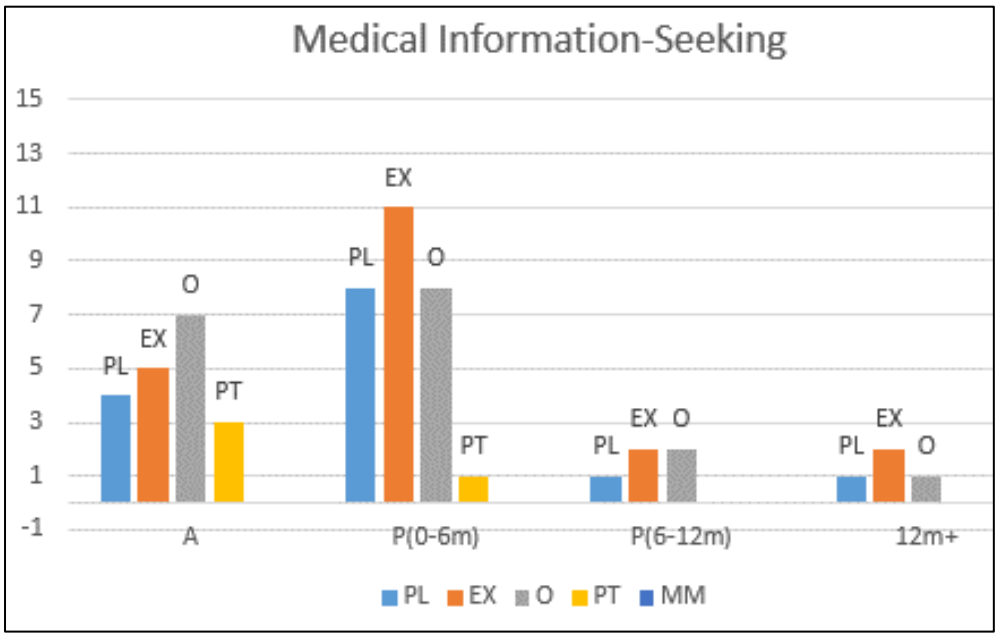


Figure 7-20 Information Resources Accessed for Medical Information-Seeking (P4)

Figure 7-21 illustrates the changes in P4's general and medical information-seeking across the four study periods. From the figure, it is clear that P4's general

information-seeking and medical information were higher in the antenatal period and first postnatal period. P4's medical information-seeking dropped off in the last two postnatal periods, after her son's reflux resolved. The drop in general information-seeking in the final postnatal period reflects P4's return to work and the reduction in her available time.

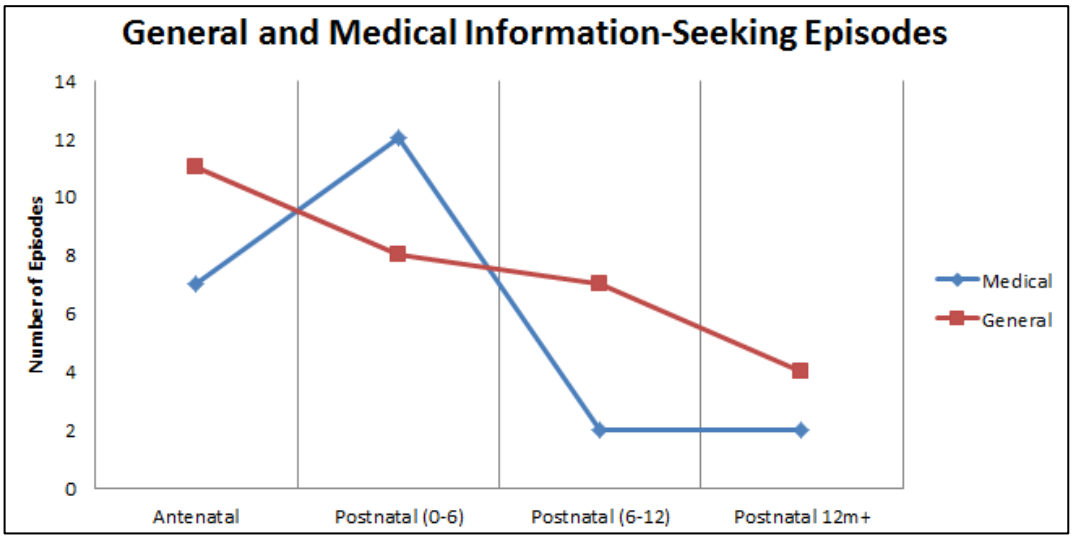


Figure 7-21 Frequency of General and Medical Information-Seeking (P4)

P4 found the first-trimester of the antenatal period to be an anxious time with a concentration of medical information-seeking. The third trimester involved another spike in information-seeking, both medical and general. However, it did not involve the same anxiety associated as the first. P4 reported that she thought the first year was harder because she was a first-time mother. However, she found the first six to nine months the hardest because of the learning curve combined with her son's reflux. For the first few months, the child changed so fast and there was always something new to learn.

7.4.1.1 *Antenatal period*

Online resources were the primary resource for both medical and general tasks during this period. This was likely influenced by the fact that P4 found pregnancy to be a very individual experience. It was not something that she wanted to talk to other people about. She valued online resources for the fact that they offered her the opportunity to search for information in private.

P4 found that she did most of her information-seeking in the first and third trimesters. In the first trimester, P4 found that she was searching for

developmental information, along with information "*about ailments, food, and exercising*". There is a level of nervousness and anxiety associated with the first trimester that can increase the level of information-seeking. P4 referred to it as a "*very dodgy time*". This is understandable as it would have been during the first trimester that P4 was referred to the High-Risk Clinic and was placed on Heparin.

P4 described that she did not do much information-seeking in the second trimester. She felt normal compared to the first trimester and she did not have the discomfort that came in the third trimester. In the third trimester, both general and medical information-seeking increased as P4 prepared to give birth and her level of discomfort increased. P4 stated that unlike the first trimester, "*there was no kind of worry*" (P4) connected to the information-seeking in the third trimester.

As online resources were the primary information resource for medical tasks it is perhaps unsurprising that experts were the second most popular information resource for medical tasks during this period. This is the only period where online resources were the sole primary resource for medical tasks. P4 found online resources to be convenient sources of information and a useful method for preparing for doctor's appointments. P4 preferred to have researched a topic prior to an appointment. Depending on the topic, P4 would prepare questions to discuss with the doctor during the consultation. Considering the time gap between clinic appointments, this is an understandable strategy. Otherwise, if P4 forgot to ask a question at an appointment she could be left waiting a number of weeks with a cognitive gap.

During this period, P4 was very aware of the currency of the information provided by personal sources. P4 was very aware of how long it was since her mother was last pregnant. P4 also perceived that her friend, who was a couple of months further along in her pregnancy would likely have forgotten what it was like in the earlier stages.

It was during the antenatal period that P4 first showed her preference for information resources presenting information using visuals. This was made evident in her enjoyment of the online resources Pinterest and Etsy and in her choice of

print resource. P4 complained that the book 'What to Expect When You Are Expecting' was too text-heavy and had content that was not relevant to her situation. P4 purchased a different book that she preferred both for its use of visuals and its content, the book was framed around the different developmental stages of pregnancy.

7.4.1.2 *Postnatal period (0-6m)*

The primary information resource for medical tasks during this period was expert resources. While the primary information resource for general tasks remained online resources. During this period, P4 found that she was "*constantly looking up information.*" This is reflected in the fact that this period has the highest number of medical information-seeking episodes and the second highest general information-seeking episodes. P4's information-seeking was partly driven by the learning curve of any new mother. P4 found that there was constantly something new to learn because children change and grow so fast during the first few months. However, the main driver for the increase in information-seeking was her son's reflux. This caused uncertainty and anxiety for P4. It also further complicated other information-seeking tasks that P4 conducted during this time, such as weaning.

Similar to the antenatal period, P4 preferred to research online before speaking to a medical expert during this period. P4 felt that if she did not prepare beforehand that she might forget to ask an important question or might discover new information that she might not "*process as well*" (P4). P4 stated that sometimes during this period she used medical professionals as a form of validation for things she wanted to do, for example changing her son's formula.

Online resources were the second most popular information resource for medical tasks during this period. P4 sought more medical information during this period than in any other. P4 attributed this to the fact that she was "*more invested in the baby than [she] probably was in [herself]*" (P4) during the antenatal period. One reason that expert resources may have replaced online resources as the primary resources is the fact that they became more convenient during this period. During the antenatal period, P4's GP was hesitant to offer advice or to prescribe

medication. Instead P4 had to wait for appointments with the High-Risk Clinic. Only if a problem was particularly serious could she arrange an earlier appointment. During the postnatal period, P4's GP was back as her primary medical care provider.

In this period, P4 began seeking the personal experiences of other mothers. P4 accomplished this through forums and through personal resources; her friends and family. This type of information was not of particular interest to P4 during the antenatal period because she found pregnancy to be a very individual experience. However, P4 found that there were more commonalities in the problems experienced by mothers of small children. For example, P4 searched through online forums to discover when other children had stopped having problems with reflux. P4 found that learning the experiences of other mothers could be "*consoling*" when they were similar to her own.

P4 sought the experience of other parents for general tasks, as she did with medical tasks. To achieve this, she searched through forums and spoke with family and friends. Although P4 searched through forums she avoided posting in forums. P4 preferred instead to dip in and out of multiple forums when required. P4 also avoided participating in any offline mother and toddler groups. It was P4's opinion that "*some mothers are very quietly boastful about their children*" (P4). P4 was fearful that joining a group would lead her to focus too much on why her son "*wasn't doing X, Y and Z"* (P4), instead of focusing on the good things.

7.4.1.3 *Postnatal period (6-12m)*

For general information-seeking, the trend continued as online information resources were the primary information resource for P4 for general tasks during this period. For medical tasks, both online and expert information resources were equally popular.

P4 stated that the first six months were the most difficult whereas *"when you get to like eight or nine months you are just a bit more relaxed"* (P4). This change is reflected in the quantity of information-seeking conducted by P4 during this period. There is a significant drop in medical information-seeking in this period, down from twelve episodes in the previous period to just two in this period. P4's general

information-seeking continued its downward trend, although the decline was not as steep as with the medical information-seeking.

> *"I think the first while is an awful lot of worry, problem-solving, looking at information, and getting yourself nuts because there is so much different information out there, whereas now you are just in a better place."* (P4)

P4 stated that part of the reason she was more relaxed was because the larger milestones in this period were "*more up to the baby rather than [her]."* Unlike with weaning, were P4 had to decide when the best time to begin was, it was up to her son when he decided to crawl etc. P4 found her son "*less of a puzzle at this age*" (P4).

Two significant events occurred during this period that also influenced P4's reduction in information-seeking. Firstly, P4 returned to work. P4 said that this took her mind off things, so she worried less. Returning to work also reduced the time that P4 had available to her for information-seeking. Secondly, P4's son's reflux resolved during this period, at ten and half months. Reflux had occupied a significant amount of P4's information-seeking time. It had also impacted other information-seeking tasks such as weaning.

P4 accessed both experts and online resources for both of the medical information-seeking episodes during this period. There is only one additional resource used during this period and that was a personal resource. It should be noted that while the expert and online resources were both actively sought for both tasks, the personal source was not, it was a passive search.

Online resources were accessed twice as much as the second most popular resource, similar to the divide in other periods. It is during this period that P4 began again to research topics that she considered to be enjoyable and fun. P4 returned to the nursery designs that she had been looking at during the antenatal period. P4 also spent time looking for baby clothes and birthday decorations. Not only are these enjoyable topics but these are all searches that involve more visual, image-based sites, which was a preference for P4.

7.4.1.4 *Postnatal period (12m+)*

Online information resources remained the primary information resources for general tasks while expert information resources were once again the sole primary information resource for medical tasks during this period. Information-seeking was at its lowest during this period as even general information-seeking reduced down to four episodes. P4 felt things had been getting easier especially since her son's reflux ended. She stated that it took "*probably nine months to a year to reach normalcy"* (P4). It was her opinion that as a first-time mother the first year was probably harder. P4 thought that she would probably be more relaxed the second time around.

As with the previous period, there were only two medical information-seeking episodes during this period and experts were consulted for both. P4 did not feel as much need to research information to prepare prior to a doctor's appointment as she had previously. P4 now felt that it was better to just wait to speak to the doctor rather than "*spending a night looking up stuff and getting [herself] in a twist about it*" (P4). P4 felt that she was less stressed about things during this period than she was when her son was younger. It was that stress that led her looking up more information.

Online resources were accessed during all but one of the four general information-seeking episodes. The general episodes during this period were back to being practical. P4 investigated strollers, walking reins and toddler books. P4 also conducted information-seeking on developmental stages. This was a task the P4 undertook in each of the postnatal periods. There was a similar development task during the antenatal period. The task during the antenatal period was conducted more frequently, weekly, and involved a mix of print and online resources. The postnatal version occurred mostly on a monthly basis and only involved a single print resource.

7.4.2 Discussion

The aim of RQ3 was to identify the primary information resources used by P4 for medical and general tasks. The previous section examined P4's primary information

resources for each of the four antenatal and postnatal periods. Reference was made to the influence of context, such as time. This section will examine this information in relation to the design guidelines identified for P4 in RQ1.

As is summarised in Table 7-9, online resources are the P4's primary resource for general tasks while both online and medical together are the primary resources of medical tasks. Table 7-9 also highlights that the antenatal and the postnatal (0-6m) periods were the busiest for P4 in terms of information-seeking. This was firstly because of the amount of new information P4 needed to learn. It was, secondly, because of the increased levels of uncertainty and anxiety experienced by P4 during those two periods.

	Medical		General	
	Number of Episodes	**Primary Resource**	**Number of Episodes**	**Primary Resource**
Antenatal	7	Online	11	Online
Postnatal (0-6m)	12	Expert	8	Online
Postnatal (6-12m)	2	Expert & Online	7	Online
Postnatal 12m+	2	Expert	4	Online

Table 7-9 P4's Primary Information Resources for Both Medical and General Tasks

Table 7-10 provides a summary of the design guidelines for eHealth resources for P4 that were identified as part of RQ1. Online information resources were the primary information resource for medical information tasks in the antenatal period. This was a time of heightened anxiety for P4, particularly in the first trimester. P4 relied on online resources to prepare for hospital appointments because they were convenient and they offered privacy. Personal experience was important to P4 during this period as P4 viewed pregnancy as very individual. Credibility was based on professional qualifications.

P4 was particularly conscious of the currency of information during this period. This was true across a variety of information resource types. Formatting was discussed in relation to pregnancy books and websites offering developmental information. P4 displayed a preference for a mix of visuals and text, rather than text only.

Anxiety continued to be a feature in the first postnatal period, 0-6m. This period saw a rise in medical information-seeking as a result of P4's son's reflux. Her son's reflux complicated other non-medical information-seeking, such as weaning. Being

a first-time mother, P4 also associated this period with a significant learning curve. Credibility was again important during this period but was now expanded to include personal experience. P4 considered parenting to have more commonalities than pregnancy. P4 continued to search online to prepare for doctors' appointments. Sometimes using a doctor just to validate a decision she wanted to make.

Type	Criteria	Design Guideline
EHealth Information Resources	Convenience	Ensure site loads quickly
	Credibility	Clearly, display the credentials of contributors to the site.
		List experience (professional and/or personal).
	Format	Consider the text to image ratio
		Use of multimedia to enhance a user's understanding of a topic
		Consider expanding sections to limit text overload
	Rank on Search List	Optimise website design to improve search engine rankings
	Security	Ensure privacy of website users
	Usability	Consider a level of customisability to make features more user-friendly
	Perceived Utility	Add timer function to recipe section of website
		Add the ability to save or bookmark articles of interest
EHealth Information Content	Complete	Topics should be covered in as much detail as possible
		Provide a personal folder to allow users to save their own notes, media and links.
	Currency	Information should be reviewed and updated regularly
		Clearly state the last date information was updated
	Relevance	Localise information for different regions
		Include information on potential positive and negative outcomes

Table 7-10 Design Guidelines for eHealth Resources for P4

P4 weaned her son during this period. P4 found it particularly difficult to find a complete information resource on weaning. In the end, P4 combined several sources of information together. The type of information P4 found the most difficult to find were guidelines on portion size written by experts. In this particular instance, P4 did not consider the personal experience of other mothers to be credible because there was no consistency in the advice in the forums. Ideally, P4 would have liked guidelines from written by an expert from her region. P4 had discussed during this period and the antenatal period, the importance of local medical guidelines.

The second postnatal period, 6-12m saw a drop in all forms of information-seeking. P4's son's reflux resolved and P4 returned to work. P4 was more confident in this

period, particularly once her son's reflux resolved. P4 found returning to work took her mind off things. However, it also reduced the amount of time that was available for her to search for information. P4's searches became "*very short and specific.*" When time is a factor, it is important to ensure that the information resource is easy to find on a search list and is convenient to access.

This is also the period that P4 returned to tasks that she found enjoyable, for example, nursery designs and birthday decorations. For these tasks, P4 was again concerned with formatting. This was different to the developmental information during the antenatal period. In that example P4 was looking for a balance of text and images were the images could enhance the text. Here P4 enjoyed using Pinterest because of the lack of text and the ability to scroll through just images. This highlights the importance of considering the purpose of each article and section of an information resource when choosing the balance of multimedia and text.

The least information-seeking occurred during the last postnatal period, 12m+. P4 was continuing to grow in confidence. She no longer felt the need to prepare for doctor's appointment by researching online.

Chapter 8: Cross-Participant Analysis & Conclusions

8.0 Introduction

This chapter presents the cross-participant analysis for each of the three research questions. The cross-participant analysis builds on the in-depth analysis conducted as part of the within-participant analysis in Chapters 4-7. For the cross-participant analysis the participants are divided into four user groups based on age (>/< 35) and maternal experience (first-time mothers/mothers with children). For each research question, similarities and differences between the user groups are highlighted. RQ1 identifies the subjective assessment criteria used by the participants for information resources and information content. RQ2 explores the information use outcomes for each user group. Particular interest is paid to associations between information use outcomes and the participants' subjective assessment criteria. The last question, RQ3 *examines the information resource preferences for the user groups over time, based on task type.* The longitudinal element in this question provides insight into how information behaviour evolved over the antenatal and postnatal periods. Any changes in the participants' subjective assessment criteria linked to information resource selection are highlighted.

Following the cross-participant discussion, design guidelines for expectant and new mothers are presented. This section includes a discussion on how the design guidelines emerged based on the subjective assessment criteria utilised by the study participants.

Next the chapter proceeds to examine the contributions of this study. This involves outlining the research objective and research questions examined as part of this research. An illustration is used to facilitate a discussion on how the research questions are used to address the research objective. Included in this section is a discussion of the potential audience for each contribution. The chapter concludes with a discussion on potential future areas of research and the limitations of the study.

8.1 Cross-Participant Analysis

The aim of this section is to provide cross-participant analysis for each of the three research questions. The analysis involves nine participants, including seven that participated in the full study (P4, P5, P7, P8, P10, P17, and P18), one that completed four data collection waves (P1) and one that completed five waves (P12).

For the purpose of analysis, the participants are divided into four user groups, see Figure 8-1. The user groups were determined based on age (>/< 35) and maternal status (first-time mothers versus mothers with children). Age was chosen as a factor because it has been shown to influence information-seeking behaviour among expectant and new mothers (c.f. Plantin and Daneback, 2009). The age thirty-five was selected because expectant mothers over thirty-five are considered to be of an "advanced maternal age" (c.f. Viau et al., 2002, Lampinen et al., 2009). Expectant mothers over thirty-five are at a greater risk of pregnancy complications which can produce anxiety (Lampinen et al., 2009). Maternal status was chosen because previous studies have suggested that there is a difference in the information-seeking habits of first-time mothers and those who already have children (c.f. Szwajcer et al., 2005).

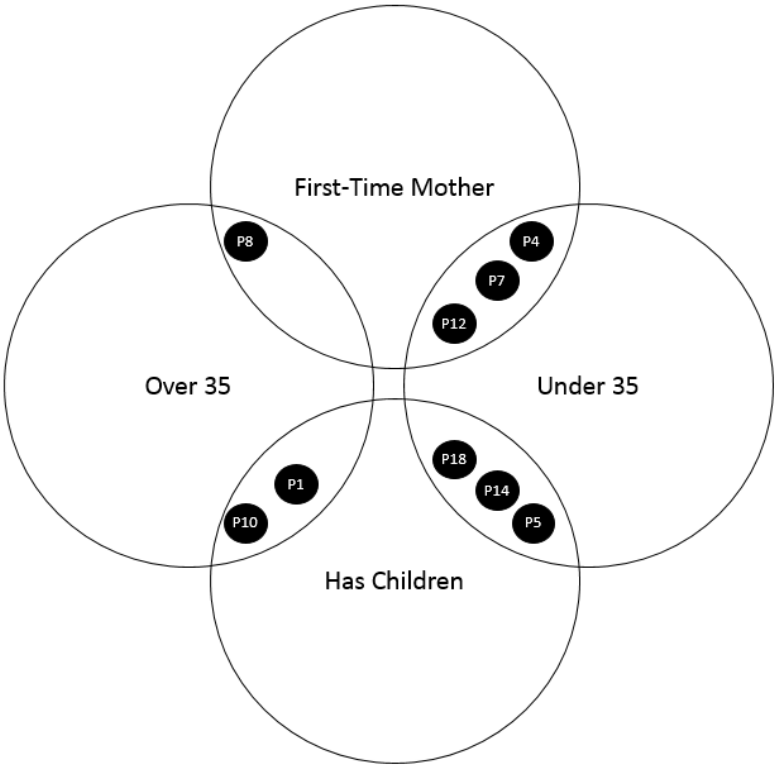


Figure 8-1 User Groups

Each participant from the in-depth within-participant analysis (Chapters 4-7) fit into each one of the four user groups in Figure 8-1. The five additional participants are also placed into the appropriate user groups.

8.1.1 RQ1: What Subjective Assessment Criteria are used during Information Processing?

This section explores the subjective assessment criteria used by the study participants to determine the quality of different information resources. The subjective assessment criteria are divided into those used to appraise information resources and those used to assess the information content. The aim is to highlight similarities and differences in how the participants judge quality in order to offer further insight into the development of the design guidelines. Bubble diagrams are used to illustrate the relative importance of the subjective assessment criteria to each user group.

Figure 8-2 ranks the subjective assessment criteria for information resources and Figure 8-3 ranks the subjective assessment criteria for information content. The size of each bubble was determined by comparing the number of quotes for a particular criterion against the total number of quotes for that user group, either information resource or information content. For example, the user group of mothers under 35 with children supplied twenty-eight information resource quotes, five of which referred to the format criterion. This makes formatting the second largest bubble in for that user group. The quotes for each participant, along with the summary table showing the cumulative number of quotes for each criterion are included in Appendix D.

Figure 8-2 suggests that age is a factor for assessment criteria for information resources. Participants under 35 had a greater variety of subjective assessment criteria than those over 35. Maternal status did not seem to be a factor. Credibility and convenience are the two criteria that were referenced by every user group, see Figure 8-2. Credibility was the only criterion to be discussed by all participants, which explains its number one position in each quadrant.

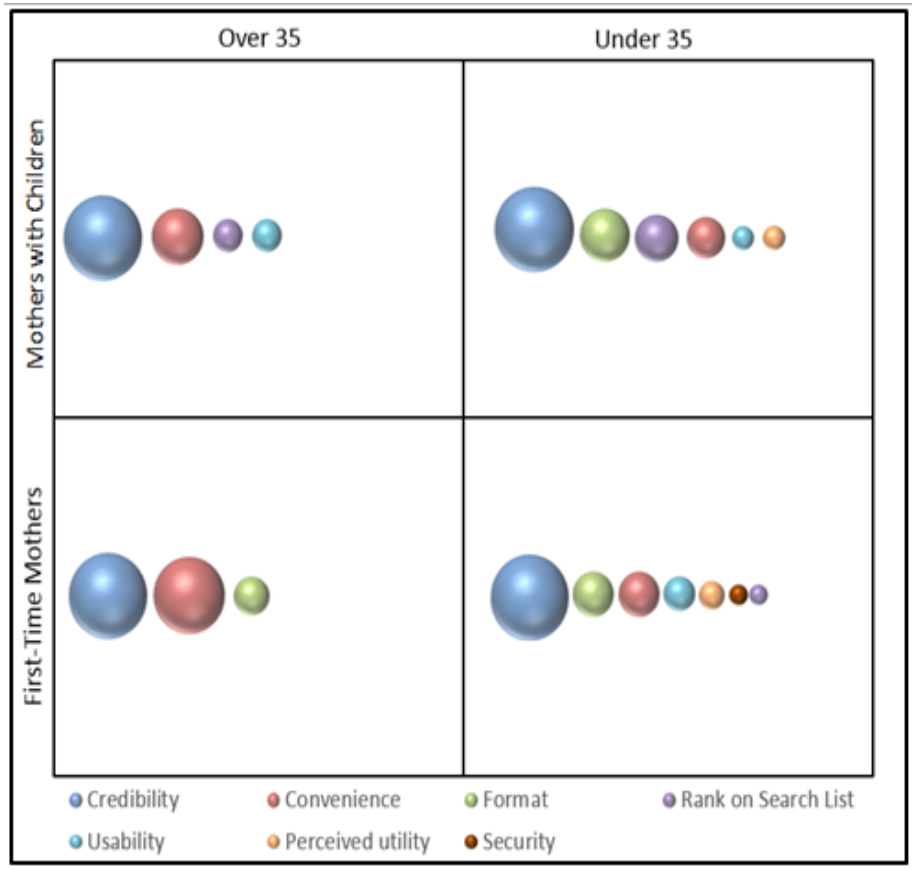


Figure 8-2 Subjective Assessment Criteria for Information Resources: Ranked by User Group

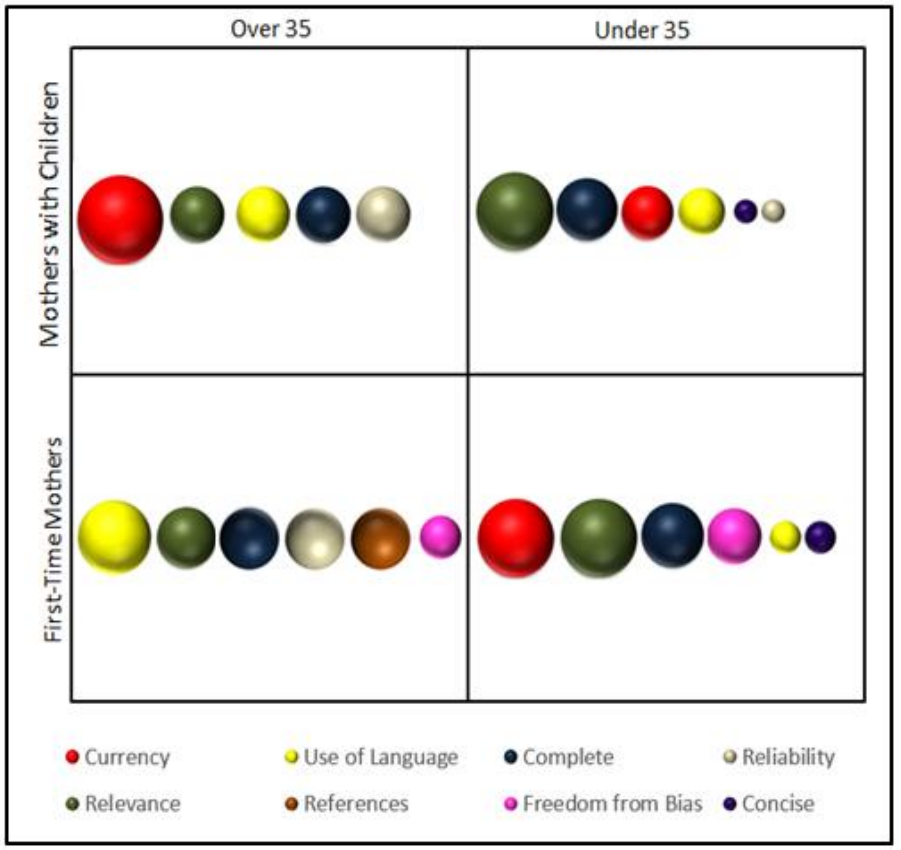


Figure 8-3 Subjective Assessment Criteria for Information Content: Ranked by User Group

Figure 8-3 ranks the subjective assessment criteria for information content by bubble size. For information resources, there was an obvious difference between the age groups (>/<35) and the number of subjective assessment criteria. This was not the case with the subjective assessment criteria for information content. As illustrated in Figure 8-3, all four user groups used either five or six subjective assessment criteria. The most popular criterion for judging information content was relevance, it was ranked either number one or two across all groups. Unlike information resources, there was no one criterion that was top ranked across every user group. Each user group ranked the importance of criteria differently. Next, each subjective assessment criteria is explored in more detail.

SUBJECTIVE ASSESSMENT CRITERIA (INFORMATION RESOURCE)

Credibility

Credibility was the information resource subjective assessment criterion that was most discussed by all user groups, see Figure 8-2. All of the participants trusted stories from other parents who had been through similar experiences. However, there was some concern about accessing personal stories through forums or blogs. Some participants (P8, P10, P12, and P14) felt that the information on forums was untrustworthy because the authors of the information could not be verified. P14 and P12 discussed how it was easier to trust people on Facebook than on forums. They could view peoples' profiles, see their names and their photographs. This desire to see who is posting information is similar to P8's habit of researching the authors of information resources prior to accessing the resource to ensure their credibility.

Professional qualifications were another sign of credibility for the study participants. Medical experts were a preferred information resource for medical tasks, particularly in cases of high uncertainty. Participants found medical experts even more credible when they had personal experience of a problem or situation (P10, P12, P7, and P18). P18 remarked that she often did not trust doctors because she felt that they were just "*reading from textbooks and they were not always right*" (P18). However, she had two doctors that she trusted, one was a mother herself and the other specialised in paediatrics and was a grandfather.

Some participants found that having an information resource associated with a known organisation made the information more trustworthy (P5, P10, P14). P10 felt that books and newspaper articles were more trustworthy than online material because they were attributed to an author and went through a review process. P5 highlighted the importance of an eHealth information resource projecting a professional feel, particularly when a parent is looking for information concerning the health of their child. Although P5 also found that she was more forgiving of formatting errors for well-known brands than for unknown sites.

P12 and P14 both expressed that the credibility of an information resource was partly judged on how much it fit with their parenting philosophy. This was most apparent with P12. During the antenatal period, P12 referred to her sister as the person she most trusted. Her sister is a midwife and a mother. P12 used to ask her sister to verify information and advice that she had received from her GP. In the postnatal period, P12 and her sister disagreed over P12's decision to do extended breastfeeding and baby-led weaning. P12 then described her sister as "*just another medical point of view*" (P12). P12 also explained how she would recheck information her friends would give her, because although she trusted her friends they might have been "*influenced by friends and family who haven't breastfed*" (P12).

Convenience

The second most popular information resource subjective assessment criterion was convenience, see Figure 8-2. Convenience was discussed in all the user groups and was the second most popular information resource criterion in both the over 35 user groups. Online resources were perceived as convenient because they provided easy access to a variety of information (P4, P8). P5 found online resources more convenient than personal resources in the postnatal period because it was more difficult to leave the house with two small children. P8 had a number of visitors early in the postnatal period; she found the personal resources convenient because useful information often came up naturally in conversation.

P18 accessed Facebook groups over forums partly because she was already a member of Facebook. She remarked that it would take too long to register with a forum when she had a question and wanted to post. P10 found online shopping to be convenient because she could get products delivered to the house. P10 valued Amazon because it recalled her details so that she did not have to keep re-entering them, which saved her time.

P10 and P7 suggested that computers were sometimes too much effort to turn on when they needed information quickly. It was easier to skim through a book. P7 and P18 also found their phones to be convenient. P18 conducted most of her online information-seeking using her phone. P7 stated that she found the Babycentre newsletter convenient because she could access it on her phone. However, if she could only view it on her laptop it would have been a nuisance. P8 also subscribed to the newsletter and appreciated that the information was delivered to her, without her having to actively search. Although she read the newsletter throughout the study there were times, particularly once she went back to work, where P8 found that the newsletter was arriving too often for her to read.

Format

The third most popular information resource subjective assessment criterion was format. Format was discussed by every user group with the exception of mothers over 35 with children, see Figure 8-2. Formatting was the second most popular criterion in both the under 35 user groups. Some participants found that poor aesthetics such as flashing ads, problems with text size, or too many images made them hesitant to trust an online resource (P5, P8, and P12). If participants felt that the design presented an amateur feel, then they were hesitant to stay, either to read health information or to purchase products. A well-designed website, with a clean, professional feel, made participants feel like the information on the site would be more accurate (P12, P18).

When looking for health information, multimedia such as images, diagrams and videos were often found to be useful when participants were trying to understand and visualise concepts (P4, P5, and P7). For example, several participants used

Google image search to research rashes during the study. Images were also used during the antenatal period to illustrate the stages of foetal development. For more general topics, colours and images can be used to make the topics more engaging. P4 commented on the use of colours and visuals in the Annabel Karmel app and sites like Etsy. Their design made accessing them more enjoyable, which caused P4 to go back more often.

Rank on Search

The rank on search list criterion was discussed in every user group except the over 35 first-time mother user group, see Figure 8-2. Participants stated that they mostly choose online resources from the top ranked search results (P4, P5, P10, and P18). This was because of a perception that websites appearing lower down on the list would not contain the information they were looking for (P5). Most participants reported staying within the first page of search results. While P18 normally choose sites from the top three results because she had been informed that they were "*the best ones*" (P18).

Usability

The usability criterion was discussed in every user group except the over 35 first-time mother user group, see Figure 8-2. P5 and P10 both expressed that they were hesitant to purchase products on websites where the features did not function as they expected them to. This was because it made them trust the information resource less. P4 stopped using an app during the antenatal period because she found it difficult to customise. Specifically, it was providing her foetal development information on the wrong week. Customisable features are only useful if they are easy for users to engage with. P12 highlighted the importance of online information resources being well-structured and easy to navigate, supporting her to find the information she required.

Perceived Utility

The perceived utility criterion was only discussed by participants in the under 35 user groups, see Figure 8-2. This criterion focused on features of information resources that participants found valuable. P4 discussed the value of the timer

function in the Annabel Karmel app, which allowed her to set a timer for each stage of the recipe.

Several of the participants accessed Facebook groups during the study. Some participants found it useful to see information from the groups they were following in their newsfeed and to be able to receive notifications on their phones (P7, P12, and P14). P7 liked to read the information posted in the parenting groups even if it was not immediately relevant because she often found it useful at a later stage.

Security

Security is the final information resource subjective assessment criterion. It was only referenced by one participant, in the first-time mothers under 35 user group. One of the reasons P4 valued online resources during the antenatal period was because of her ability to search for information anonymously. P4 felt that pregnancy was an individual experience and appreciated her privacy.

SUBJECTIVE ASSESSMENT CRITERIA (INFORMATION CONTENT)

Currency

The currency criterion was discussed by participants in three of the user groups, and it was the number one criterion in two groups, see Figure 8-3. The majority of participants stated that they preferred to have access to up-to-date information, particular for medical tasks (P1, P4, P5, P10, P12, and P18). Participants who had children previously were open to reusing their old books for general tasks such as weaning (P5, P10). However, P5 did go online to investigate how guidelines had changed in the interim. P14 stated that she did not check the date of information because she assumed that the websites that came up first on the Google search results were the newest.

In the antenatal period P4 was conscious of the currency of personal resources. P4 felt that people were likely to forget some of the details of what it was like being pregnant. This was particularly true of her mother, because it was so long since her mother was pregnant. Interestingly, P4 did not have the same concerns in the postnatal period about parenting advice. P10 discussed how she relied on her husband for up-to-date medical information because he is a doctor.

Relevance

Relevance is an important criterion; it was discussed by all four user groups, see Figure 8-3. It was the number one criterion for the mothers under 35 with children and it was second or joint second for the other three user groups. One method that participants used to judge relevance was based on its fit to the task or situation. Both P4 and P14 reported that they stopped using information resources because they contained too much irrelevant information. P14 had found the Babycentre app to be a useful information resource in the antenatal period. However, in the postnatal period she found it filled with information that did not apply to her.

P14 had the opposite opinion concerning her Facebook groups. Both P14 and P18 stated they found their Facebook groups were able to provide relevant advice because the members were mothers who had been through similar experiences. P14 stated that when her daughter was suffering from chronic constipation her Facebook group provided her with advice that was more useful and relevant to her situation than her GP.

Another method that participants used to judge relevance was based on applicability to location. Participants discussed a preference for accessing medical information from Irish websites (P4, P5, P8, and P12). This preference was partly driven by the difference in healthcare systems. As a result, UK websites were the second preference because of the similarities between the healthcare system in Ireland and the UK (P4, P5). Local information was also important for participants for certain general tasks, for example weaning guidelines (P4), product purchases (P5) and childcare information (P8).

Complete

The complete criterion appears in all four quadrants in Figure 8-3 and was discussed by all participants with one exception. The majority of participants in the study expressed a preference for detailed information resources. Participants criticised information resources that did not provide sufficient detail (P1, P4, P5, P8, P12, and P14). P5 stated that it was easier to make an informed decision when she had all the information. P5 found one information resource that combined patient stories

with factual information to be particularly useful. P12 criticised health professionals for not being able to confirm their advice with reference to specific research studies; while P8 preferred information resources to be as detailed as possible, including worst case scenarios. Most participants discussed the level of detail per topic, but the range of topics covered by an information resource was also discussed. P5 stated that it was difficult to find one information resource that provided high-quality information on all the health and parenting topics she was interested in.

Although the majority of participants in this study preferred detailed information resources, it should be noted that several reported participants also avoided information at particular points (P4, P8, P12, and P18). P18 criticised her daughter's doctor for providing her information on potential worst case scenarios about her daughter's heart condition before the test results were returned from the laboratory. P12 stated that she sometimes just read the basic information and avoided the detail so that she would not worry as much. P4 found herself just searching for positive stories from other mothers when she was worried about being treated with Heparin.

EHealth information resources should provide a personal folder to users to allow them to save their own notes, media, and links. Participants in the study often accessed multiple information resources during information-seeking episodes. By providing users with a folder to save their search results and personal notes, it allows users to build their own complete information resource. It also ensures that users return to the eHealth information resource.

Use of Language

Use of language was discussed across all user groups, see Figure 8-3. This criterion was important because it influenced whether participants understood the information and how much they trusted it. Some participants found that the phrasing and tone used influenced their perception of the information (P8, P10, P12, P14, and P18). P14 and P18 both felt that the American websites used different terminology and tone than European parenting websites and tended to

avoid them. P18 sometimes found it difficult to understand the medical terminology used by medical professionals. She reported searching online or consulting her Facebook group in order to understand what the doctors were trying to explain.

Reliability

In general, participants did not have any particular method of judging reliability. P1 and P8 both stated that they would return to information resources that they had previously found to be reliable. P8 was particularly attached to the Babycentre website. Although if she could not find the information there, P8 felt that the first page of Google search results was usually reliable. P5 remarked that she did not have one reliable information resource that she relied on. Instead, she just used Google keyword searches when she needed information.

Concise

The concise criterion only appears in the under 35 user groups, see Figure 8-3. P14 and P7 both discussed the value of concise information. P7 found that once her daughter started moving, she was more distracted and had less time for searching. P7 wanted information that she could quickly read in ten minutes. Time restriction was a common issue with participants in the postnatal period that influenced the frequency of their information-seeking and their choice of information resources. P14 showed a definite preference for information resources that delivered only the facts. Although she valued her Facebook group, she was dismissive of any other information resource that had "*emotive language attached to it*" (P14).

Freedom from Bias

Freedom from bias was identified by two participants, P8 and P12. P12 avoided information that was sponsored by formula companies. She felt that formula companies were influencing certain sites to provide poor breastfeeding advice so women would give up and turn to formula. As somebody who wanted a homebirth, P8 felt that the antenatal class in the hospital was biased towards medical interventions.

References

P8 was the only participant to comment on the importance of references. P8 felt it was important for an information resource to supply references so that it was clear where their information came from. It also aided P8, if she wished to investigate a topic further.

The next section explores information use outcomes from a cross-participant perspective. Connections are drawn between the information use outcomes and the subjective assessment criteria identified in RQ1.

8.1.2 RQ2: What are the Information Use Outcomes?

The purpose of this question is to identify and discuss the information use outcomes observed in the study. As discussed in Chapter Two, there are two stages of information use outcomes; these are internal and behavioural. Internal use can be separated into cognitive and affective outcomes. Behavioural use outcomes refer to observable changes in behaviour as a result of information-seeking. For the purpose of this study it is assumed that information use begins at the point of cognitive use. This may involve a new opinion/belief or it could mean a confirmation or change to an existing opinion/belief.

Figure 8-4 is an Information Use Outcome Pattern Diagram (IUOPD). The diagram illustrates all the potential information use outcomes divided into nine categories, see Table 8-1. Table 8-1 presents an analysis of the information use outcomes for each user group and the overall total. This analysis was based on the information-seeking episodes reported by the participants that were analysed previously using the Information Behaviour Analysis Tool (IBAT) diagrams. The information-seeking episodes for the participants (P1, P7, P12, P14, and P18) are included in Appendix C. The analysis of the information use outcomes for each participant is included in Appendix E.

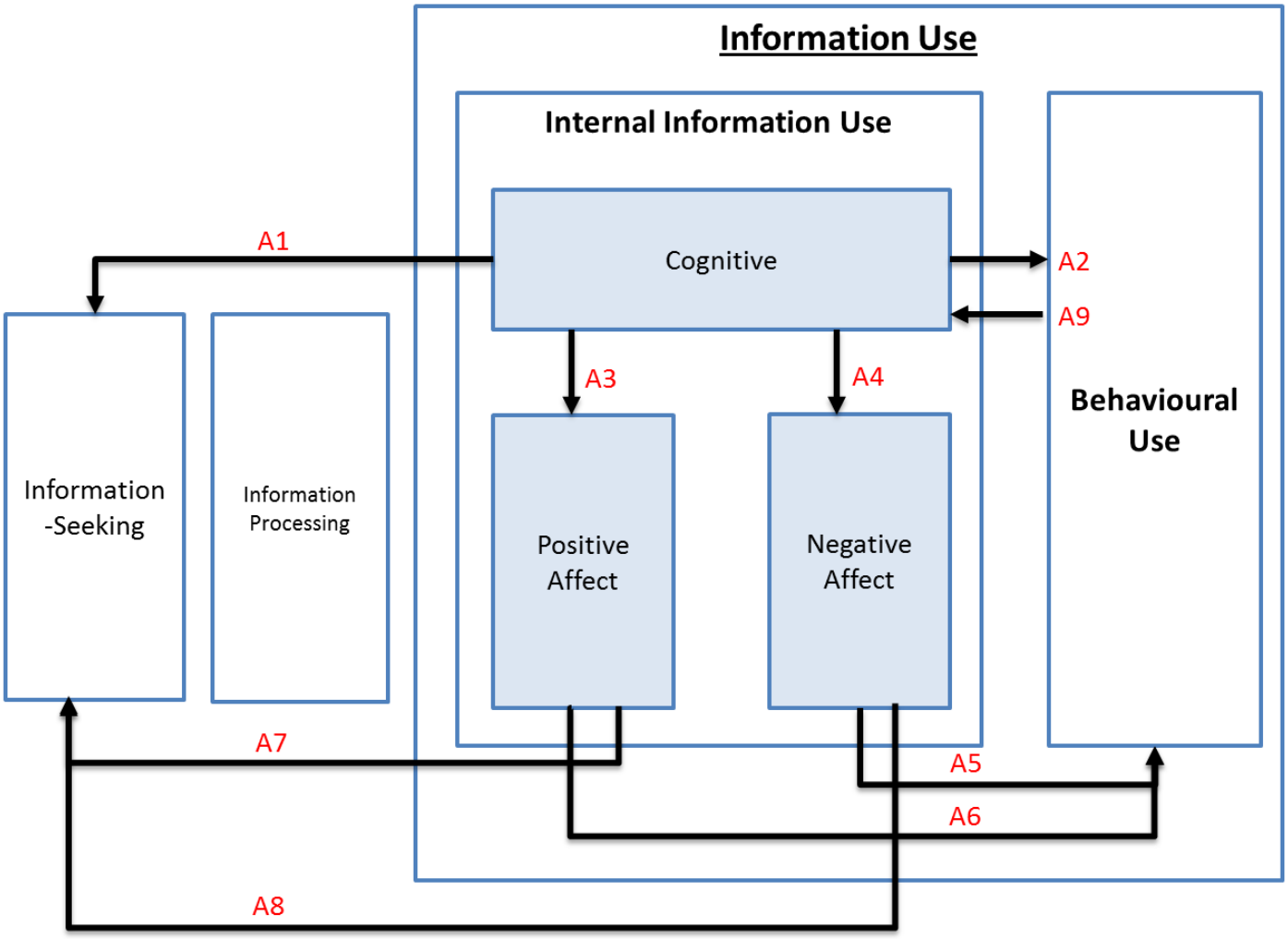


Figure 8-4 Information Use Outcome Pattern Diagrams (IUOPD)

Code	Description	Over 35		Under 35		Total
		First-Time	*Has Children*	*First-Time*	*Has Children*	
A2	Cognitive use resulting in behaviour use	10	11	32	33	86
A1	Cognitive use resulting in information-seeking	17	5	18	23	46
A3	Cognitive use resulting in positive affect	9	12	15	10	46
A4	Cognitive use resulting in negative affect	8	7	9	17	41
A8	Negative affect resulting in information-seeking	5	4	6	12	27
A6	Positive affect resulting in behaviour use	4	4	7	1	16
A9	Behavioural change cognitive use	3	3	6	2	14
A7	Positive affect resulting in information-seeking	3	1	4	3	11
A5	Negative affective resulting in behaviour use	4	1	2	1	8

Table 8-1 IUOPD User Group Summary Table

As illustrated in Table 8-1, cognitive use resulting in behaviour use (A2) was the most popular outcome overall. It ranked either first or second with all the groups. Both cognitive use resulting in information-seeking (A1) and cognitive use resulting in positive affect (A3) were the second most common outcomes.

Cognitive use resulting in information-seeking (A1) was common with the over 35 mothers with children than with the other user groups, see Table 8-1. As discussed in RQ3, the over 35 mothers with children user group, reported less information-seeking and a smaller variety of topics than the other user groups. This group tended to be satisfied with credible information resources and did not seek verification with additional sources. This group was also comfortable relying on their own past experience, which may explain this result.

The dominance of cognitive over affective use outcomes (see Table 8-1) may be a result of the difficulty in collecting internal use outcome data. As internal information use occurs within the mind of the information-seeker, researchers are dependent on the information-seeker to articulate the process.

Negative affect resulting in information-seeking (A8) ranked higher that positive affect resulting in information-seeking (A7). This is understandable, as participants are more likely to want more information if they are feeling stressed or uncertain than if they are feeling happy or reassured. However, there were exceptions to this; for example, P12 grew frustrated with her public health nurse and the advice she was providing. After a disagreement between the two, P12 decided it would be easier to lie to the public health nurse in future. To pretend she was going to adopt her suggestions.

Participants were often satisfied with positive affect as an information use outcome. This was reflected in certain scenarios where participants conducted searches with reassurance as the aim. For example, P8 sought information online concerning infant diarrhoea after her daughter contracted it from the crèche. P8 was confident that it was nothing more serious but felt more comfortable confirming she was correct. When reassurance was the aim of a search, participants did not always feel the need to continue information-seeking or alter their

behaviour once their reassurance goal was achieved. Reassurance was also sought by participants before undertaking an action, i.e. participants wanted to confirm they were making the correct decision. In those cases behavioural use took place following positive affect.

Negative affect was sometimes caused when participants were provided with information that was worrying or upsetting, for example when P18 was informed that her daughter who had a weakened immune system was accidently exposed to somebody with swine flu. However, negative affect could also be a result of a problem with the information content or information resource, for example, when participants felt frustrated by not being able to find complete or credible information. Both P18 and P14 often turned to their Facebook groups because they felt that the mothers in the group provided more relevant information than their GP's. P18 sometimes asked the group for help when she could not understand the terminology used by health professionals.

For a participant to take the advice of an information resource and enact behaviour change, the information resource needed to meet their subjective assessment criteria (see RQ1). Where an information resource was not considered credible or provided insufficient information, participants often decided to continue searching. If participants encountered conflicting information, they tended to continue searching until they found a consensus. An alternative option was to find a credible information resource capable of resolving the conflict. If resolving the conflict was not possible through information-seeking, participants were left relying on their own instincts. However, this sometimes left them with a degree of uncertainty concerning their decision.

8.1.3 RQ3: What are the Primary Information Resources for Medical and General Tasks during the Antenatal and Postnatal Periods?

Research Question Three (RQ3) identifies the primary health-related information resources accessed by participants for medical and general tasks. Longitudinal analysis is used to determine the preferences of each of the four user groups at four different points in time (both antenatal and postnatal). This enables the

researcher to compare the preferences of different user groups and to highlight the changes in group preferences over time. This section first focuses on general tasks before discussing medical tasks.

GENERAL TASKS

Table 8-2 illustrates the information resource types accessed for general tasks for each user group across the four time periods. As with the individual analysis, information resources types were counted once per information-seeking episode. The number of times they were accessed during the episode did not factor into the analysis.

As illustrated in Table 8-2, participants reported accessing online resources more than any other information resource for general tasks. Online resources were the sole primary resource for every user group, in every period except for one. In the postnatal period (6-12m) online resources were the joint primary resource along with personal resources for first-time mothers under 35.

Personal information resources increased in popularity in the first two postnatal periods, particularly for first-time mothers, see Table 8-2. Participants found the personal experiences of other mothers to be relevant and useful sources of information. Forums and Facebook groups were alternative methods for participants to gain access to other mothers. Both P12 and P18 built relationships with mothers in their Facebook groups that turned into real world meet-ups and friendships.

Print information resources were also considered a credible information resource by the majority of participants. Other than P8 who liked to read all of a parenting book, participants expressed a preference for using books as reference material. They would dip in and out of the book as the need arose.

Expert information resources were accessed by every user group for general tasks, see Table 8-2. For general tasks, the expert category includes both medical professionals and other professionals who would be knowledgeable in a specific area. For example, when P5 went to a speciality shop to seek advice on strollers.

Nutrition was one general task area where participants sought the advice of medical professionals during the study.

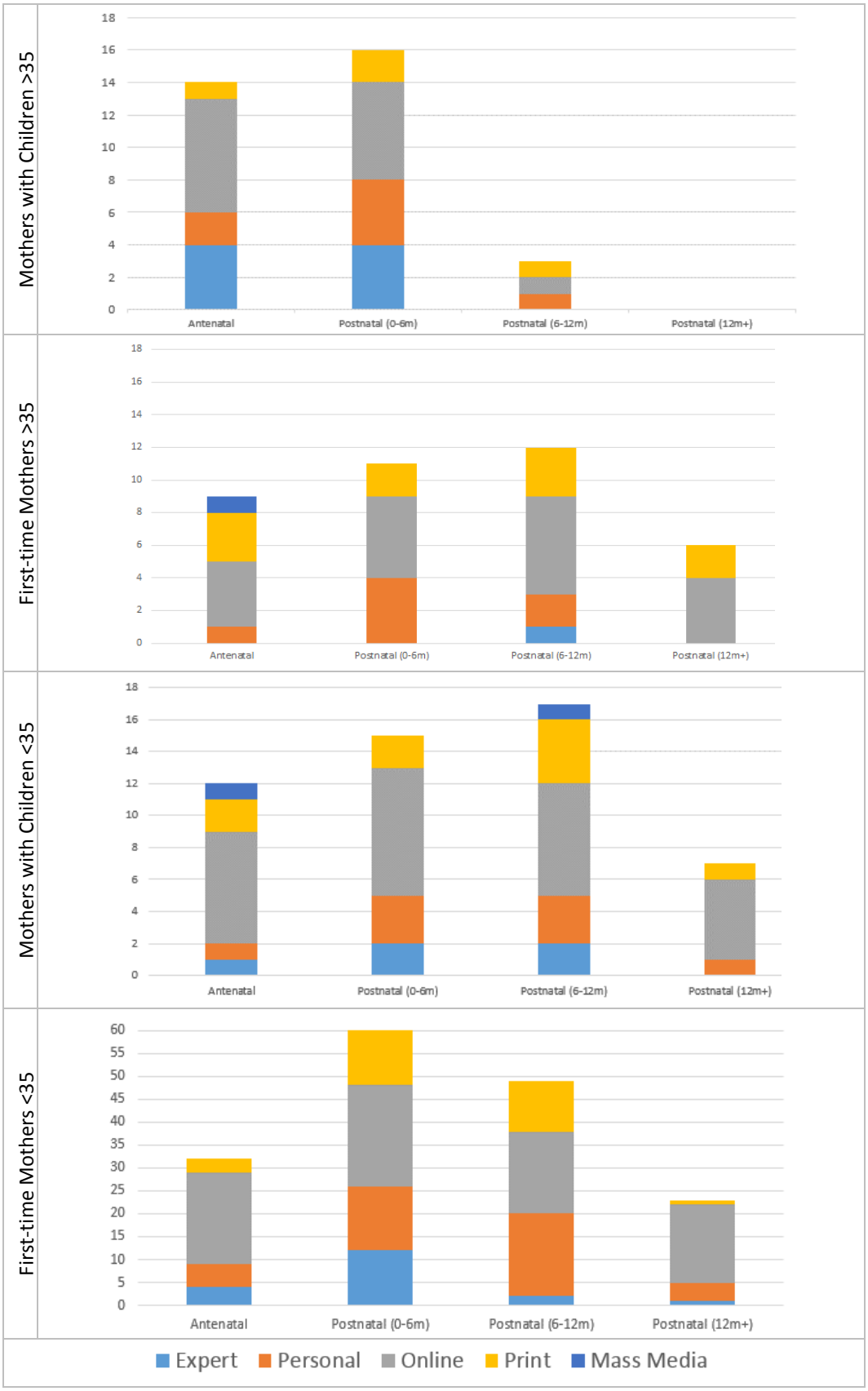


Table 8-2 Analysis of Information Resources Accessed for General Tasks

The last information resource category in Table 8-2 is mass media. This was not a popular information resource category. However, both P14 and P8 both reported receiving useful information from the TV reality documentary series 'One Born Every Minute' during the antenatal period. P14 also discovered interesting information in the postnatal period, during a radio interview with a psychologist who was discussing parenting.

As part of the cross-participant analysis, the general tasks were divided into sub-categories to facilitate a more detailed discussion. The categories are listed in Table 8-3. The table also illustrates the number of information-seeking episodes involving each task category, for each user group.

From Table 8-3, it is evident that first-time mothers under 35 conducted the most active general information-seeking. Although it should be noted that the category, diet and exercise (baby) may be skewed because of the level of detail provided by P7 in her activity diary compared to the other participants. While other participants indicated they were searching for information on weaning, or provided more detail when they were having difficulty, for example introducing dairy. P7 provided significantly more detail on individual food products.

As evidenced by Table 8-3, expectant and new mothers under 35 searched for a greater variety of general topics than those over 35. While first-time mothers under 35 searched for the greatest variety of topics in every period other than the postnatal (6-12m) period. The over 35 with children user group had the lowest variety of general topics, and no general information-seeking in the last postnatal period, see Table 8-3. Researching products prior to purchase and diet and exercise (baby) were the dominant categories in this user group.

The variety and quantity of general information-seeking for each user group is at its lowest in the last postnatal period. Spikes in information-seeking in either the first or second postnatal period were usually caused by the diet and exercise (baby) category.

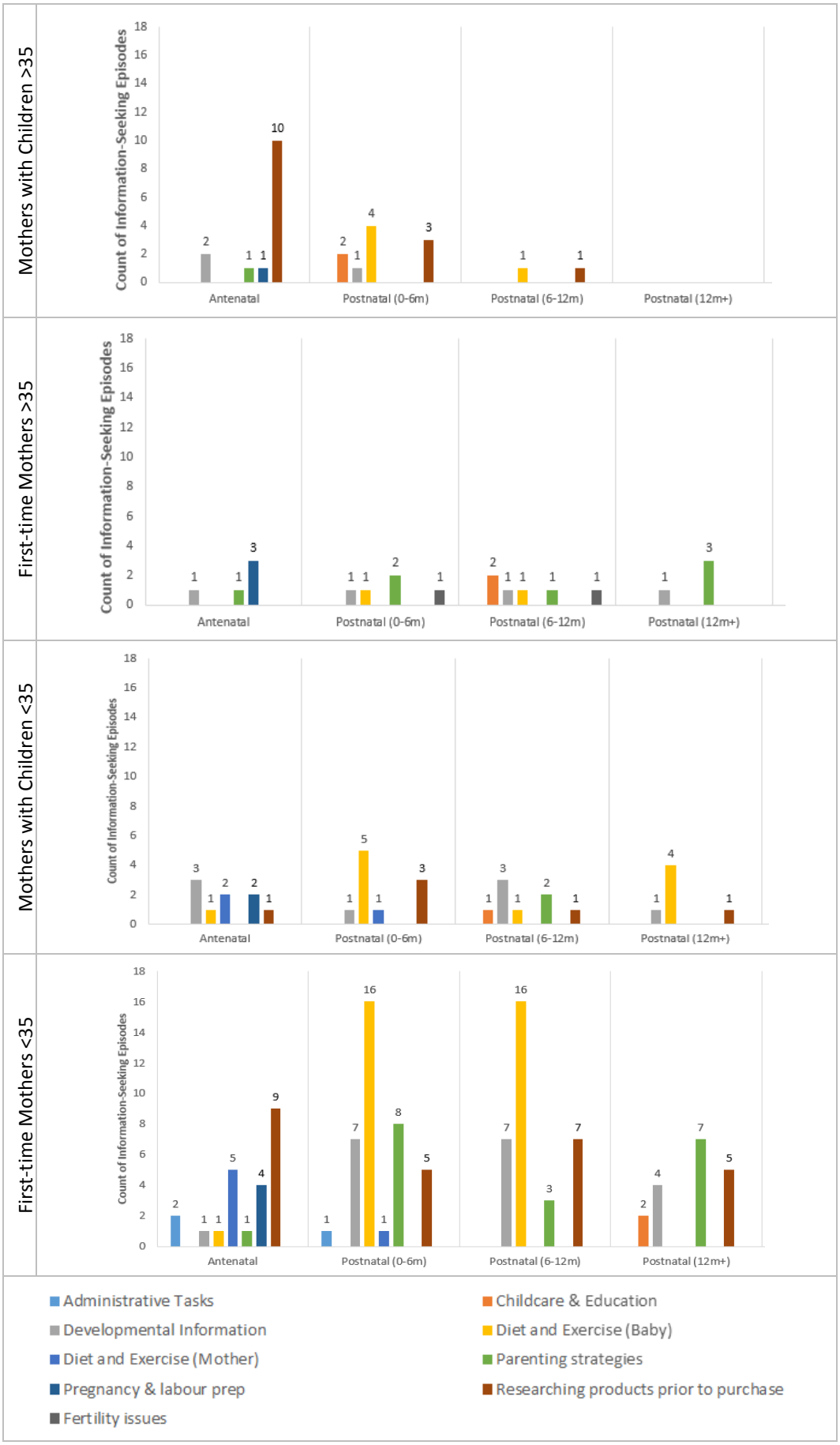


Table 8-3 General Information-Seeking Task Categories by User Group

All participants researched information on weaning during the postnatal period. The general consensus among the participants was that there was a lot of conflicting information on weaning across different information resources. Participants found it difficult to find one complete information resources with all the information they required, such as guidelines on portion size (P4, P8).

Time was the main reason given by participants for a reduction in general information-seeking. This was the case for both first-time mothers and for mothers who already had children. Participants expressed that as their children grew older they took up more of their free time. Participants reported that their information-seeking became more problem-focused as their children grew older. They had less free time for browsing through information resources.

MEDICAL TASKS

Table 8-4 illustrates the information resource types accessed for medical tasks for each user group across the four time periods. As with the general tasks, information resources types were counted once per information-seeking episode. The number of times they were accessed during the episode did not factor into the analysis.

Online and expert information resources were the primary information resources for medical tasks. For both the under 35 user groups, online information resources were the overall primary information resource for medical tasks. They were the primary resource in three out of four time periods, see Table 8-4. In the other period, expert information resources were the primary information resource. Expert information resources were the second most popular information resource for the under 35 user groups.

For the over 35 user groups, expert information resources were the overall primary information resource, see Table 8-4. Online information resources were the second most popular choice for mothers over 35. In the postnatal (6-12m) period online information resources were the primary information resource for medical tasks, for first-time mothers over 35.

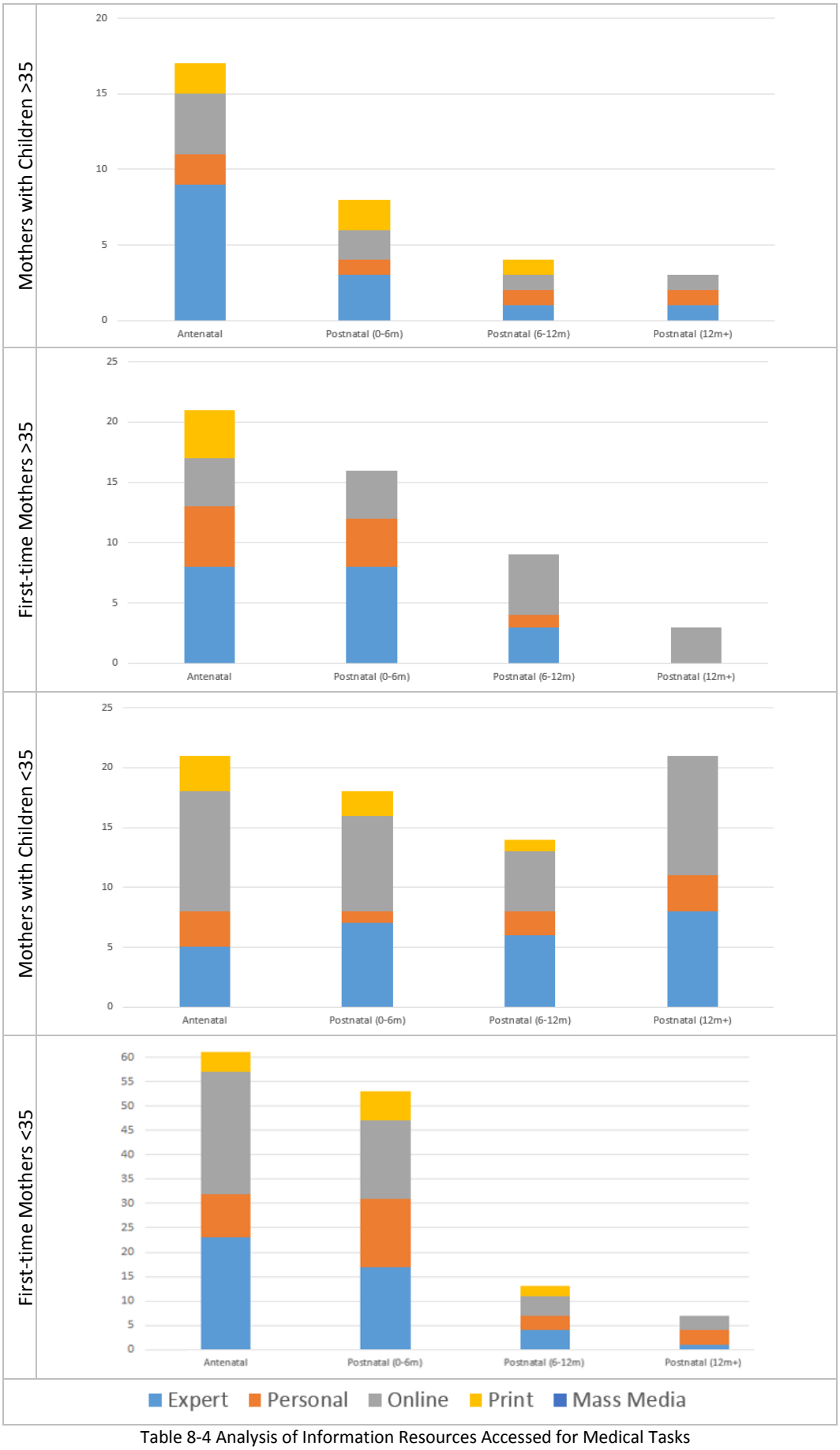


Table 8-4 Analysis of Information Resources Accessed for Medical Tasks

Online and expert information resources were often used by participants in combination with each other. Participants sometimes used online information resources to decide if they needed to visit the doctors. On other occasions they used online information resources to prepare prior to an appointment. Online resources were also a useful means to gain additional information not provided by medical professionals.

As illustrated in Table 8-4, although print and personal information resources were accessed for medical tasks, it was not to the same degree as they were consulted for general tasks. In this instance print resources mainly refer to books as participants rarely accessed leaflets, even for medical tasks. Participants expressed that leaflets they received often provided very basic information (P4, P5, and P18), if they required more detailed information participants had to search elsewhere. No participant reported accessing a mass media information resource as part of a medical task.

As part of the cross-participant analysis, the medical tasks were also divided into sub-categories. Medical tasks were divided into those that affected the mother and those that affected the child. All medical tasks in the antenatal period were included in the first category due to the physical connection between mother and child during this period.

As illustrated in Table 8-5, for mothers under 35, medical information-seeking concerning their baby took over in the postnatal period. For the last two postnatal periods, the mothers in the under 35 user groups only reported medical information-seeking regarding their baby. They did not report any medical information-seeking concerning themselves.

Mothers over 35 researched medical conditions concerning themselves longer into the study than their younger counterparts, see Table 8-5. For the first-time mothers over 35 user group, this continued until the postnatal (6-12m) period. The over 35 mothers with children user group continued to report medical tasks concerning themselves for the duration of the study.

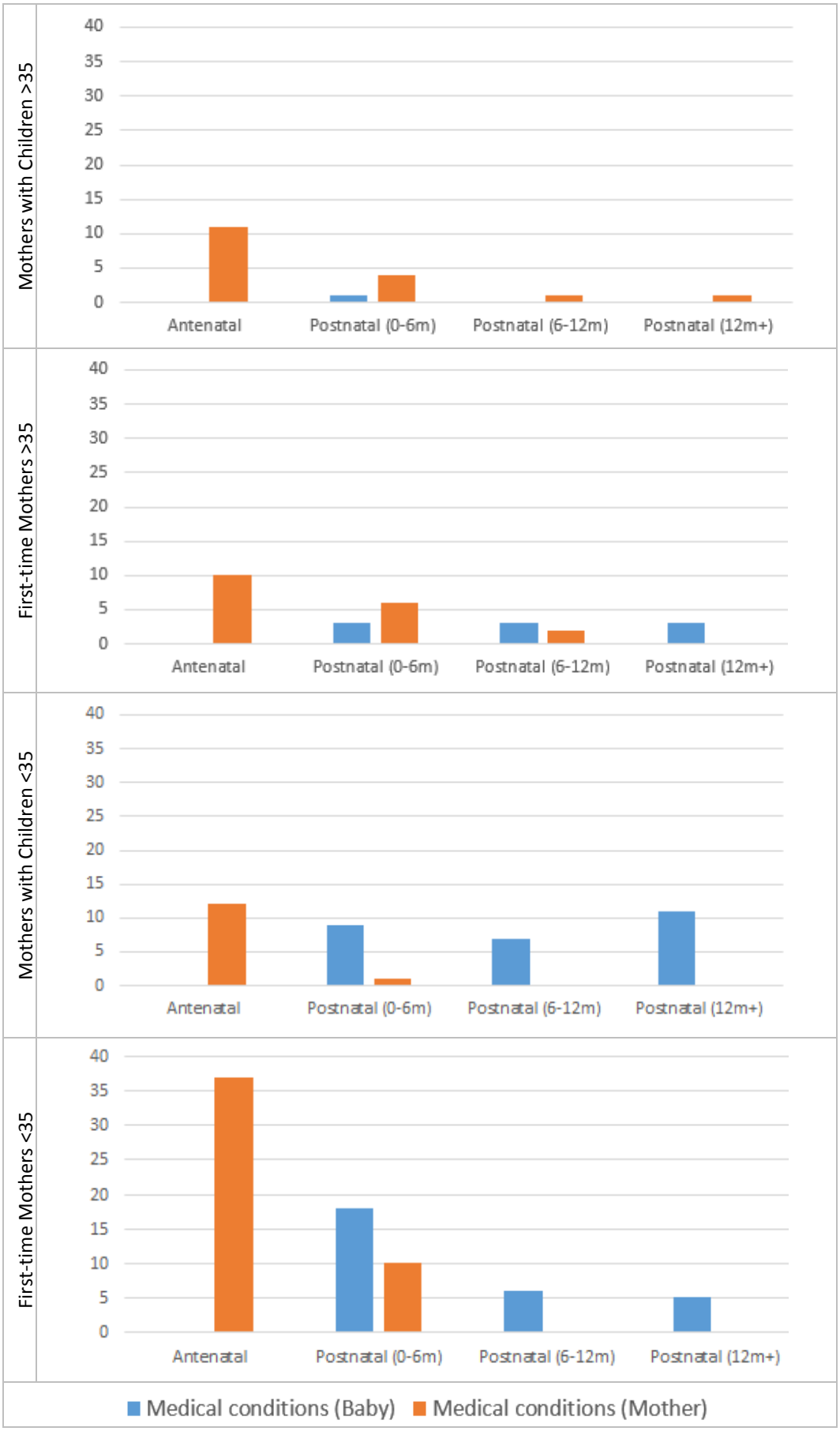


Table 8-5 Medical Information-Seeking Task Categories by User Group

Medical information-seeking was less impacted than general information-seeking by participants reported a reduction in free time. Medical information-seeking tended to be more urgent and related to the well-being of the participant or their family; medical tasks therefore could not be deferred. Changes in medical information-seeking were primarily driven by variations in the number of medical tasks. As illustrated in Table 8-5, medical information-seeking for most user groups declined between the antenatal and postnatal (12m+) periods. However, an increase was observed in the under 35 mothers with children user group in the postnatal (12m+) period. During this period, all three participants in the group had medical tasks caused by sick children.

One factor that did influence the reduction in medical information-seeking for the first-time mothers was an increase in confidence. As their children grew older, the participants reported becoming more confident relying on their own judgment. Participants became more comfortable relying on online information for minor concerns. The reduction in expert information resources is evident in Table 8-4.

RQ3 highlighted the changes in information resource preferences over time for both general and medical tasks. General and medical tasks were broken down into sub-categories to provide eHealth designers insight into the topics that interest expectant and new mothers during the antenatal and postnatal periods.

Online information resources were a popular choice for both medical and general tasks. Online information resources continued to be a popular information resource for general tasks as overall general information-seeking declined in the postnatal period. The main reason reported for a decline in general information-seeking was a reduction in free time. The convenience and accessibility of online resources made them more popular than alternative options. This demonstrates the importance of the convenience criterion as the postnatal period progresses. The variety of topics available on an information resource was also shown to be important. Several of the participants developed a relationship with the Babycentre website, as they felt it covered a range of topics they were interested in. When an issue arose they would go there before searching anywhere else.

For medical tasks, online information resources were often used in combination with expert information resources. Participants found them useful (1) prior to visiting a medical professional, (2) to fill an information gap in between consultations, and (3) to answer questions not resolved during consultations. This highlights the potential for eHealth information resources to augment existing healthcare systems. Online information resources were also considered a useful source of information for minor health concerns. First-time mothers became more confident relying on their own judgment as the postnatal period progressed. This resulted in a drop in expert information resources.

8.1.4 Discussion

The aim of this section was to provide cross-participant analysis for each of the three research questions. The cross-participant analysis built on the in-depth analysis conducted as part of the within-participant analysis, examining the participants as part of four user groups based on age (>/<35) and maternal experience (first-time mothers/mothers with children). For each research question, similarities and differences between the user groups were identified. RQ1 discussed the subjective assessment criteria used by the participants to assess information resources and information content. RQ2 explored the information use outcomes for each user group, highlighting links to the participants' subjective assessment criteria. Finally, RQ3 examined the information resource preferences for each user group over time and based on task type.

The next section presents the design guidelines for eHealth resources for expectant and new mothers. This includes a discussion on the link between the subjective assessment criteria and the guidelines.

8.2 Design Guidelines for eHealth Resources and Content

This section discusses the evolution of the design guidelines for eHealth resources and information content. For simplification, the design guidelines for eHealth resources are discussed first, in 8.2.1, followed by eHealth content, in 8.2.1. Each sub-section follows the same layout.

In order to ground the discussion, the design guidelines are presented at the beginning of each sub-section. This is followed by the assessment criteria used by the study participants. These assessment criteria were the basis for identifying the design guidelines. Therefore it was deemed important to provide a short summary, combining their definition and insight into how the criterion led to a design guideline or guidelines.

8.2.1 EHealth Information Resource Design Guidelines

This section presents the design guidelines for eHealth information resources. This is followed by a summary of the assessment criteria which were used to identify the guidelines. EHealth information resources were defined in Chapter Two as:

EHealth information resources use the internet and related technologies to provide health and wellness information and services to users

The design guidelines for eHealth resources are presented in Table 8-6. These guidelines refer to the design of the information resource itself and not to the information provided by the resource.

Criteria	Design Guideline
Credibility	List background information of contributors including professional qualifications and personal experience.
	Highlight any professional organisations connected to the eHealth resource.
	Work to increase brand awareness.
Convenience	Reduce the amount of input required by users of forms.
	Make site accessible on a wide range of devices.
	Allow users to change the frequency of push content.
Format	Consider the layout, the balance of text and multimedia.
	Consider using multimedia to enhance users understanding of topics.
	For general topics, use colours and images to enhance user engagement.
Rank on Search List	Optimise website design to improve search engine rankings.
Usability	Ensure features work properly and function as expected.
	Ensure eHealth resources are easy to navigate.
Perceived Utility	Allow users to register for notifications for new, relevant content.
Security	Facilitate anonymous browsing.

Table 8-6 Design Guidelines for eHealth Information Resources

Seven assessment criteria were identified across all the study participants for eHealth information resources: 1) Credibility, 2) Convenience, 3) Format, 4) Rank on Search List, 5) Usability, 6) Perceived Utility, and 7) Security. Which led to fourteen design guidelines, see Table 8-6. Each of these assessment criteria is discussed below; this includes insight into the creation of the associated design guidelines.

CREDIBILITY

Credibility is defined in Chapter Two as *"the believability of the information resource".* The analysis of participant data found that the believability of the information resource was judged primarily based on three factors:

1. The professional qualifications and experience of the provider.
2. The personal experience of the provider.
3. The reputation of the provider, gained through personal experience or through brand awareness.

Insight for design guidelines: EHealth information resources should provide background information on contributors, including information on professional qualifications and relevant personal experience. Relevant personal experience appears to be more of a factor in the postnatal period; when new mothers are looking for information and reassurance from others who have had similar experiences.

Expectant and new mothers cannot verify the identity of contributors who remain anonymous or who use pseudonyms. This can make expectant and new mothers distrustful of the information provided by those contributors. Providing information on the contributors experience and credentials would enable expectant and new mothers to make their own credibility judgements. Providing information on their identity would allow the mothers to conduct their own background research.

EHealth information resources should highlight any connection to professional organisations or government agencies. This makes the information resource appear more trustworthy. To further improve the reputation of the eHealth information resource, an effort should be made to increase brand awareness among expectant and new mothers. One reason this is important is that expectant and new mothers are likely to be more forgiving of perceived issues with the design of eHealth resource if they know and trust the brand.

CONVENIENCE

Convenience is defined in Chapter Two as the "*perceived ease with which the user may use/access the information resource.*" A review of the data found that eHealth information resources were often considered convenient because of their ability to access information at any time, in a range of locations. However, there were also features of individual eHealth information resources which made them less convenient, for example the data entry requirements.

Insight for design guidelines: EHealth information resources should be designed to be viewed on a wide range of devices. This ensures that expectant and new mothers find them convenient to access in a variety of circumstances and locations. EHealth information also should strive to reduce the amount of input required by users on forms. This can save time for users when they are registering or ordering from the site.

EHealth designers should consider making the timing of push information resources customisable. The amount of free time available to expectant and new mothers evolves other the antenatal and postnatal period. Each mother is different, with different demands on her time.

FORMAT

Format is defined in Chapter Two as "*the look and feel of the information resource, including the method of presenting information*." This is one of the criteria that can influence a user's perception of the other criteria. Poor formatting can influence a user's perception of an eHealth information resource credibility. Issues with formatting can also influence the readability of the information content (a dimension of the 'Use of Language' criterion).

Insight for design guidelines: EHealth designers should consider the balance of text and images in the information resource. Designers should be cognizant of the influence of design and the use of advertising on the credibility of the information resource. A professional looking eHealth information resource will make expectant and new mothers more willing to trust the information on the site.

Multimedia, such as images and diagrams can be integrated into eHealth information resources to enhance expectant and new mothers understanding of topics. Images and colours can also be utilised within information resource to make the site more inviting and to enhance user engagement.

RANK ON SEARCH LIST

Rank on search list is defined in Chapter Two as "*the position the information resource has on a search listing*". This is another criterion which can influence a user's perception of other criteria. It was evident from the data analysis, that eHealth sites ranked higher on the search listing were often perceived to be more: 1) relevant, 2) current, and 3) reliable.

Insight for design guidelines: EHealth information resources should optimise their design to improve their search engine rankings. As eHealth sites higher up the search listing are perceived by expectant and new mothers to be more relevant, current and reliable it can be assumed that an improvement in search rankings is pertinent to increasing user traffic.

USABILITY

Usability is defined in Chapter Two as "*the level of ease the user experiences interacting with the information resource and navigating through it.*" Poor usability was shown to cause expectant and new mothers difficultly locating required information. Poor usability also negatively impacted their perception of the credibility of the information resource

Insight for design guidelines: eHealth designers should ensure that sites are easy to navigate and that features work correct. Poor navigation would cause the eHealth information resource to lose the advantage of having high-quality information on the site; it is of no value if the target audience cannot find it. Features that do not work correctly can lead to frustration and mistrust of the information resource. This would likely discourage repeat traffic.

PERCEIVED UTILITY

Perceived utility is defined in Chapter Two as "*a balance between how useful an information resource is considered and the perceived cost (effort, opportunity cost and monetary cost).*" This criterion looked at features that data analysis highlighted as useful, reasons for repeat visits to an information resource.

Insight for design guidelines: Designers of eHealth information resources should allow expectant and new mothers to register for update notifications. The updates should be tailored to information the individual is interested in. This would build a connection between the eHealth information resource and their audience.

SECURITY

Security is defined in Chapter Two as "*confidence that the resources will protect user data from misappropriation or unauthorised alteration or loss.*" The key elements of this criterion were the ability to remain anonymous and keep data private.

Insight for design guidelines: Providers of eHealth information resources need to balance expectant and new mothers desire to verify the identities of contributors with the desire of some users to remain anonymous. Designers should provide the facility to browse the eHealth information resource anonymously. For balance, registration may be required to access some areas of an eHealth information resource, for example, a member's area with user generated content.

8.2.2 EHealth Information Resources Content Design Guidelines

This section presents the design guidelines for eHealth information content. This is followed by a summary of the assessment criteria which were used to identify the guidelines. The design guidelines for eHealth content are presented in Table 8-7. While the guidelines in the previous section concentrated on the eHealth information resources, the guidelines in this section are targeted on the information contained within the eHealth resource.

Eight assessment criteria were identified across all the study participants for eHealth information content. However, only seven were used to create design

guidelines. The eight criteria, reliability was not used because none of the participants had any method for judging reliability. The seven criteria used for determining the design guidelines were: 1) Currency, 2) Relevance, 3) Complete, 4) Use of Language, 5) Concise, 6) Freedom from Bias, and 7) References. Which led to fourteen design guidelines, see Table 8-7. Each of these assessment criteria are discussed below, this includes insight into the creation of the associated design guidelines.

Criteria	Design Guideline
Currency	Information should be reviewed and updated regularly.
	Clearly state the last date information was updated.
Relevance	Localise information for different regions.
	Highlight key points from articles and personal stories.
Complete	Topics should be covered in as much detail as possible.
	Provide a personal folder to allow users to save their own notes, media, and links.
	Provide topic summaries with further detail included in a link or collapsible section.
	Include a range of topics that interest your target audience.
	Include a mix of personal stories and expert opinions.
Use of Language	Be clear and ensure medical terms are explained.
	Use authoritative language; avoid the use of slang and colloquialisms.
	Ensure that statistics are used appropriately and explained with a narrative.
Concise	Summarise facts and avoid extra detail.
	Provide facts and avoid emotive language.
Freedom from Bias	If an article is written from a particular perspective, highlight this at the start.
	Be conscious of the negative perception that certain sponsors or advertisers could cause.
References	Clearly display references for source material.
	Provide references to help users who wish to do additional research on a topic.

Table 8-7 Design Guidelines for eHealth Information Content

CURRENCY

Currency is defined in Chapter Two as "*the age of the information.*" Analysis of the data found that that currency of information influenced expectant and new mothers' selection of a range of information resources. This criterion was more of a concern for during medical tasks than for general tasks. The importance of currency for medical tasks was driven by the fact that medical information and guidelines are constantly being updated and the need to be informed of the latest research.

Insight for design guidelines: EHealth designers need to ensure that information is reviewed and updated regularly to adhere to changes within the medical field. In

order to demonstrate the currency of the information, articles should clearly state the last date that information was reviewed. This could help to increase expectant and new mothers' confidence in the information, particularly for medical tasks.

RELEVANCE

Relevance is defined in Chapter Two as "*the applicability of the information to the user's needs.*" The analysis of the study data found that the relevance of the information was judged primarily based on two factors:

1. The fit to the task or situation.
2. The applicability to location

Insight for design guidelines: EHealth information resources should provide a summary of the key points at the start of the article that would allow expectant and new mothers to determine its relevance to the task. In the postnatal period in particular, time is an important consideration. This would allow them to make a quick assessment.

Where possible, eHealth information resources should offer region-specific information to make their information more relevant, both for general and medical information. An example of Region-specific general information would be products and services available in the local area. While an example region-special medical information would be medical guidelines specific to the region.

COMPLETE

Complete is defined in Chapter Two as "*the comprehensiveness and depth of the information.*" The complete criterion can refer to: 1) the level of detail provided on an individual topic and 2) the number of different topics per site. A link was found between the complete criterion and the relevance criterion. If an information resource did not provide sufficient detail on a topic, it could also be perceived as not being relevant to the user's needs. This criterion was also connected to credibility. The analysis found that information resources that provided comprehensive information on a topic were often considered more trustworthy.

Insight for design guidelines: EHealth information resources should cover topics in as much detail as possible. However, eHealth designers should consider using topic summaries, with more detailed information contained within a collapsible section or making additional information accessible through a link. This would allow expectant and new mothers to avoid potentially distressing information if they wished to. This would also allow expectant and new mothers to skim the summary to discover if the topic was relevant, thus saving time.

EHealth information resources should also consider their target audience and the range of topics that interest them. The more topics of interest that an eHealth information resource covers, the more often a user will visit.

EHealth information resources should provide a personal folder for users to allow them to save their own notes, media, and links. Expectant and new mothers often access multiple information resources during information-seeking episodes. By providing users with a folder to save their search results and personal notes, it allows users to build their own complete information resource. It would also ensure that users return to the eHealth information resource.

USE OF LANGUAGE

Use of language is defined in Chapter Two as "*the information is easy to read and understandable.*" This is important as it judges if the information content is understandable to the user. This criterion was found to influence the expectant and new mothers' perception of the information resources credibility.

Insight for design guidelines: EHealth information resource designers should ensure that all the information is easy to understand and all terminology is explained. The use of slang and colloquialisms could undermine expectant and new mothers' perception of the quality of the information. Statistics should only be included when appropriate and they should be properly explained to avoid confusion.

CONCISE

Concise is defined in Chapter Two as "*the information is succinct, lacking in superfluous detail.*" When information is concise it enables expectant and new mothers' to access relevant information quickly. This criterion is associated with the use of language criterion.

Insight for design guidelines: In order to remain concise, eHealth information resources should avoid including superfluous detail in articles. This can be achieved by avoiding emotive language and long-winded explanations. Articles should include summaries of the facts to facilitate skimming when expectant and new mothers are under time pressure.

FREEDOM FROM BIAS

Freedom from bias is defined in Chapter Two as "*the information is not influenced by a particular point of view or agenda.*" The analysis found that expectant and new mothers were conscious of the views and agendas of authors and the potential bias that advertising could bring to an information resource. This criterion can negatively influence participants' perception of an information resource credibility.

Insight for design guidelines: Designers of eHealth information resources should be aware of the potential negative effect that certain advertisers or sponsors could have on the reputation of the information resource. This should be taken into consideration when allowing companies to advertise on the site.

There are many emotive topics for expectant and new mothers. When producing an article on a potentially divisive topic, information can either be provided on all sides or from one perspective. If a decision is made to write the article from one perspective, that should be declared from the start. This enables expectant and new mother to understand the perspective from which the article was written.

REFERENCES

References are defined in Chapter Two as "*citations for used material or recommendations for additional sources of information.*" The use of references can

increase the credibility of an information resource by highlighting the quality of research.

Insight for design guidelines: EHealth information resource designers should include references as part of articles to demonstrate where they sourced their information. Providing links to additional sources of information allows expectant and new mothers to expand their own search if they wish to find additional information.

8.2.3 Discussion

This section discussed the evolution of the design guidelines for eHealth resources and information content. The design guidelines were identified based on the subjective assessment criteria used by expectant and new mothers to assess information resources and content during the study.

However, it should be evident from the discussion that the subjective assessment criteria do not exist in isolation. Certain criteria have been shown to interact with each other, for example format and credibility. Certain criteria have also been shown to be more relevant in particular contexts, for example the concise criterion when search time is limited. These factors were taken into consideration in the development of the design guidelines.

The next section discusses the contributions of the study. This includes a review of the research objective and questions. The section also considers the potential audience for the each contribution.

8.3 Contributions

The aim of this study was to produce design guidelines for eHealth information resources based on the information behaviour of expectant and new mothers. In order to achieve this objective, three research questions were formulated. After analysing the data from the exploratory longitudinal study, it was possible to answer the three research questions and produce the design guidelines. Furthermore, the researcher has identified a number of contributions to both theory and practice emerging from this study.

Figure 8-5 illustrates the relationship between the three research questions. The subjective assessment criteria for eHealth resources and content were identified and analysed as part of RQ1. These were key to producing to the objective of producing design guidelines for expectant and new mothers.

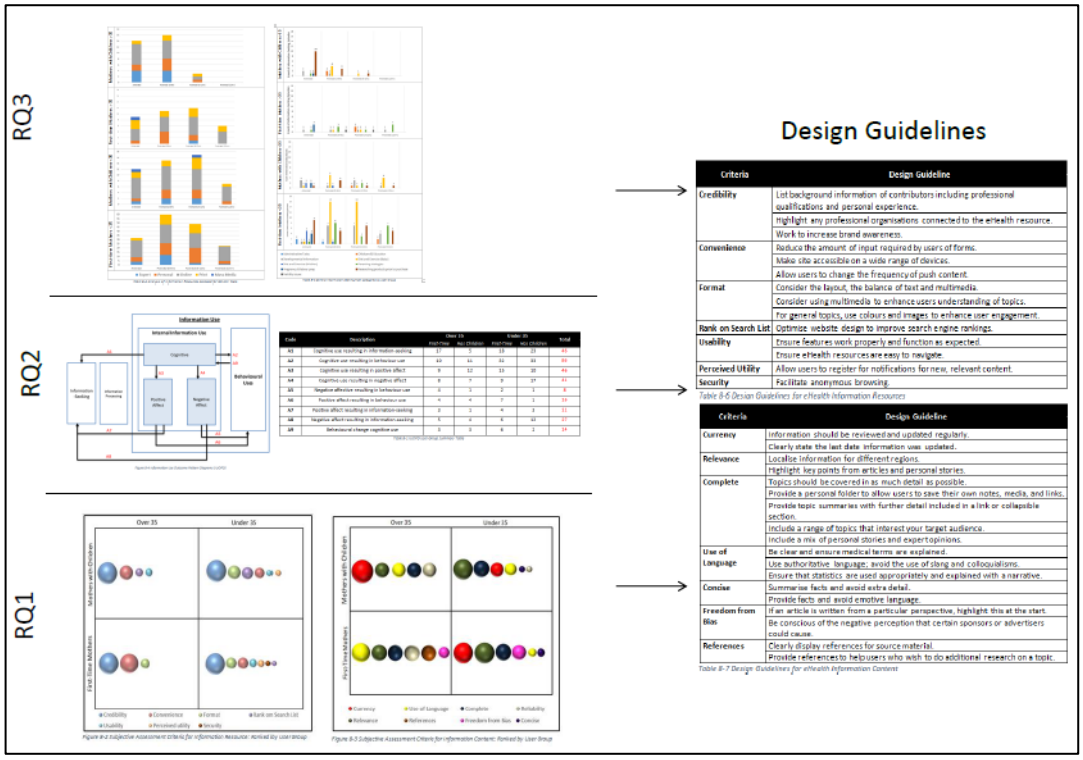


Figure 8-5 The role of the research questions in addressing the objective

RQ2 operationalised the information use section of the theoretical model, empirically demonstrating the connections between information use and other areas of information behaviour. RQ2 was able to highlight the impact of information resource quality on information use outcomes. For example, eHealth information resource designers who wish to produce behavioural use outcomes need to ensure that their information resource meets the requirements of expectant and new mothers. Information resources that were incomplete or not credible tended to produce renewed information-seeking for alternative sources of information.

RQ3 demonstrated the changes in medical and general information resource preference and task categories over time. The information on task categories is useful for eHealth designers wishing to provide a complete information resource for expectant and new mothers. The insight into changes in information resources

preference for general and medical tasks further highlights the importance of certain assessment criteria identified in RQ1.

Table 8-8 summarises main contributions produced from this study under five headings. Table 8-8 considers both the audience and the contribution type in its analysis. It is suggested that the contributions from this study are relevant to a wide audience, including researchers and practitioners.

		Design Guidelines for eHeath Resource and Content	Research Model: Adapted Model of Health Information Behaviour	The Influence of Context on Information Behaviour	Information Behaviour Analysis Tool (IBAT)	Information Use Outcome Pattern Diagrams (IUOPD)
Audience	*Researchers*		**X**	**X**	**X**	**X**
	Information Resource Designers	**X**		**X**	**X**	**X**
	Expectant and New Mothers	**X**				
	Medical Professional	**X**		**X**		
	Policy Makers	**X**		**X**		
Type	*Theory*		**X**	**X**	**X**	**X**
	Practice	**X**		**X**	**X**	**X**

Table 8-8 Contributions by Audience and Type

Each of the five contribution categories referred to in Table 8-8 is discussed in more detailed in the following sections.

8.3.1 Design Guidelines for eHealth Resource and Content

This section discusses the contribution of the design guidelines for eHealth resources and content. The design guidelines are the objective of the study. The design guidelines are presented in in Table 8-9 and Table 8-10. They are a practical contribution. As illustrated in Table 8-8, it is proposed that the design guidelines would be of primary benefit to: 1) information resource designers, 2) expectant and new mothers, 3) medical professionals and 4) policy makers.

Criteria	Design Guideline	Over 35		Under 35	
		First-Time	*Has Children*	*First-Time*	*Has Children*
Credibility	List background information of contributors including professional qualifications and personal experience.	**X**	**X**	**X**	**X**
	Highlight any professional organisations connected to the eHealth resource.		**X**		**X**
	Work to increase brand awareness.				**X**
Convenience	Reduce the amount of input required by users of forms.		**X**		**X**
	Make site accessible on a wide range of devices.			**X**	**X**
	Allow users to change the frequency of push content.	**X**			
Format	Consider the layout, the balance of text and multimedia.	**X**		**X**	**X**
	Consider using multimedia to enhance users understanding of topics.	**X**		**X**	**X**
	For general topics, use colours and images to enhance user engagement.			**X**	
Rank on Search List	Optimise website design to improve search engine rankings.	**X**	**X**	**X**	**X**
Usability	Ensure features work properly and function as expected.		**X**	**X**	**X**
	Ensure eHealth resources are easy to navigate.			**X**	
Perceived Utility	Allow users to register for notifications for new, relevant content.			**X**	**X**
Security	Facilitate anonymous browsing.			**X**	

Table 8-9 Design Guidelines for eHealth Information Resources

Criteria	Design Guideline	Over 35		Under 35	
		First-Time	*Has Children*	*First-Time*	*Has Children*
Currency	Information should be reviewed and updated regularly.		**X**	**X**	**X**
	Clearly state the last date information was updated.		**X**	**X**	**X**
Relevance	Localise information for different regions.	**X**	**X**	**X**	**X**
	Highlight key points from articles and personal stories.	**X**	**X**	**X**	**X**
Complete	Topics should be covered in as much detail as possible.	**X**	**X**	**X**	**X**
	Provide a personal folder to allow users to save their own notes, media, and links.	**X**	**X**	**X**	**X**
	Provide topic summaries with further detail included in a link or collapsible section.			**X**	**X**
	Include a range of topics that interest your target audience.				**X**
	Include a mix of personal stories and expert opinions.				**X**
Use of Language	Be clear and ensure medical terms are explained.	**X**		**X**	**X**
	Use authoritative language; avoid the use of slang and colloquialisms.		**X**		
	Ensure that statistics are used appropriately and explained with a narrative.		**X**		
Concise	Summarise facts and avoid extra detail.			**X**	
	Provide facts and avoid emotive language.				**X**
Freedom From Bias	If an article is written from a particular perspective, highlight this at the start.	**X**			
	Be conscious of the negative perception that certain sponsors or advertisers could cause.			**X**	
References	Clearly display references for source material.	**X**			
	Provide references to help users who wish to do additional research on a topic.	**X**			

Table 8-10 Design Guidelines for eHealth Information Content

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Aforementioned, the objective of this study was to produce design guidelines for eHealth information resources and these are presented in Table 8-9 and Table 8-10. The design guidelines are divided into guidelines for eHealth information resources (Table 8-9) and eHealth information content (Table 8-10). The guidelines emerged based on an analysis of the subjective assessment criteria used by the participants when processing a range of information resource types. By not restricting the analysis to eHealth assessment criteria it allowed the researcher to witness why participants sometimes choose between different information resource types and sometimes choose to combine them.

The design guidelines are grouped by subjective assessment criteria. The tables include columns for each of the four user groups included in the study. The user groups were divided based on age (>/< 35) and maternal status (first-time mothers versus those who already had children).This is used to highlight which guidelines apply to particular user groups. Noteworthy, the analysis revealed that some guidelines, for example, guidelines under the credibility criterion, apply to every user group, see Table 8-9. There are also other guidelines that are restricted to one or two user groups, for example the guidelines under the references criterion, see Table 8-10.

The guidelines could be used by eHealth designers to create eHealth resources tailored to the requirements of expectant and new mothers. The guidelines could also be used by medical professionals or policy makers wishing to commission an eHealth resource for this target audience.

It is suggested that the guidelines could be used as a quality measure to test existing information resources. This would make the guidelines useful to designers wishing to test their existing resources and to medical professional or policy makers looking to find eHealth resources to recommend to expectant and new mothers. Finally, as a quality measure, expectant and new mothers may themselves find the guideline useful as a transparent measure of quality. Researchers have noted that some existing quality measures fail because they don't list their criteria (Bernstam et al., 2005).

8.3.2 Research Model: Adapted Model of Health Information Behaviour

This section details the contributions related to the Adapted Model of Health Information Behaviour. The contributions are theoretical. It is suggested that other researchers are the audience for the contributions detailed in this section, see Table 8-8. Primarily these researchers would be in the information systems and information science disciplines.

This research proposed an adapted version of Wilson's (1997) Information Model, see Figure 8-6. Researchers within the information behaviour discipline have argued that there is not enough theory development within the area, with researchers instead preferring to build new models rather than adapting older models (Bawden, 2006). This study used Wilson's (1997) model as a base. Changes were made to the model based on criticisms of the original model and a review of current literature. These changes are highlighted in Table 8-11.

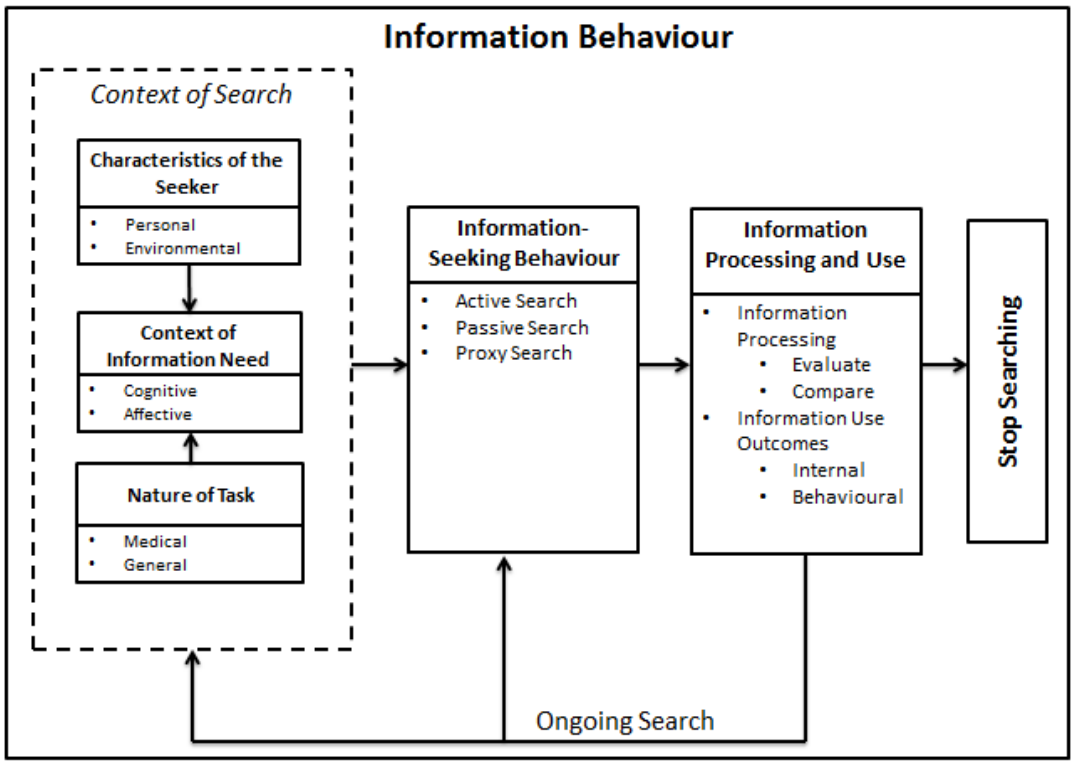


Figure 8-6 The Adapted Model of Health Information Behaviour

Researchers have highlighted information processing and use as a concept that lacks both conceptual clarity and empirical investigation (Tuominen and Savolainen, 1997, Niemelä et al., 2012). A review of the literature in Chapter 3, confirmed the

inconsistent and interchangeable use of terminology reported by other researchers (Savolainen, 2009, Kari, 2010). This study began to address the conceptual deficit and confusion over terminology by proposing that information processing and use should be divided into two concepts, information processing and information use outcomes, see Table 8-11.

Section	Description	Reference
Structure of Model	Moved context variable under one heading based on criticism of Wilson model.	(Niedzwiedzka, 2003)
	• Added additional feedback arrows between information processing and use and information-seeking to highlight multidirectional non-linear nature of information-seeking. • Stop searching was added to differentiate between on-going information-seeking and searches that concluded.	(McKenzie, 2003, Foster, 2004)
Context	Removed reference to specific theories from context based on criticism of Wilson model.	(Niedzwiedzka, 2003, Case, 2012)
	Listed task within the model as part of context because research has highlighted the influence of task on information behaviour.	(Byström and Järvelin, 1995, Vakkari, 2003, Agarwal, 2011)
Information-seeking	After a review of information search definitions four were selected: • *Passive search* was a combination of both of Wilson's passive categories. • *Active and on-going* search were taken directly from Wilson's model. • On-going search was moved to the bottom of the model, on top of the feedback arrows to better illustrate the meaning of the term. • Proxy search was added to the model represent searches conducted by other individual's behalf of the original information-seeker.	(c.f. Chang and Rice, 1993, Wilson, 1997, McKenzie, 2003, Niederdeppe et al., 2007)
Information-Processing and Use	Information processing and use was divided into two categories: • Information processing • Information use outcomes	(c.f. Savolainen, 2006)

Table 8-11 Changes to Wilson's (1997) Model

The Adapted Model of Health Information Behaviour was used to frame the empirical investigation and analysis. Information process and information use outcomes, concepts which lack empirical investigation (Tuominen and Savolainen, 1997, Niemelä et al., 2012), were each the basis of a research question. Information processing was investigated by studying the subjective assessment criteria of information resources and information content. Information use outcomes were examined through exploring the outcomes reported by the study participants. A

visual analysis was utilised to demonstrate the connections between information use outcomes and the other areas of information behaviour.

The exploration of information processing and use should be of particular interest to researchers within information science. This empirical investigation begins to address the current deficit in the area. There is a need to examine these concepts in other contexts with different populations.

8.3.3 The Influence of Context on Information Behaviour

This section describes the contributions specific to the influence of context on information behaviour. The contributions in this section fall under three sub-headings: 1) of task characteristics, 2) time, and 3) accessibility. These contributions were observed as part of the data analysis. The contributions are theoretical and practical, as they influenced the design guidelines. The influence of these contributions on the design guidelines means that they would be of interest to the majority of the target audience groups, see Table 8-8. These includes: 1) researchers, 2) information resource designers, 3) medical professionals and 4) policy makers. Context is an area of interest both to information systems and information science researchers wishing to explore the impact of context on an individual's interaction with information resources.

Task Characteristics

This study confirms the influence of tasks characteristics on information behaviour. Differences were observed in information-seeking frequency and information resource preferences between general and medical tasks. The study also confirms that task importance has a mediating impact on information resource assessment criteria (c.f. Agarwal, 2011).

In previous studies task importance has been defined in relation to the well-being of the information-seeker (Xu et al., 2006). This study found that task importance also referred to the well-being of family members. This finding likely reflects the subjects under investigation. Further research is required to understand the applicability of this finding to other populations and other contexts.

Task complexity was shown to influence information-seeking. Task complexity is defined as tasks which are non-routine and unpredictable (c.f. O'Reilly, 1982, Anderson et al., 2001, Byström, 2002). In those examples, participants tended to seek multiple information resources. They also displayed a preference for credible information resource to manage the uncertainty caused by the higher complexity.

It is proposed that information providers should have an understanding of the impact of task characteristics on the information behaviour of their target audience. This information could aid eHealth designers to customise their site not only to a target audience but also to a specific task. The information could also be used by medical professionals and policymakers when designing or recommending information resources.

Time

The analysis shows that time has a mediating impact on information-seeking. The study found that when free time was reduced participants prioritised their information-seeking tasks. This resulted in a reduction in general information-seeking in the latter part of the postnatal period, particularly after participants returned to work. This reduction in information-seeking also led to a reduction in the variety of information resources accessed. Building a relationship with the expectant and new mother in the antenatal period and/or early in the postnatal period was shown to increase the likelihood of repeat visits, even as information-seeking declined. This highlights the importance of the design guidelines for eHealth designers.

Accessibility

The final context contribution relates to accessibility. The accessibility of an information resource was shown to impact information-seeking. Accessibility was defined in this study as the time, effort and perceived difficulty in accessing information from a particular information resource (Wilson, 1997, Agarwal et al., 2011). The study confirmed previous reports that online health information-seeking is partly driven by the short time patients get to spend asking doctors questions (Cline and Haynes, 2001, Papen, 2013). Participants often searched online after a

consultation to gather additional information not answered during the consultation by their doctor. To address the problem of limited consultation times, the researcher suggests eHealth providers and health professionals' work together to provide online information support for expectant and new mothers.

8.3.4 Information Behaviour Analysis Tool (IBAT)

This section details the contributions related to the Information Behaviour Analysis Tool (IBAT). The tool provided both theoretical and practical contributions. It is suggested that the audience for the tool is researchers and information resource designers, see Table 8-8.

The Information Behaviour Analysis Tool (IBAT) was developed through several iterations over the course of this longitudinal study, see Figure 8-7. The aim of the tool was to provide a diagrammatic analysis of key information-seeking episodes from each interview, thus providing a pattern of information-seeking behaviour. During the study, this analysis tool was used to analyse the information-seeking behaviour of expectant and new mothers. It also provided an effective visual representation for discussion purposes. When multiple IBATs were taken together they were a useful method for discovering patterns, for example the differences between general and medical tasks.

Participant:	**Stage:**	**Title:**		
Context of Search	Search Type	Information Resource	Information Processing	Information Use
Key General= G Medical = M	Active = A Passive = P Proxy = PR	Personal = PL Online= O Expert = EX Print = PT Mass media= MM	Evaluate = E Compare = C	Internal = I Behavioural = B

Figure 8-7 Blank IBAT Diagram

It is proposed that the IBAT can be utilised by other researchers to analyse the information behaviour of different user groups, other than expectant and new mothers. It is also suggested that the IBAT can be utilised for researchers outside of the health space, to study more general information behaviour questions. The IBAT

could be utilised as a useful data collection tool for both researchers and information resources, as a means to better understand the information behaviour of a target population.

8.3.5 Information Use Outcome Pattern Diagrams (IUOPD)

This section details the contributions related to the Information Use Outcome Pattern Diagram (IUOPD). The diagram provided both theoretical and practical contributions. It is suggested that the audience for the tool is researchers and information resource designers.

In order to determine the outcomes of information use, the IUOPD was developed. The IUOPD offers an overview of the patterns of information use outcomes. The IUOPD in Figure 8-8 ranks the connections between information use outcomes observed during the study. The most observed connection was cognitive use resulting in behavioural use.

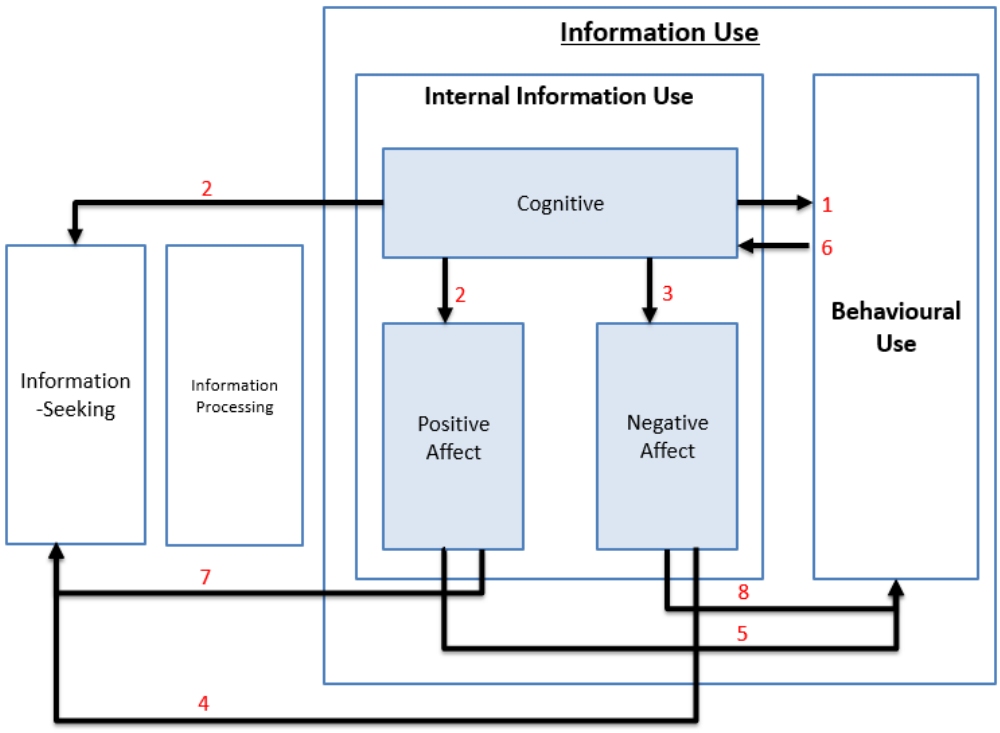


Figure 8-8 IUOPD Diagram Ranked by Information Use Outcome

The IUOPD represents an attempt to lift the lid on a process that has been referred to as a "*black box*" because it occurs within the mind of the information-seeker (c.f. Spink and Cole, 2006). Importantly, the IUOPD also illustrates how information use

outcomes can feed back into information-seeking, reinforcing the iterative view of information behaviour.

It is suggested that the IOUPD could be used by researchers to further explore this under-researched area. The IUOPD could be tested on other user groups and in other domains, for example on project managers during a system role out. Information systems designers could utilise the IUOPD as a method of understanding the impact of their product on their target audience.

8.4 Recommendations for Further Work & Limitations of Study

Researchers often face challenges over the course of a research project. Longitudinal studies place a significant burden on researchers in terms of time (Venkatesh and Vitalari, 1991). Researchers have to balance theoretical aims with practical constraints, such as access to resources (Pettigrew, 1990). This section examines the limitations faced as part of this research. The section further proposes areas of potential future research.

8.4.1 Limitations of the Study

Attrition has been identified as a common problem with prospective longitudinal research (Ployhart and Vandenberg, 2010). Considering the aim of collecting data from each participant for approximately eighteen months, over seven interviews, attrition was a known risk. Given the nature of the area under investigation it is difficult to control for attrition, for example health uncertainty of mother or baby may be an issue which is out of the researcher's control. Out of twelve participants starting the study, three participants were omitted from the final analysis because they left the study before completing four or more interviews. Of the nine remaining participants, seven completed all interviews and a further two participants completed four or more interviews.

As described in Chapter 3, this study involved seven data collection- waves, both interviews and activity diaries. This resulted in a significant quantity of data which needed to be organised and analysed. It is not unusual for the volume of data collected in longitudinal studies to leave researchers feeling overwhelmed when it comes to data analysis (Pettigrew, 1990). This is particularly true of the type of

comparative analysis described by Pettigrew. Therefore, it was essential to employ effective data reduction techniques to manage the complexity.

Researchers have further highlighted the difficulty in capturing internal information use outcomes because they are subjective and occur within the mind of the participant (Wilson, 1999). During this study some participants reported a greater variety of information use outcomes than others. It is not clear whether that was the case or whether some participants were better at recalling the information use outcomes of their information-seeking. It is proposed that using the Information Behaviour Analysis Tool (IBAT) during the interview as a data collection tool might help promote further discussion. The tool could be extended to include the element of internal information use. By sketching out the information-seeking episode during the interview, participants may find it easier to articulate the process.

8.4.2 Future Research

This section proposes potential future areas of research based on the findings of this research study. Firstly it is suggested that the design guidelines for eHealth resources for expectant and new mothers could be further evaluated by testing them using a larger sample size. This could be achieved using qualitative methods such as a focus group or through a survey methodology. Prospective longitudinal research offers the advantage of depth (c.f.Pettigrew, 1990), whereas the proposed future research aforementioned would provide breadth.

This study identified design guidelines for eHealth information resources for expectant and new mothers based on their subjective assessment criteria. Research suggests that there can be a mismatch both at the information and technical level between what is produced and what people want (c.f. Bechtel and Ness, 2010, Kreps and Neuhauser, 2010). By creating guidelines based on the subjective assessment criteria of expectant and new mothers, it is proposed that an information resource could be designed to better meet their requirements. To validate this assertion these guidelines could be used by a developer to produce an eHealth information resource for expectant and new mothers. The results could then be tested on this demographic.

The study identified relationships between several of the subjective assessment criteria. However, this was not the focus of the study and only emerged as part of the analysis. This is an area which should be explored further both with different user groups and in different domains. Understanding the interconnections between the criteria would provide a better theoretical understanding of information processing. This would also likely lead to superior design guidelines.

This study presented the adapted model of health information behaviour, an adapted version of Wilson's (1997) general model. As part of this study the model was evaluated based on the health information behaviour of expectant and new mothers. For future research it is suggested that this model could be evaluated with other user groups, for example adolescents or patient advocacy groups. There is also potential to test the models applicability outside of the health information-seeking domain. For example the model could be tested in a professional setting, with managers as the user group.

The IBAT diagram provides a method for analysing information behaviour. As described in Chapter 3, the diagram was developed using multiple iterations over the course of the longitudinal study. To validate the IBAT diagram as an analysis tool for general information behaviour it should be evaluated in different contexts with other user groups. As suggested in the previous section, there is also the opportunity to assess the IBAT as a data collection instrument. The IBAT could be used within an interview setting to guide participants through the information behaviour process. As the IBAT diagram is adaptable, greater focus can be given to particular areas depending on the researcher's needs, for example internal use or context.

As highlighted in Chapter Two, information processing and use has been identified as a concept within information behaviour that lacks clarity and has received a lack of empirical investigation (Niemelä et al., 2012, Bawden and Robinson, 2012, Case and O'Connor, 2015). This study attempted to add some clarity to the area by dividing information processing and use into separate concepts, information process and information use outcomes. Each concept was evaluated during the

study, with a research question devoted to each. However given the lack of empirical investigation identified in the literature, it is proposed that the concepts should be further evaluated with other user groups and in other subject areas.

8.5 Conclusions

This chapter presented the cross-participant analysis for each of the three research questions. The cross-participant analysis built on the in-depth analysis conducted as part of the within-participant analysis, examining the participants as part of four user groups based on age (>/<35) and maternal experience (first-time mothers/mothers with children). For each research question, similarities and differences between the user groups were identified. RQ1 identified and ranked the subjective assessment criteria used by participants to evaluate information resources and content. RQ2 explored the information use outcomes for each user group, and highlighted links to the participants' subjective assessment criteria. Finally, RQ3 examined the information resource preferences for each user group over time and based on task type.

Following the cross-participant discussion, the chapter presented the design guidelines for eHealth information resources and content; the objective of the study. The chapter continued with a discussion on the contributions of the study. This included an analysis of the audience for each contribution, which included: 1) information resource designers, 2) expectant and new mothers, 3) medical professionals and 4) policy makers. The chapter concluded with a discussion of the limitations of the study and an exploration of potential areas of future research.

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Appendix: A - Interview Guide

Interview Guide

Topics to cover in every interview:

- Review the activity diary with the participant
- How has the participant's information-seeking changed since the last interview? (increase/decrease)
- Has the type of information you have been looking for changed?
- Have you found that you are getting your information from the same sources all the time, or has it changed?
- Did the participant alter their behaviour as a result of any information they found?
- Did the participant encounter any conflicting information?
- If encounter health professionals – is information sufficient?
- First-time Mother:
    - How are finding Pregnancy/Motherhood?
- Mother with children
    - Does this pregnancy differ from previous?
    - Has your information-seeking changed?

Topics to cover in the last interview:

- What were the busiest and quietest periods from the start of pregnancy to now, for information-seeking?
- What information resources did the participant find most useful at the different stages? (antenatal, postnatal)
- Were there different topics that the participant remembers being particular difficult to find information on?
- Was there any particular topic that the participant remembers spending a lot of time searching?
- Are there any features of online resources that the participant values?
- Are there are changes that the participant would like made to the online resources she uses?

Appendix: B - Informed Consent

Information Sheet

Purpose of the Study: As part of the requirements for to complete my PhD in Information Systems at UCC, I have to carry out a research study. The study is concerned with how women (antenatal to postnatal) search for information, process that information and use it. The study will look at what drives the search for information, and why different sources of information are chosen over others. The aim is to use that information to develop guidelines to help produce resources that will better meet the needs of women in the future.

What will the study involve? The study will take place over eighteen months, starting from when you are between 3-6 months pregnant. It will involve keeping an activity journal of when you looked for information, why you went looking and how you would rate the source you used. The study will also involve interviews with me, one at the start of the study, and then every three months after. In the interviews we will discuss the information resources in greater detail.

Why have you been asked to take part? You have been asked because the requirements for my study are that all participants must be between three and six months pregnant at the start of the study.

Do you have to take part? You do not have to take part, and you can withdraw at any time during the study

Will your participation in the study be kept confidential? Yes. I will ensure that no clues to your identity appear in the thesis. Any extracts from what you say that are quoted in the thesis will be entirely anonymous. If you wish to opt out of having quotes of yours used in the thesis, you can do so on the consent form.

What will happen to the information which you give? The data will be kept confidential for the duration of the study. On completion of the thesis, they will be retained for a further six months and all identifying information will be destroyed.

What will happen to the results? The results will be presented in my thesis. They will be seen by my supervisor, a second marker and the external examiner. The thesis may be read by future students on the course. The study may be published in a research journals

What are the possible disadvantages of taking part? I do not envisage any negative consequences for you in taking part.

Who has reviewed this study? The Social Research Ethics Committee reviewed this study.

Any further queries? If you need any further information, you can contact me

If you agree to take part in the study, please sign the consent form overleaf.

Consent Form

I……agree to participate in Carolanne Mahony's research study.

The purpose and nature of the study has been explained to me in writing.

I am participating voluntarily.

I give permission for my interview with Carolanne Mahony to be tape-recorded

I understand that I can withdraw from the study, without repercussions, at any time, whether before it starts or while I am participating.

I understand that I can withdraw permission to use the data within two weeks of the interview, in which case the material will be deleted.

I understand that anonymity will be ensured in the write-up by disguising my identity.

I understand that disguised extracts from my interview may be quoted in the thesis and any subsequent publications if I give permission below:

(Please tick one box:)

I agree to quotation/publication of extracts from my interview ☐

I do not agree to quotation/publication of extracts from my interview ☐

Signed……. Date…….

Appendix: C - Additional Information-Seeking Episodes

Participant 1

Homebirth

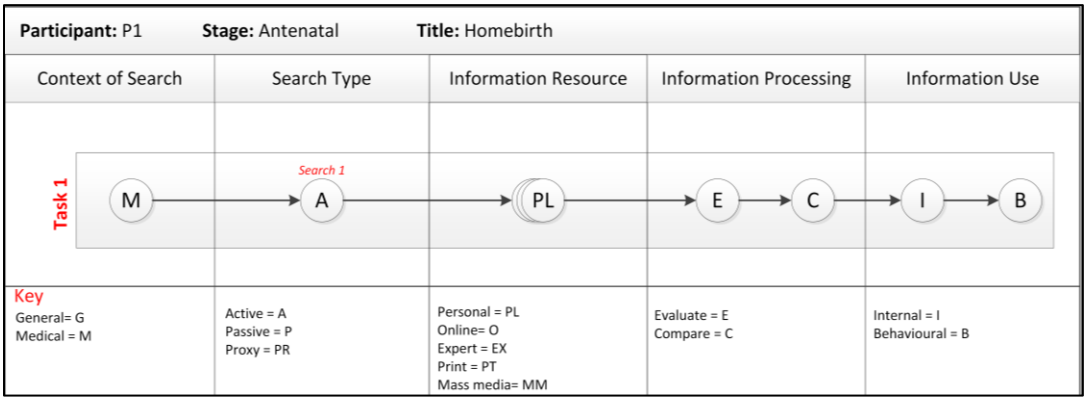


Figure C-1 P1: Homebirth (Antenatal)

The information-seeking episode included one medical task and a single active search of personal information resources. The aim was to learn about her friends experiences of a homebirth.

- **Search 1:** P1 reported speaking to a few friends about homebirths. She asked one of them for the number of a midwife and decided to ring. She felt no need to research the idea further. Her medical background and uncomplicated first labour likely led to her confidence.

Labour Signs

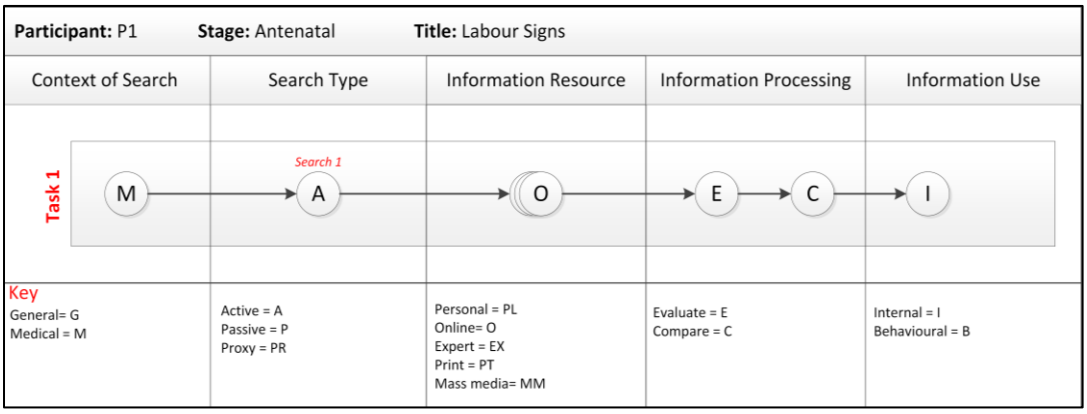


Figure C-2 P1: Labour Signs (Antenatal)

The information-seeking episode included one medical task and a single active search of online information resources. P1 went five days over her due date, as that

had not happened in her first pregnancy she decided to go online to review the different signs of labours.

- **Search 1:** P1 reported reviewing several sites to remind herself of the signs of labour. She said she found the information useful but found nothing to really act upon.

Postnatal Support

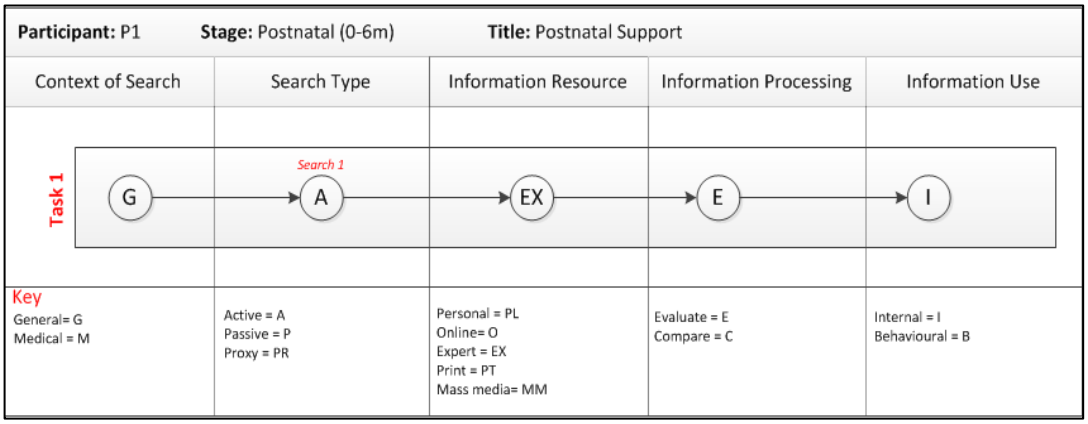


Figure C-3 P1: Postnatal Support (Postnatal 0-6)

The information-seeking episode included one general task and a single active search of an expert information resource. As P1 opted for a homebirth, she received support from a midwife who called to her house for consultations during the antenatal period and for six weeks postnatally. This episode describes one of those encounters.

- **Search 1:** Illustrates P1 consulting the midwife about early breastfeeding issues. P1 found the midwife to be a great support. P1 commented that she did not need to search for any other information for the six weeks postnatally.

Breastfeeding

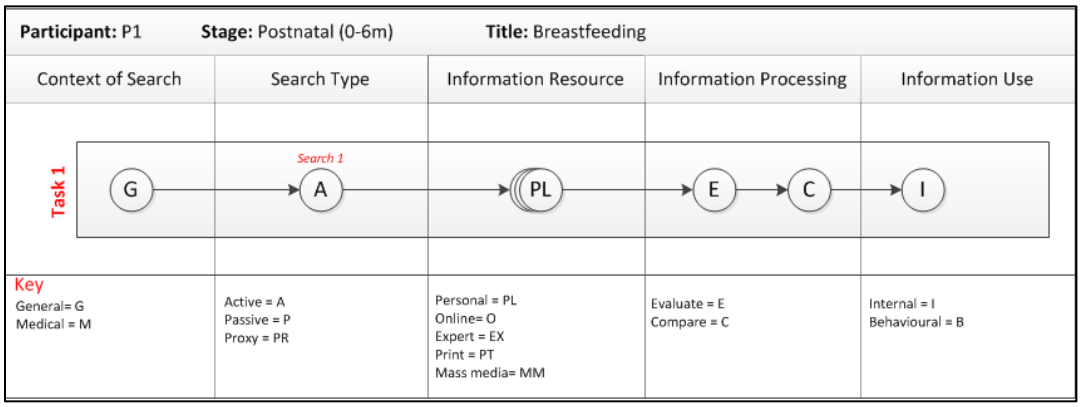


Figure C-4 P1: Breastfeeding (Postnatal 0-6m)

The information-seeking episode included one general task and a single active search of personal information resources. P1 was a member of Le Leche and Cuidiú breastfeeding support groups. She reported attending there meetings for information and because from "*a social point of view it's important as well to have someone to talk*" (P1). This episode illustrates one of the Thursday Le Leche meetings.

- **Search 1:** P1 described listening to the other mothers sharing their stories and experiences of breastfeeding. She stated that she about contrast that with her own past experiences of breastfeeding her older son.

Weaning

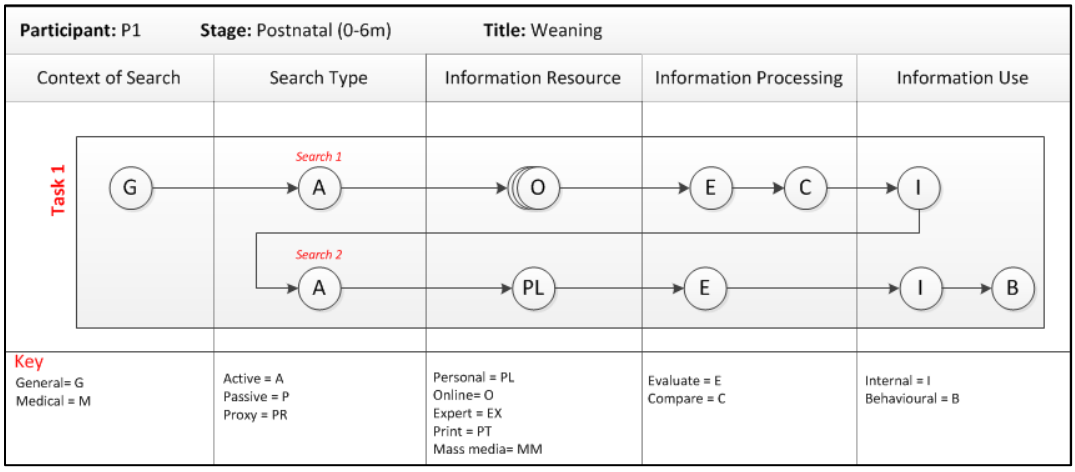


Figure C-5 P1: Weaning (Postnatal 0-6m)

The information-seeking episode included one general task and two active searches of online and personal information resources. The aim of the task was to find guidance on weaning.

- **Search 1:** P1 searched online for guidance on weaning. She stated that she searched through forums and information pages. She discovered inconsistencies in the advice offered on the forums. The information offered on the information pages was more consistent but she felt she wanted more information.
- **Search 2:** P1 decided to speak to her sister who had children the same age as her own. Her sister recommended the Annabel Karmel book. P1 took her sisters advice and purchased the book.

Participant 7

Trouble Sleeping

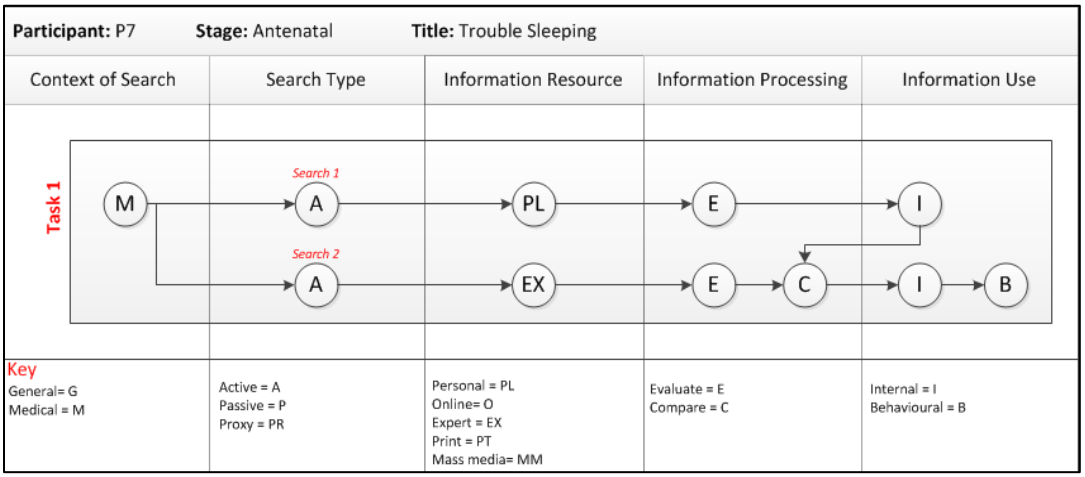


Figure C-6 P7: Trouble Sleeping (Antenatal)

The information-seeking episode included one medical task and two active searches of personal and expert information resources. The aim of the task was to discover a solution to her sleeping problems.

- **Search 1**: P7 asked for advice from her sister-in-law who is a midwife.
- **Search 2:** P7 also asked advice from her pregnancy yoga instructor. P7 compared the advice the both gave her and decided to try adding more pillows and adjusting her sleeping position.

Diet during Pregnancy

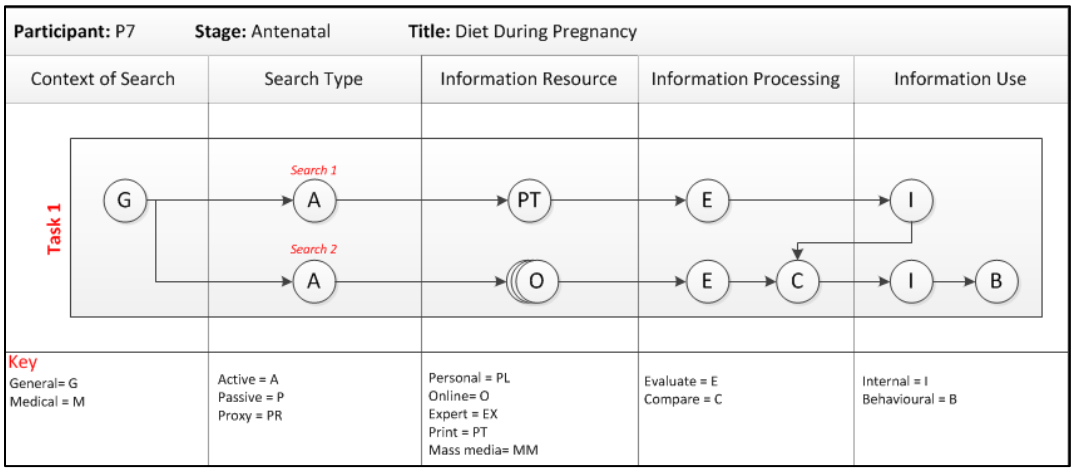


Figure C-7 P7: Diet during Pregnancy (Antenatal)

The information-seeking episode included one general task and two active searches of print and online information resources. The aim of the task was to understand what she should and should not eating while pregnant.

- **Search 1:** P7 first decided to consult her pregnancy book 'What to Expect When You Are Expecting'.
- **Search 2:** P7 also decided to conduct a search. Based on a comparison of the two searches P7 made a number of adjustments to her diet, including taking raspberry leaf tea.

Flu Vaccine

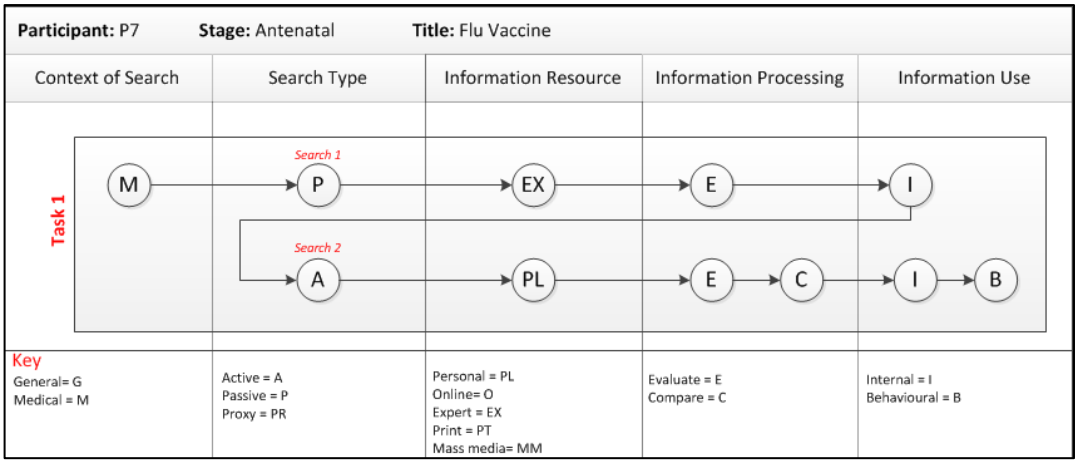


Figure C-8 P7: Flu Vaccine (Antenatal)

The information-seeking episode included one medical task. The task included one passive search and one active search. During the episode P7 accessed a combination of expert and personal information resources. The aim of the task was decide whether or not to take the flu vaccine.

- **Search 1:** The first search was a passive search. During a check-up the nurse at the GP practice asked P7 if she wanted to get the flu vaccine. P7 was not sure what to do because she likes to avoid medication where possible.
- **Search 2:** The second was an active search. P7 decided to consult her sister-in-law. P7 stated that she considered the advice of her sister-in-law and the practice nurse but in the end decided against getting the vaccine. P7 said her decision was partly based on the fact that her husband had recently had the flu and she had not contracted it.

Rash

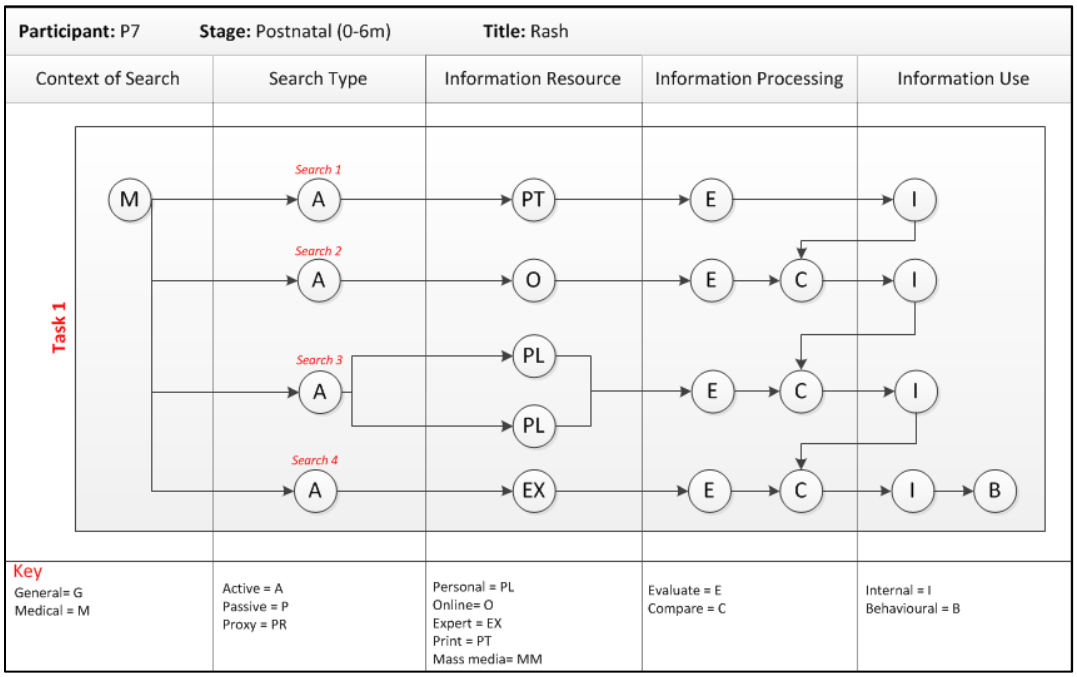


Figure C-9 P7: Rash (Postnatal 0-6)

The information-seeking episode included one medical task. The task included four active searches. During the episode P7 accessed a mix of print, online, personal and expert information resources. The aim of the task was discover the cause and solution for her daughter's rash.

- **Search 1 & 2:** P7 reported when she spotted a rash on her daughter's neck she decided to consult her parenting book and the Babycentre website. P7 stated that the Babycentre website was particularly good because it included pictures of different rashes, so she could compare them against her daughters. Based on the pictures P7 was confident that the rash was just a breastfeeding rash.
- **Search 3:** When the rash persisted, P7 decided to speak to both her sister-in-law and her mother-in-law, both of whom agreed with her assessment of breastfeeding rash.
- **Search 4:** P7 had thought the rash would go away on its own but instead it got worse, so she decided to consult the chemist. The chemist agreed it was a breastfeeding rash and recommended a cream. P7 took his advice and purchased the cream.

Breastfeeding

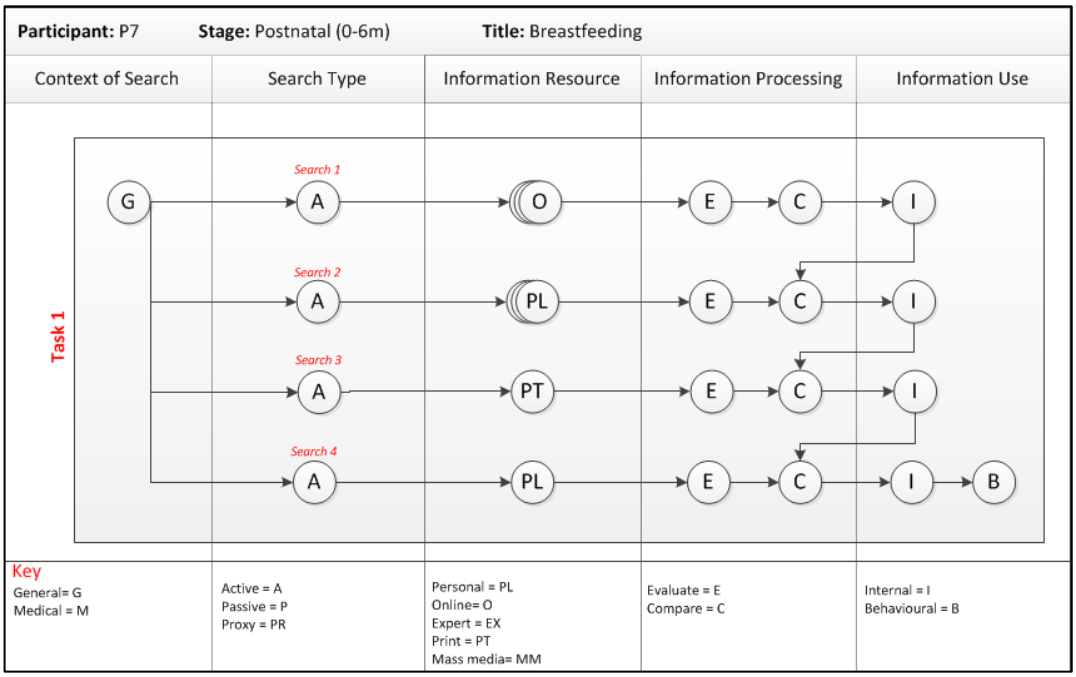


Figure C-10 P7: Breastfeeding (Postnatal 0-6)

The information-seeking episode included one general task. The task included four active searches. During the episode P7 accessed a mix of online, personal and print information resources. P7 reported feeling "*anxious about the breast feeding and worried that she wasn't getting enough*" (P7). The aim of the task was to learn more about breastfeeding in an attempt to become more confident in the processes.

- **Search 1, 2 & 3:** P7 reported accessing a variety of information resources, including online, print and personal resources. P7 stated that she found useful information from all of them. However, she was still worried about her daughter getting enough because **"***you can't see how much she is eating when you are breast feeding*" (P7).
- **Search 4:** The information resource the P7 found most useful was her sister-in-law, the midwife. P7 remarked that the combination of her professional experience and her personal experience of breastfeeding herself made her a particularly useful source of information. She was able to give P7 some practical advice which she decided to apply.

Fever

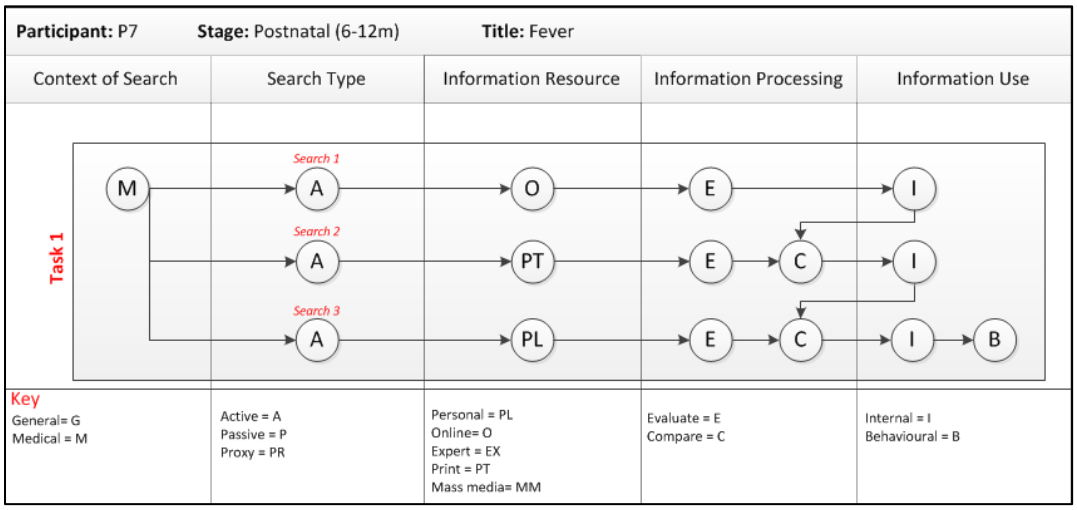


Figure C-11 P7: Fever (Postnatal 6-12m)

The information-seeking episode included one medical task. The task included three active searches. During the episode P7 accessed a mix of online, print, and personal information resources. During this episode P7's daughter had a 24 virus with a fever. The aim of the task was for P7 to learn how to manage the fever and to know what signs she should what out for.

- **Search 1 & 2:** When P7 first realised her daughter was ill, the first places she looked were the Babycentre website and her parenting book, 'What to Expect in the First Year'.
- **Search 3:** P7 next consulted her sister-in-law for advice. She stated that she spent the day texting her sister-in-law with updates on how her daughter was doing and asking her advice. P7 again highlighted the advantages of her sister-in-law being both a mother and a midwife.

Weaning

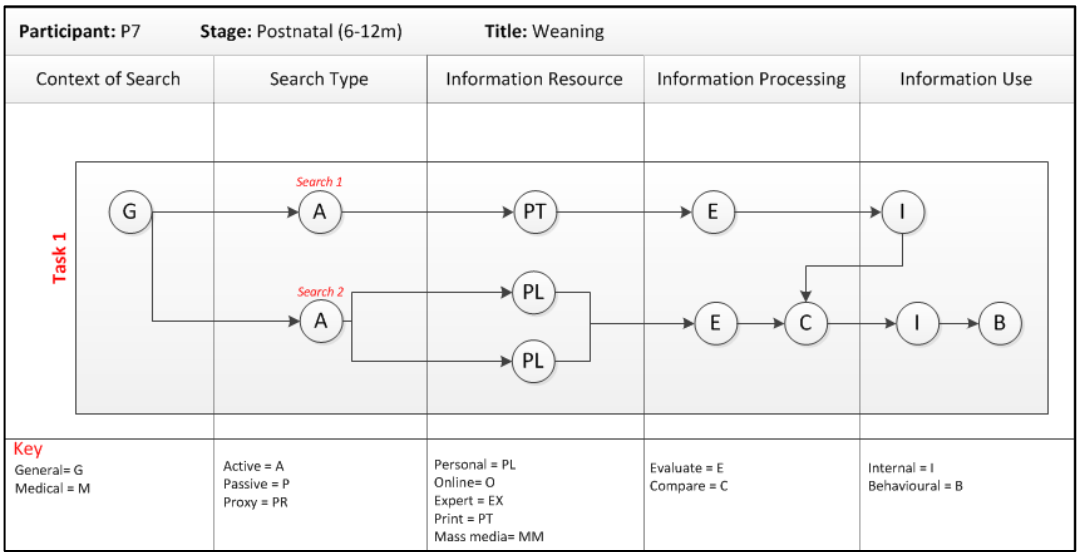


Figure C-12 P7: Fever (Postnatal 6-12m)

The information-seeking episode included one general task. The task included two active searches. During the episode P7 accessed a combination print and personal information resources. The aim of the task was for P7 to learn the best method for weaning her daughter on to a bottle.

- **Search 1:** The first information resource P7 consulted was her parenting book, 'What to Expect in the First Year'.
- **Search 2:** P7 next consulted her two sister-in-laws for advice. P7 stated that she relied primarily on the advice they provided. She trusted them because they had gone through the process themselves before.

Sunken Frenulum

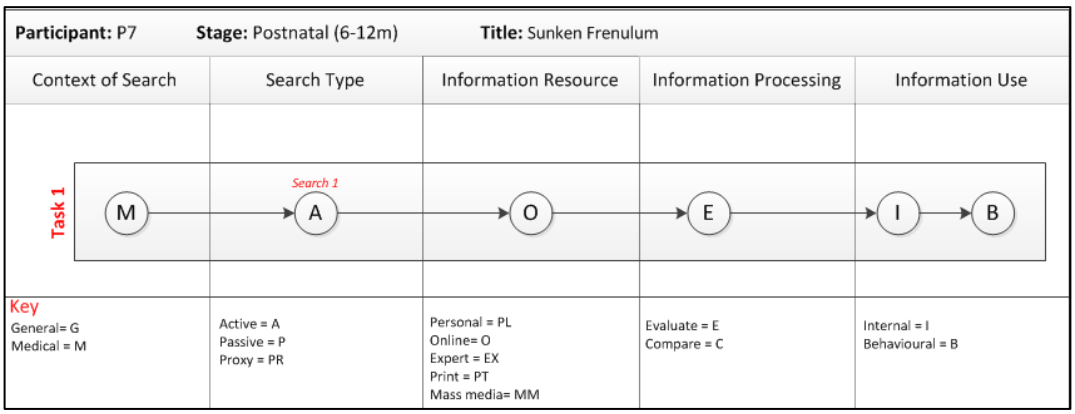


Figure C-13 P7: Sunken Frenulum (Postnatal 6-12m)

The information-seeking episode included one medical task and one active search. During the episode P7 accessed one online information resources. The aim of the task was for P7 to discover a reason for her daughter's sunken frenulum.

- **Search 1:** P7 reported being concerned when she noticed that her daughter's frenulum was sunken. She stated that she went straight to the Babycentre website to discover the cause. According to the site, a sunken frenulum is usually caused by dehydration. P7 decided to increase the amount of water she her daughter as a result of the information.

Signs of a Concussion

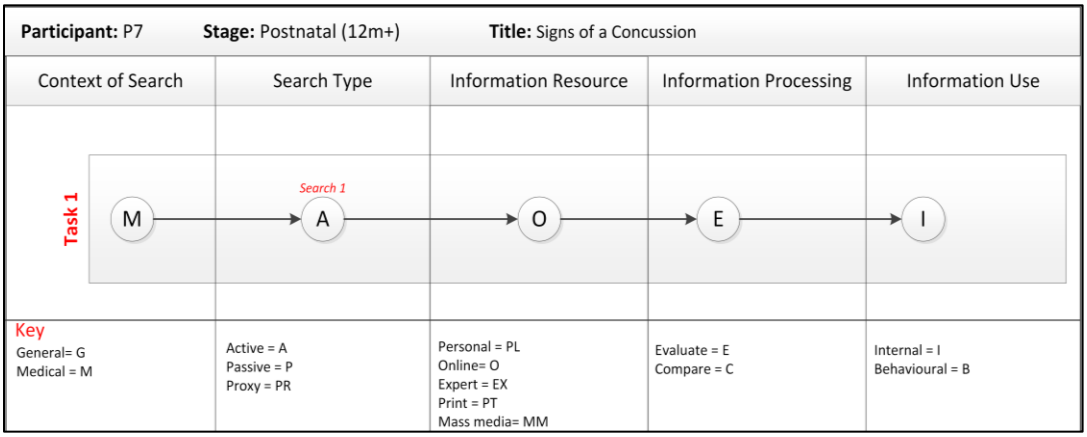


Figure C-14 P7: Signs of a Concussion (Postnatal 12m+)

The information-seeking episode included one medical task and one active search. During the episode P7 accessed one online information resources. P7's daughter hit her head and P7 was concerned of the due to the risk of concussion. The aim of the task was for P7 to discover the signs of concussion so she could watch out for them.

- **Search 1:** P7 stated that she went straight to the Babycentre website to look for the signs of a concussion. The site gave a list of signs for parents to watch out for. P7 was relieved that her daughter was not exhibiting any of the signs.

Participant 12

Braxton Hicks

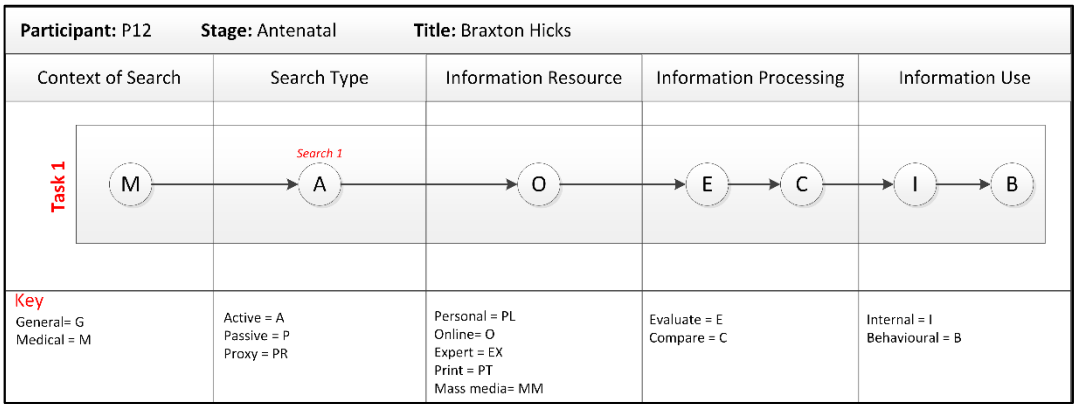


Figure C-15 P12: Braxton Hicks (Antenatal)

The information-seeking episode included one medical task and one active search. During the episode P12 accessed one online information resource. During the episode P12 was experiencing cramps. The aim of the episode was to discover if the cramps were a sign of pre-term labour or Braxton Hicks.

- **Search 1:** P12 decided to consult the mothers in her Facebook mothers group for their opinion on her cramps. The consensus in the group was that *"if it is not too painful and if it is not regular, you know, it is probably Braxton Hicks"* (P12). This reassured P12 and she decided not to go to the hospital or consult a doctor.

Flu Vaccine

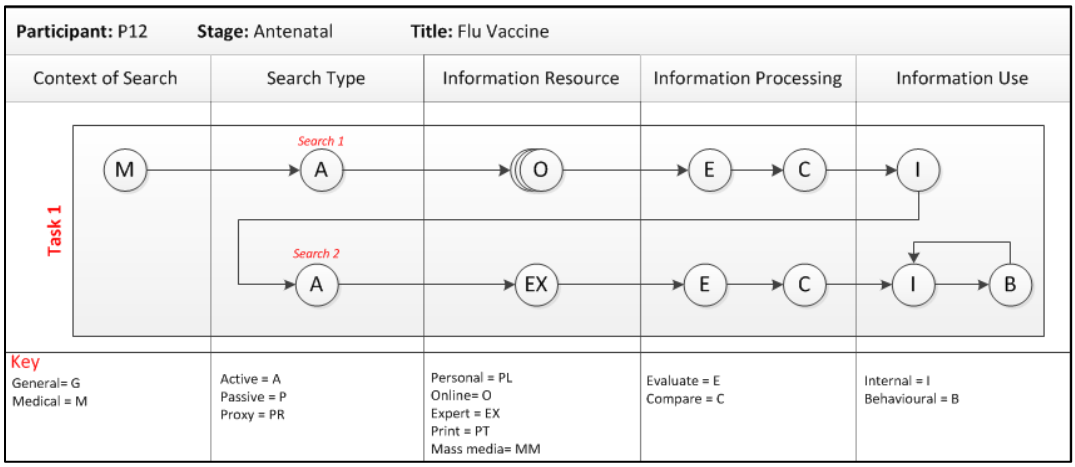


Figure C-16 P12: Flu Vaccine (Antenatal)

The information-seeking episode included one medical task and two active searches. During the episode P12 accessed both online and expert information resources. The episode describes P12 attempting to decide whether or not to take the flu vaccine.

- **Search 1:** P12 decided to search online to research information on the flu vaccine. Although she had no problem finding information, none of the information resources were able to convince her in either direction.
- **Search 2:** P12 decided to consult her GP for advice. The GP was able to reduce some of P12's concerns about the potential side-effects of the vaccine. P12 decided to take the vaccine. P12 found it was a relief having made the decision.

"Now that I have taken it I can stop worrying, I am protected. I can put it out of my head. Whereas if I hadn't, I probably would have worried every day until the baby was born." (P12)

Migraine

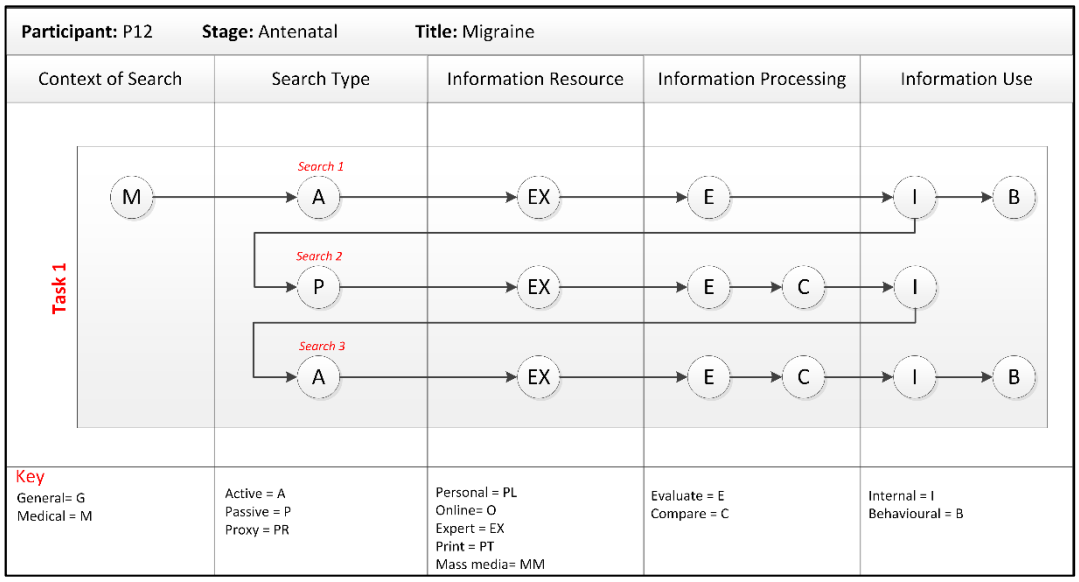


Figure C-17 P12: Migraine (Antenatal)

The information-seeking episode included one medical task, two active searches and one passive search. During the episode P12 accessed expert information resources. The aim of the episode was to find something that P12 could take for her migraines when she was pregnant.

- **Search 1:** P12 had experienced a migraine at the start of her pregnancy. During a visit with the hospital consultant P12 decided to ask what she could take if she got another migraine while she was pregnant. The consultant advised her to take Solpadol. P12 decided that she would purchase some.
- **Search 2:** The second search was a passive search. When P12 went to purchase the Solpadol the pharmacist enquired why P12 wanted them. When P12 explained, the pharmacist was reluctant to sell the Solpadol P12. The pharmacist informed P12 that Solpadol were unsafe for pregnant women.
- **Search 3:** P12 decided to go to her GP to get another opinion. When she explained the situation to her GP, the GP agreed with the pharmacist. P12 decided it was better to be safe and did not purchase the Solpadol.

Symphysis Pubis Dysfunction (SPD)

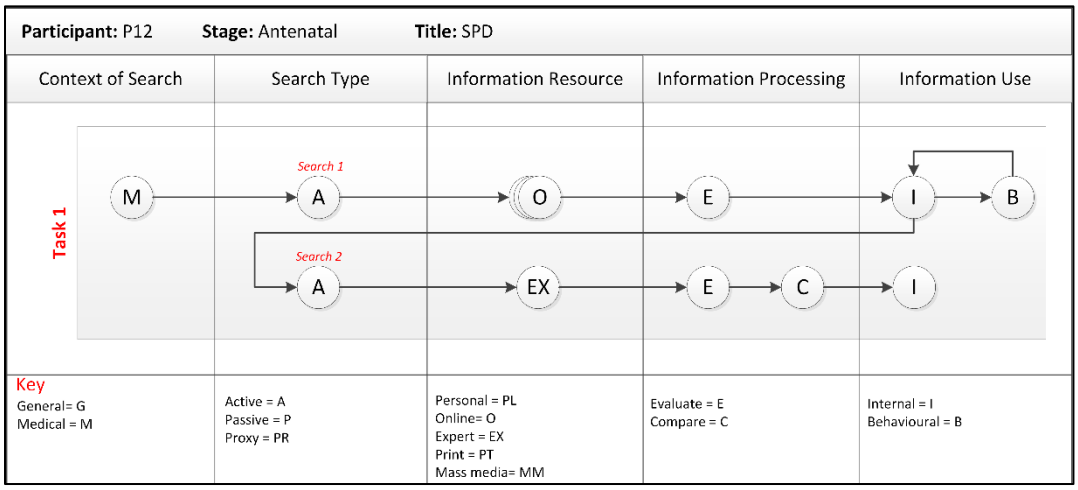


Figure C-18 P12: SPD (Antenatal)

The information-seeking episode included one medical task and two active searches. During the episode P12 accessed online and expert information resources. The aim of the episode was to find the cause of and solution to her pelvic pain.

- **Search 1:** P12 first decided to search online to find the cause of her pain. Based on the information she found online, P12 decided that she had SPD (Symphysis Pubis Dysfunction). P12 found advice on how to reduce pain associated with SPD which she decided to adopt. For example, P12 purchased a support belt and changed her sleeping position. However, P12 found that changes to her behaviour didn't improve her pain.
- **Search 2:** P12 decided to consult her midwife on the issue. P12 explained the pain to her midwife, the midwife examined her. The midwife then explained to P12 that she did not have SPD. The midwife told her it was "*ligament pain, it is just part of it, put up with it*" (P12).

Salmonella

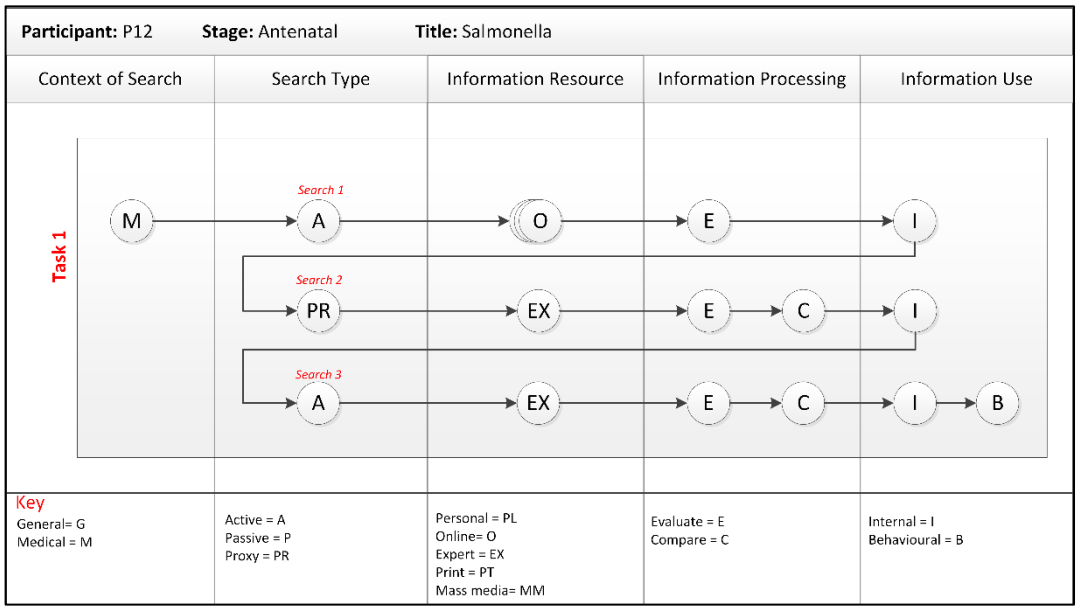


Figure C-19 P12: Salmonella (Antenatal)

The information-seeking episode included one medical task, two active searches and one proxy search. During the episode P12 accessed both online and expert information resources. This episode describes when P12's husband's niece contracted a form of salmonella which had not previously been seen in Ireland. The twelve year old was seriously ill and was hospitalised for a month. P12 was concerned about any potential risk to her pregnancy. The aim of this episode was to discover how P12 could minimise those risks.

- **Search 1:** P12 searched online to try and learn more about the condition and potential risks. This just made her more nervous about catching it when she was pregnant.
- **Search 2:** P12 didn't want her or her husband to be anywhere near her husband's family because they had been in the hospital visiting. However, P12 wanted expert information. P12 asked her husband to contact his sister, to ask one of the doctors to provide them with more information. However, when she got the information relayed back she didn't trust it because it had gone through too many people.
- **Search 3:** P12 decided to ask her own GP's advice. The GP advised her to stay away from everybody until the child was given the all clear. P12 decided

to continue to do that. Even after the child came home from hospital P12 refused to eat food in the same house when she was pregnant because she was too nervous.

Tongue Tie

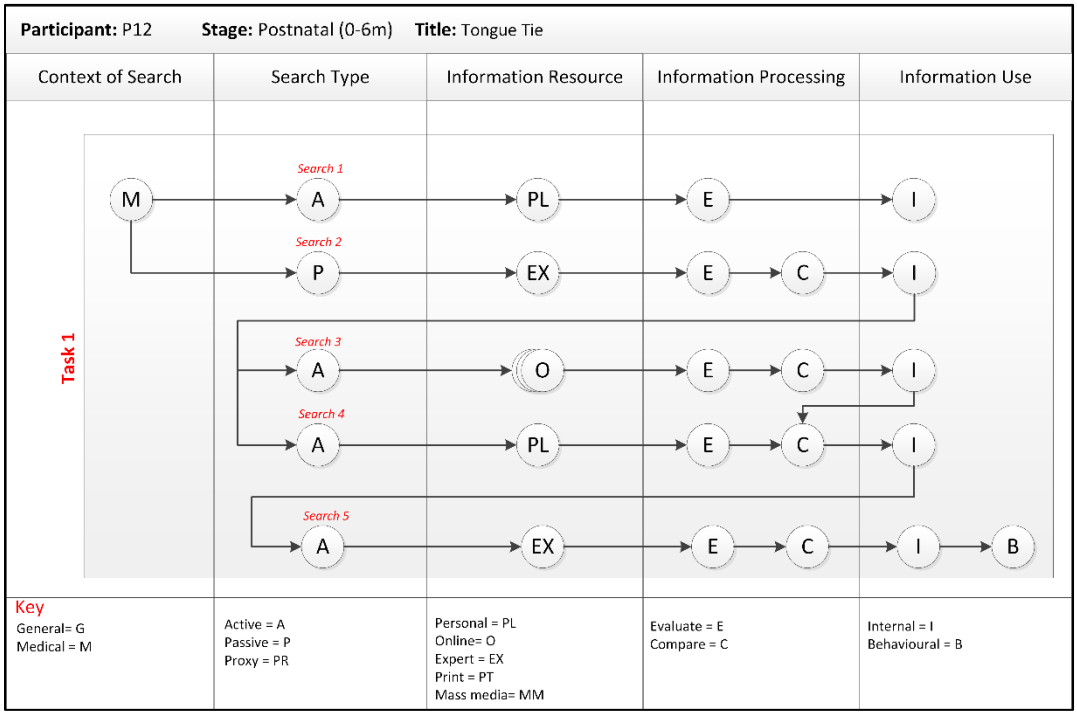


Figure C-20 P12: Tongue Tie (Postnatal 0-6m)

The information-seeking episode included one medical task, three active searches and one passive search. During the episode P12 accessed online, expert and personal information resources. This episode occurred shortly after P12's son was born. P12 was finding breastfeeding painful. P12 thought the pain could be linked to a lip tie she had noticed in the child's mouth.

- **Search 1:** P12 asked her mother if she thought her son's mouth looked normal because P12 thought it didn't feel right. Her mother wasn't sure but said that all babies were different.
- **Search 2:** The second search was a passive search, a routine check-up with the public health nurse. The nurse asked P12 how breastfeeding was progressing. P12 explained that she was finding it painful, so the nurse checked her son's mouth and discovered the lip tie.

- **Search 3 & 4:** Because the public health nurse had also spotted the lip tie, P12 decided to Google the condition and to speak to her brother-in-law who is an ENT. The brother-in-law was dismissive of the lip tie. He said it didn't need to be corrected because it didn't interfere with breastfeeding. According to P12 that opinion was the "*old school of thought [and she] now knew better*" (P12).
- **Search 5:** P12 decided to get the opinion of a lactation consultant. The lactation consultant examined her son and informed P12 that her son had a type of tongue tie that needed to be corrected or the pain would get worse and she would eventually stop breastfeeding. P12 decided to get the tie removed.

Weaning

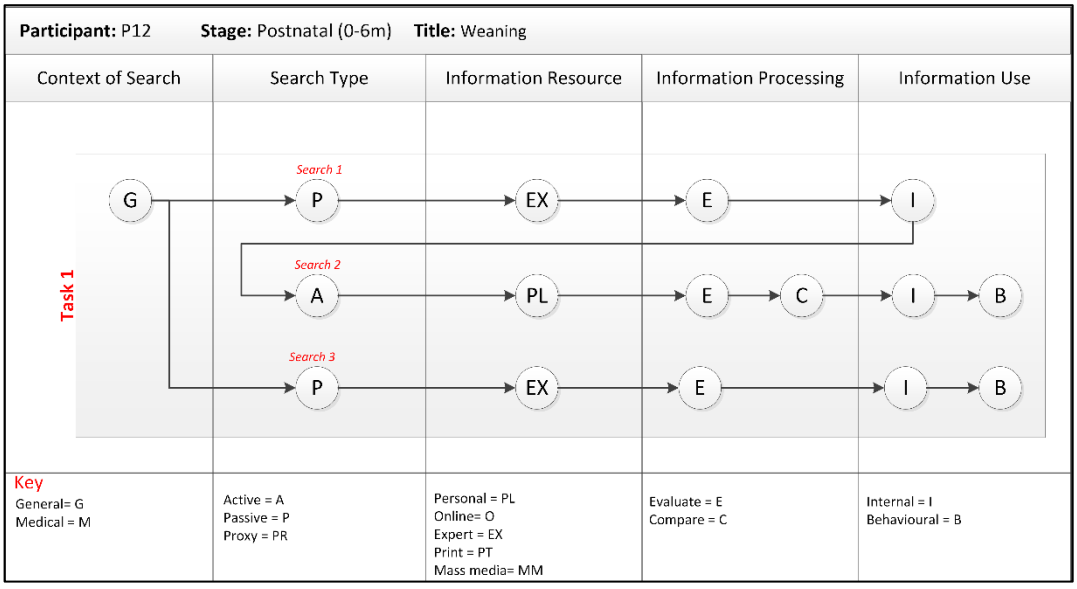


Figure C-21 P12: Weaning (Postnatal 0-6m)

The information-seeking episode included one general task, one active searches and two passive search. During the episode P12 accessed one online, expert and personal information resources. This episode illustrates P12's relationship with the public health nurse, whom she felt was old fashioned and stuck in the 1950s. This episode highlights the interaction between P12 and the public health nurse on weaning.

- **Search 1:** The first search was a passive search, a routine check-up with the public health nurse. At seventeen weeks old the public health nurse was encouraging P12 to give her son water and baby rice to supplement her breastfeeding.
- **Search 2:** P12 *"didn't really get along"* with the public health nurse. She decided to ask the advice of her breastfeeding support group, Cuidiu. The group disagreed with the public health nurse, they informed P12 that baby rice and water have no nutritional value. P12 decided to discount the public health nurses advice and to just continue breast feeding.
- **Search 3:** The third search was a passive search, it is the next routine check-up with the public health nurse. The public health nurse again offered P12 advice, this time on weaning. She informed P12 that she should get her son used to a spoon before he turned six months. The public health nurse also advised against baby led weaning because she felt it could harm the child's *"jaw development and causing him to have speech problems"* (P12). Based on her previous encounters with the public health nurse P12 did not trust the advice that she was provided but also did not wish to argue with her. So P12 decided it was easier to lie and pretend that she was doing what the nurse advised.

Teething

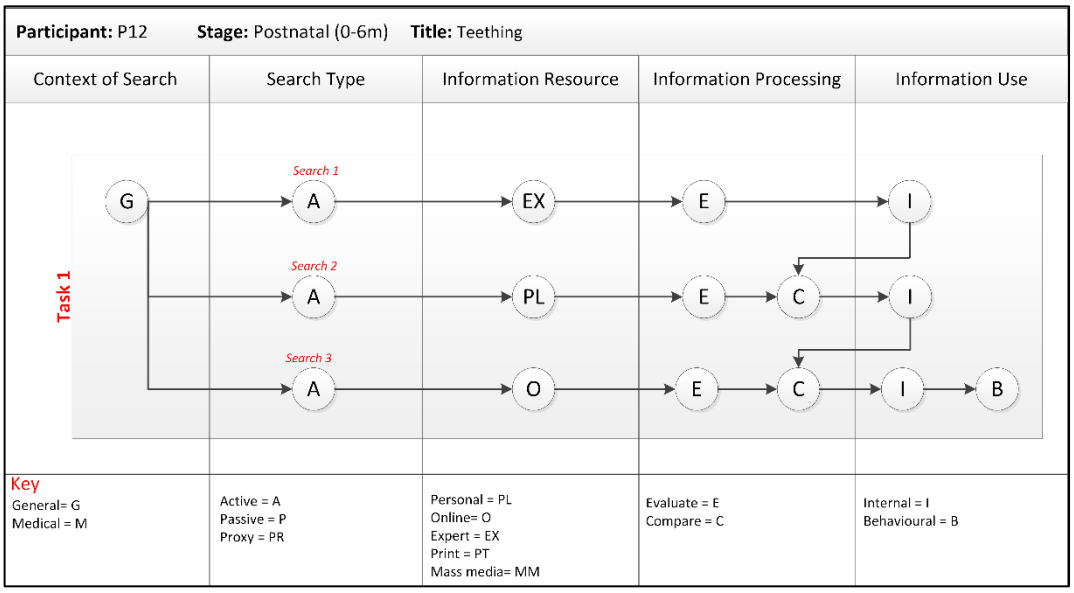


Figure C-22 P12: Teething (Postnatal 0-6m)

The information-seeking episode included one general task and three active searches. During the episode P12 accessed personal and online information resources. This episode describes P12 looking for tips for making teething easier for her son.

- **Search 1:** The first search involves P12 asking for advice from the counsellor in her breastfeeding support group, Cuidiu. The counsellor suggested 'clever feeders', which allow mothers to place frozen fruit inside for the child to chew on.
- **Search 2:** P12 also decided to consult her mother. Although her mother did not have any new advice, she did inform P12 that she had gotten her own teeth early.
- **Search 3:** Finally P12 decided to consult the mothers in her Facebook mothers group. They also suggested the 'clever feeders'. A number of the mothers also suggested that she should try rubbing Calgel into his gums. After comparing the advice, P12 decided to purchase both the Calgel and a 'clever feeder'.

Calpol Reaction

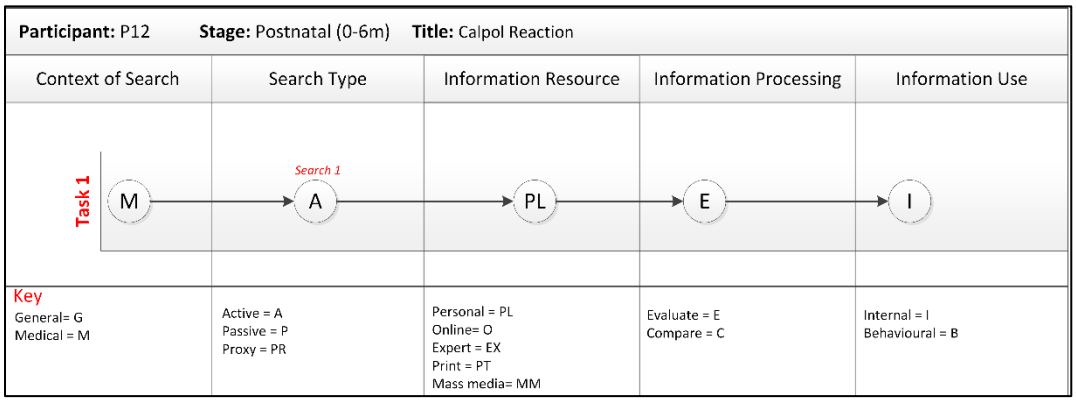


Figure C-23 P12: Calpol Reaction (Postnatal 0-6m)

The information-seeking episode included one medical task and one active search. During the episode P12 accessed a personal information resource. P12 gave her son a spoon of Calpol and her vomited afterwards. The aim of this episode was to discover if the vomiting was an allergic reaction to the Calpol.

- **Search 1:** After her son vomited P12 contacted a friend of hers who is a nurse in an accident and emergency department. Her friend was able to reassure P12 that there was nothing to worry about because an allergic reaction would be more severe.

Participant 14

Placenta Praevia

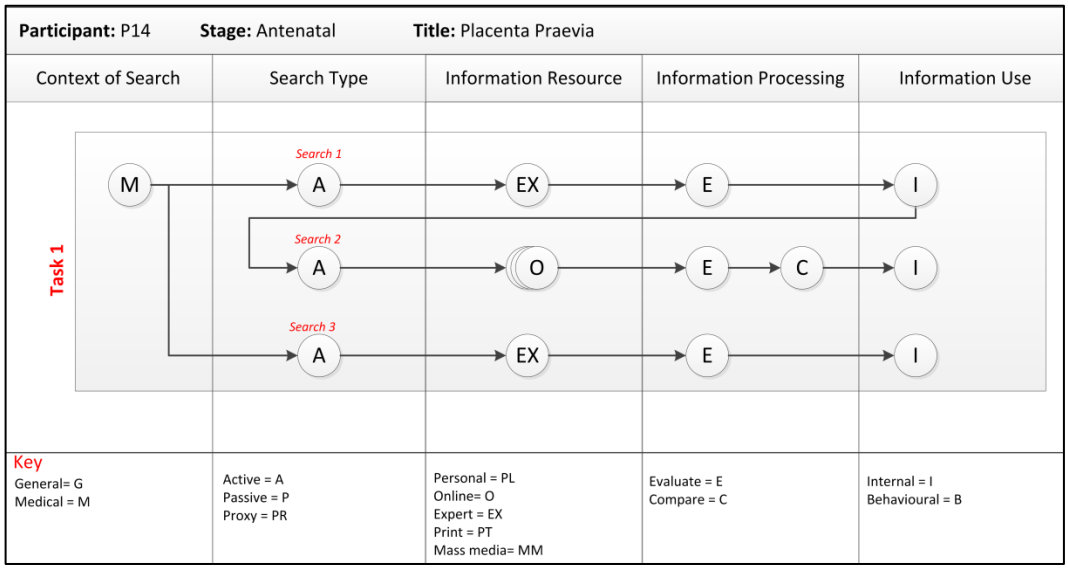


Figure C-24 P14: Placenta Praevia (Antenatal)

The information-seeking episode included one medical task and three active searches. During the episode P14 accessed a combination of expert and online information resources. The task occurred shortly after P14 was informed that she had placenta praevia. The aim of the task was to learn more about placenta praevia. This included information on the condition, likelihood of a natural birth, a treatment for the associated back pain).

- **Search 1**: The first search was a discussion with her GP. P14 found the GP to be *"quite good, she was quite understanding"* (P14). But because Placenta Praevia can resolve itself up to 32 weeks the GP could not give her too many definite answers.
- **Search 2**: For the second search P14 visited several websites looking for information. She found that there was "*too much information*" (P14). She ended up "*freaking herself out*." P14 stated that she probably should not have searched online because it did not help her in the instance and it only added to her feelings of stress.
- **Search 3**: The third search describes P14 return to the hospital for a scan. During her visit they determined the placenta praevia had resolved, the placenta had moved. P14 stated that this was a "*huge relief, because you*

are not worrying about having a miscarriage or bleeds or any of that kind of thing" (P14).

Pelvic Pain – SPD

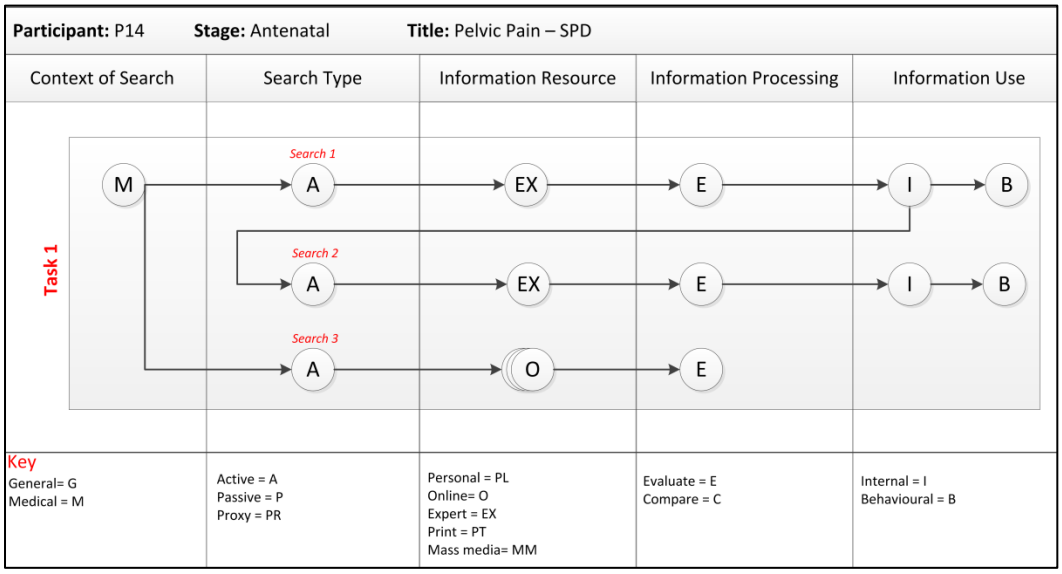


Figure C-25 P14: Pelvic Pain – SPD (Antenatal)

The information-seeking episode included one medical task and three active searches. During the episode P14 accessed a combination of expert and online information resources. P14 was in a lot of pain which was limiting her everyday activities. She recognised the pain because she had experienced it on her previous pregnancy so she knew the cause. This episode describes P14 seeking treatment.

- **Search 1**: P14 first visited her GP. The GP confirmed that she had SPD and advised P14 that she should go for physiotherapy. P14 decided that she would go to a physiotherapist.
- **Search 1**: P14 went to see the physiotherapist. The physiotherapist gave P14 advice on methods to reduce the pain, which P14 took on board. The physio also gave P14 a support belt which she was able to wear for a while before her baby bump got too big.
- **Search 3:** P14 also searched online for tips for reducing the pain but she didn't find it helpful. P14 stated the information she found was "*just too general and not specific to me and my needs*" (P14).

Baby Slings

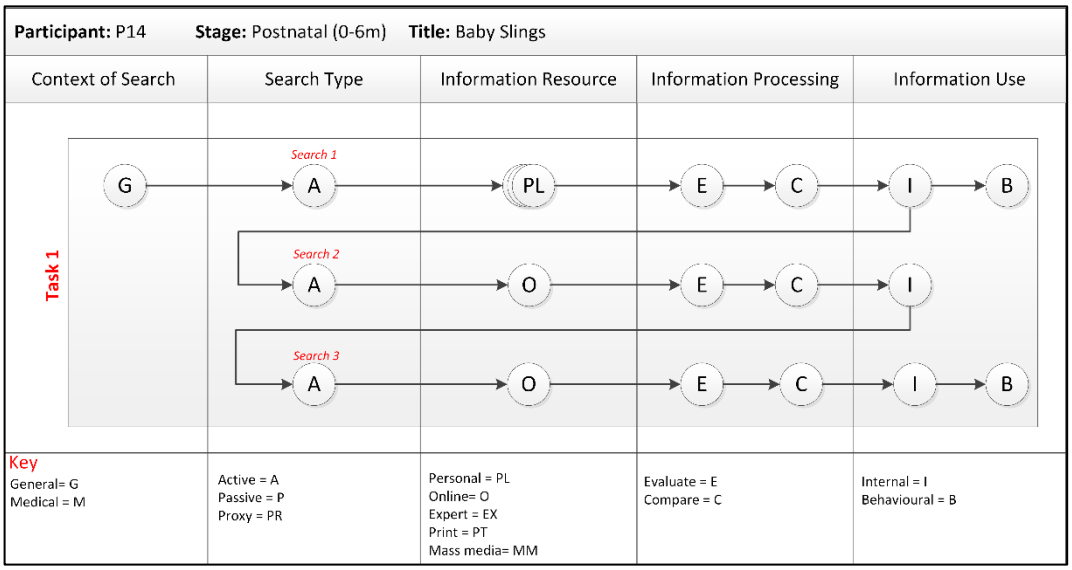


Figure C-26 P14: Baby Slings (Postnatal 0-6m)

The information-seeking episode included one general task and three active searches. During the episode P14 accessed a combination of personal and online information resources. P14 was finding her baby sling uncomfortable. Some of the mothers in the breastfeeding group she attended advised her that the sling she had bought was only good when the child was very small, but as the child got older it became less comfortable for both the baby and her. Once P14 understood it was a problem with that particular sling she decided to research alternatives.

- **Search 1**: Other mothers in the breastfeeding group explained to P14 that the reason she was finding her baby sling uncomfortable was an issue with that model. This led P14 to decide stop using her sling and to decide to purchase a different sling.
- **Search 2**: P14 decided to ask the opinion of the mothers on one of the Facebook groups she was a member of. The majority of mothers in the group appeared to have a particular favourite sling so she decided to research that one.
- **Search 3**: P14 went on Amazon to price the sling and read the reviews. All the reviews were positive and the price was reasonable to P14 decided to buy it. This was relatively unusual for P14 as she did not usually purchase products online, preferring instead to buy in person.

Weaning

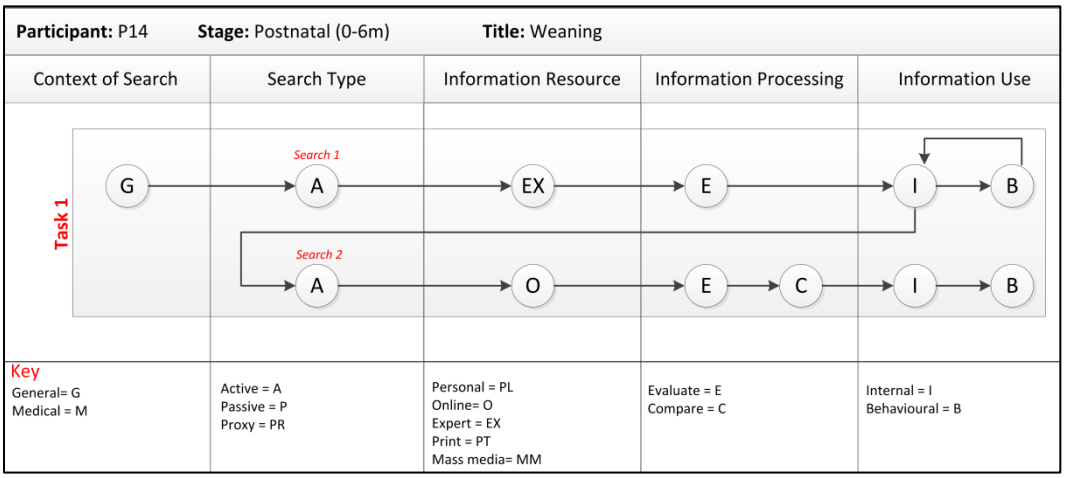


Figure C-27 P14: Weaning (Postnatal 0-6m)

The information-seeking episode included one general task and two active searches. During the episode P14 accessed a combination of expert and online information resources. This episode describes P14 seeking advice on how to begin the weaning process.

- **Search 1**: At 18 weeks the public health nurse had told P14 that her child was a hungry baby and should be weaned on to solids. P14 thought that was "*ridiculous*" advice and waited until the child was nearly six months old. At that point P14 couldn't remember how she had started the process with her older child so took the public health nurses advice when she was told to start the child on Weetabix in the morning and proper diners. The child was constipated for five days and P14 blamed the advice of the public health nurse.
- **Search 2**: P14 sought the advice of one of the Facebook groups she was a member of. They suggested the problem was the level of wheat and the number of meals the child was getting. Their advice was to start the child on fruits and vegetables and one maybe two meals a day. P14 decided to take this advice.

Croup

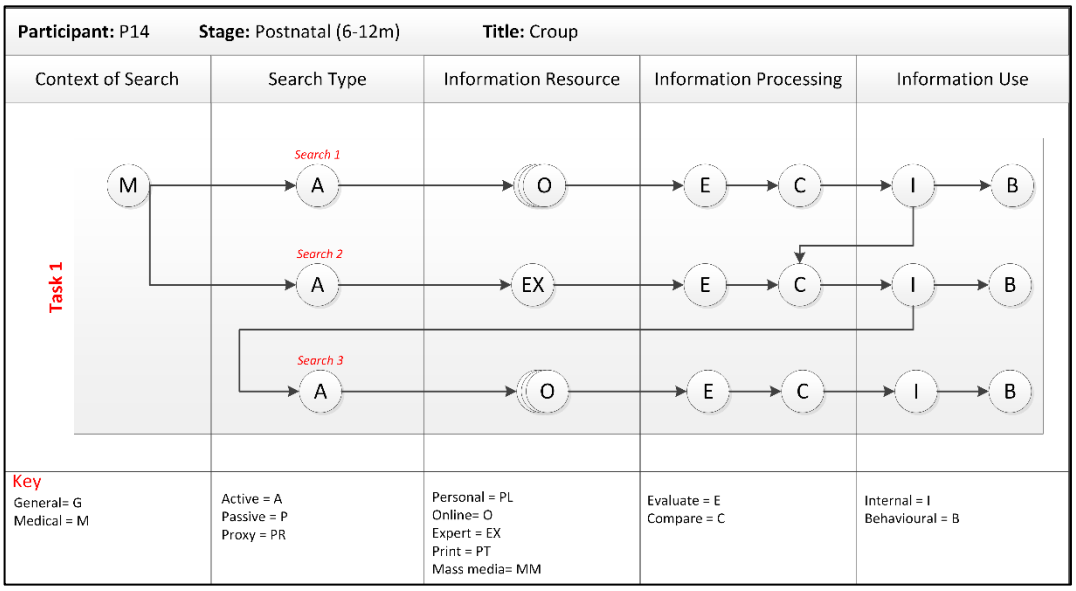


Figure C-28 P14: Croup (Postnatal 6-12m)

The information-seeking episode included one medical task and three active searches. During the episode P14 accessed a combination of expert and online information resources. P14's daughter contracted croup. P14 was unfamiliar with the condition and this is reflected in her information-seeking.

- **Search 1**: P14 used a Google search to determine that her daughter and croup, an illness that she had not heard of before. P14 visited several sites including the NHS, HSE and the net doctor and found the information they provided very helpful. They gave her an idea of what she should look out for, how long it would likely last and the medications that are prescribed. The sites also provided information on how she should manage the condition.
- **Search 2**: When the croup did not go away after a couple of days P14 was worried and decided to take her to the GP. The GP confirmed it was croup and prescribed steroids and gave P14 a prescription for antibiotics to give to the child if her temperature had not gone down in three days. P14 gave the child the steroids but didn't want to give her the antibiotics, she decided to rely on Calpol instead.
- **Search 3**: P14 also decided to search online for any additional tips for that could help the child. On net doctor she found information on using steam.

So brought the child into the bathroom with the steam from the shower and kept placing boiling kettles in her room.

Chicken Pox

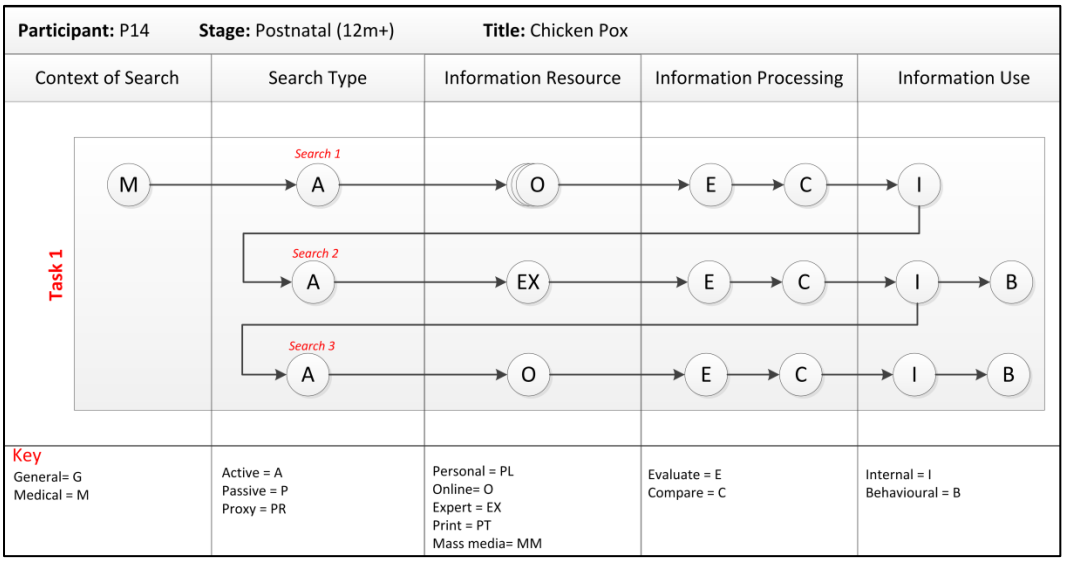


Figure C-29 P14: Chicken Pox (Postnatal 12m+)

The information-seeking episode included one medical task and three active searches. During the episode P14 accessed a combination of expert and online information resources. In this episode P14's daughter had a rash. P14 was convinced it was chicken pox, but she wanted to confirm that she was corrected. Also because her daughter had eczema she wanted advice on how best to treat the condition.

- **Search 1**: P14 did a google image search to check if the rash looked like chicken pox. P14 felt the images matched her daughter's rash.
- **Search 2**: Went to the pharmacist to confirm that the child had chicken pox and to ask their advice. The pharmacist confirmed the child had chicken pox and advised calamine lotion and antihistamines. P14 took the advice on board.
- **Search 3**: P14 asked advice from one of her Facebook groups. They gave similar advice to the pharmacist but also provided other suggestions, some of which she tried, such as putting bread soda into a bath.

Recipe ideas

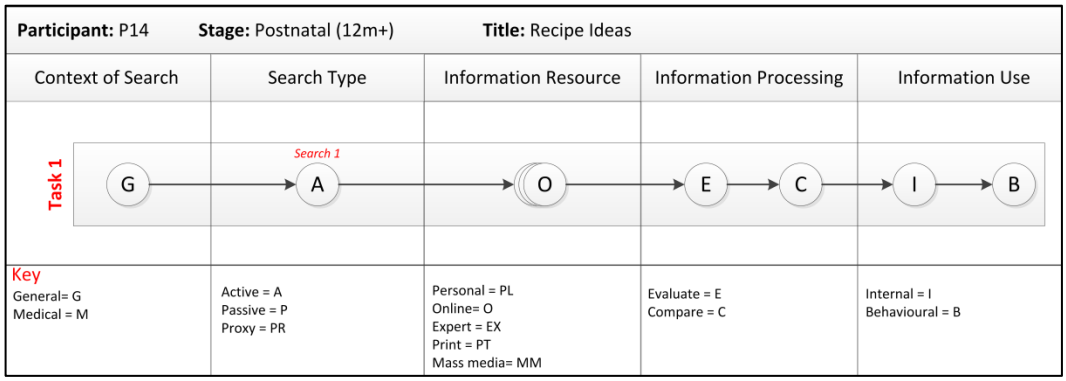


Figure C-30 P14: Recipe Ideas (Postnatal 12m+)

The information-seeking episode included one general task and one active searches. During the episode P14 accessed online information resources. This episode describes P14 investigating recipe ideas.

- **Search 1**: P14 was looking for food ideas for the children. She found that people would sometimes post questions on one of the Facebook forums she was a member of asking for tips. P14 stated that *"lots of people would come back with ideas and different recipes"* (P14). P14 kept an eye on the responses as she found it was a "handy" way to get ideas and she had adopted a number of the ideas.

Rotavirus

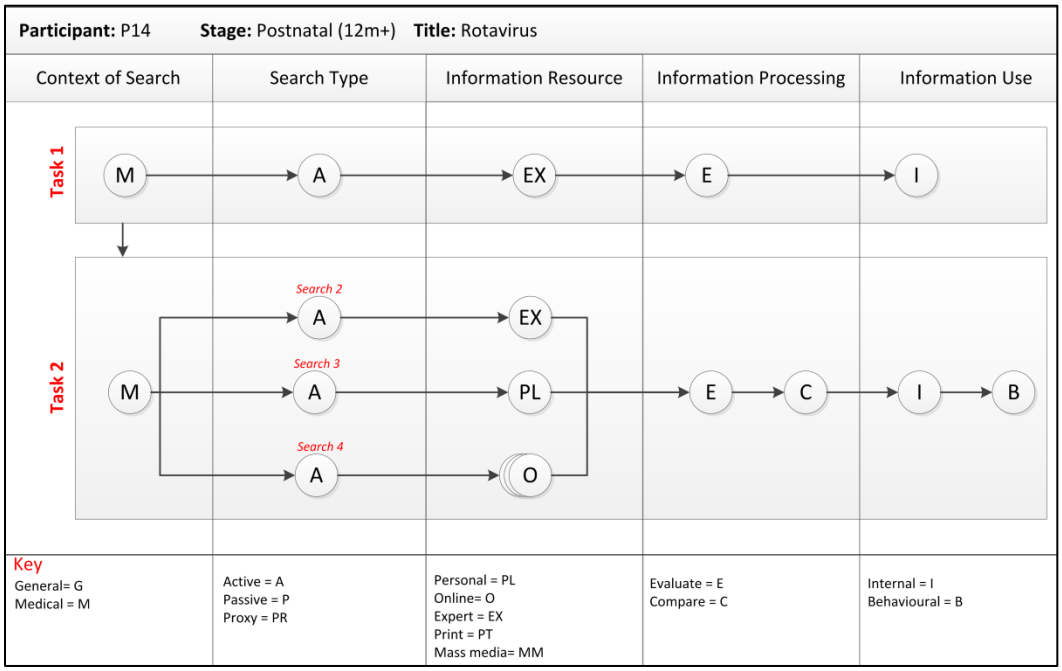


Figure C-31 P14: Rotavirus (Postnatal 12m+)

The information-seeking episode included two medical tasks and three active searches. During the episode P14 accessed online, expert, and personal information resources. This episode describes a time when P14's daughter contracted rotavirus, a severe form of gastroenteritis. P14's daughter had been unwell, but she assumed it was just a stomach bug. This episode details what occurred after her daughter "went limp" and was brought to hospital.

- **Task 1**: The aim of this task was find get a diagnosis for their daughter
    - **Search 1**: P14 had thought her daughter had a tummy bug but when she went limp P14 brought her straight to A&E. The doctor then informed P14 that her daughter had the rotavirus. This was something that P14 had never heard of.
- **Task 2**: To find out information about rotavirus
    - **Search 2, 3 & 4**: While waiting in A&E P14 spoke to the doctors, rang her mother-in-law. Retired midwife and searched online using her phone. All three sources matched in the information they provided on the rotavirus. Including information on how to make the child feel better – give the child surgery drinks.

Participant 18

Protein in Urine

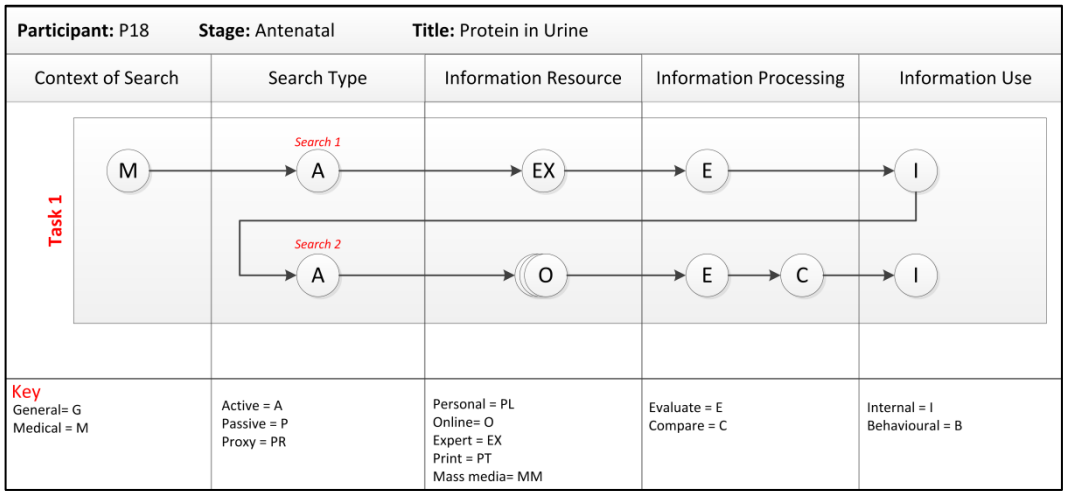


Figure C-32 P18: Protein in Urine (Antenatal)

The information-seeking episode included one medical task and two active searches. P18 accessed a combination of expert and online information resources during the episode. The aim of the task was to discover the cause of P18's pain.

- **Search 1**: P18 first went to hospital to discover the source of her pain. The doctor did tests and found protein in P18's urine. The doctor in the hospital told P18 what was wrong, but P18 did not understand the "*medical terms*" (P18). This led P18 to search online in try and understand what was wrong.
- **Search 2**: For the second search, P18 conducted a Google search. She accessed mainly forums during her search, as they were the most popular website type returned by Google search. P18 stated that she reviewed "*a lot*" of sites until she was satisfied because each one "*had different things to say*" (P18).

Heart Condition

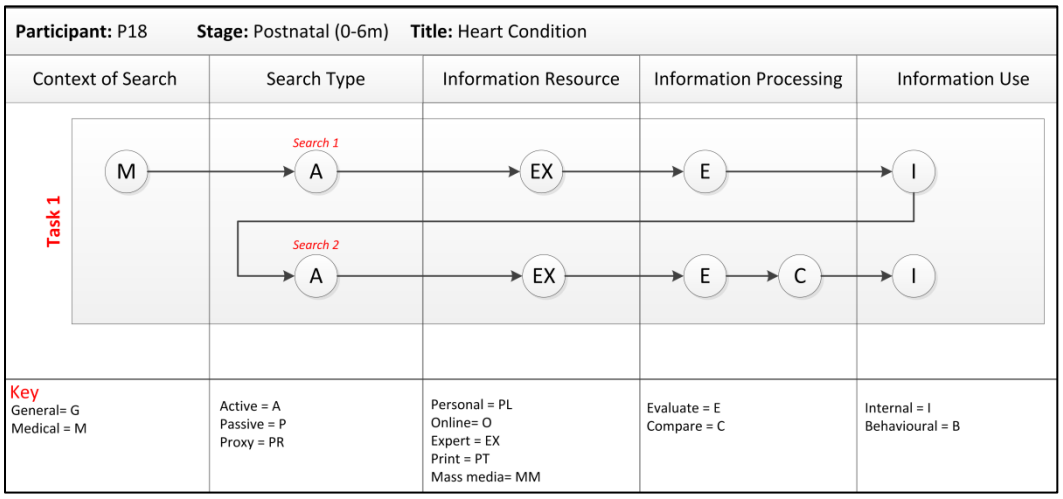


Figure C-33 P18: Heart Condition (Postnatal 0-6m)

The episode contained one medical task and two active searches. P8 consulted only expert information resources during the episode. P18's daughter was born with a hole in her heart. This medical information-seeking details the initial discussion with the doctors over whether her daughter would require surgery to correct the problem. P18 stated that she relied solely on expert resources during this episode because she was tired from having a new baby and had limited time because she returned to work when the child was two weeks old.

- **Search 1**: The first search conducted by P18 was a hospital appointment. P18 stated that the doctors were "*very nice*" (P18), however, she felt they spent too much time explaining "*everything that [could] go wrong before they explained what was actually wrong*" (P18). During the appointment they informed P18 that her daughter would likely need an operation.
- **Search 2**: The second search was a follow-up hospital appointment. During the appointment, P18 and her partner were informed that their daughter would now not require an operation. P18 felt frustrated that she had been put through "*unnecessary stress*" (P18). She would have preferred if the doctors had not told her of the possibility of the operation until they knew either way.

Sun Factor

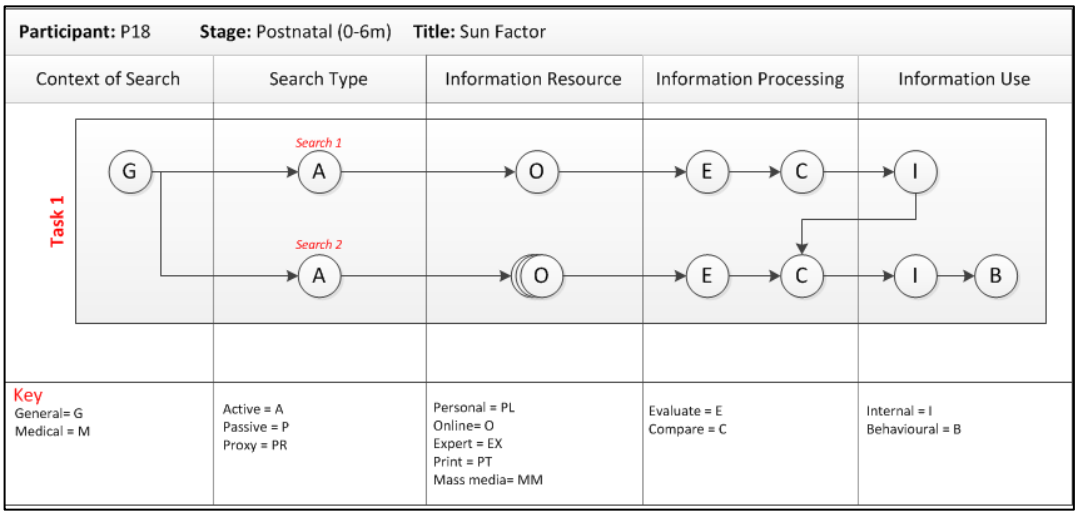


Figure C-34 P18: Sun Factor (Postnatal 0-6m)

The episode contained one general task and two active searches. P8 consulted only online information resources during the episode. P18's was going on holiday and so the aim of the task was to discover the best sun protection factor for babies.

- **Search 1**: For the first search P18 went to the TripAdvisor website and read through the discussions between other parents on the subject.
- **Search 2**: For the second search P18 consulted her Facebook "Mum's Group". Although there were some different opinions, P18 found the discussion useful and was able to find advice that led her to purchase a sun cream.

Vomiting Bug

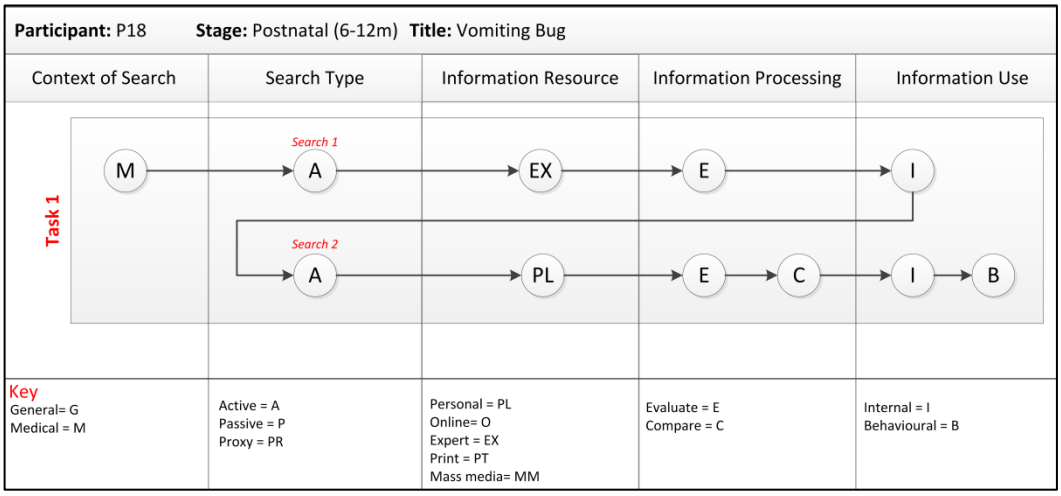


Figure C-35 P18: Vomiting Bug (Postnatal 6-12m)

The episode contained one medical task and two active searches. P8 consulted both expert and personal information resources during the episode. P18's children both got the vomiting bug. The aim of the task was to uncover methods to relieve the symptoms.

- **Search 1**: P18 first went to the GP. The GP confirmed it was the vomiting bug but said that there was nothing to do other than to keep the children hydrated.
- **Search 2**: After the GP confirmed it was the vomiting bug, P18 decided to speak to her mother. Her mother agreed with the GP's advice concerning keeping the children hydrated. P18's mother suggested giving her son Coca Cola to help hydrate him but had no suggestions on how to hydrate her daughter. P18 decided to go with GP's advice of keeping the children hydrated, and incorporated her mother's advice for her older son.

Head Injury

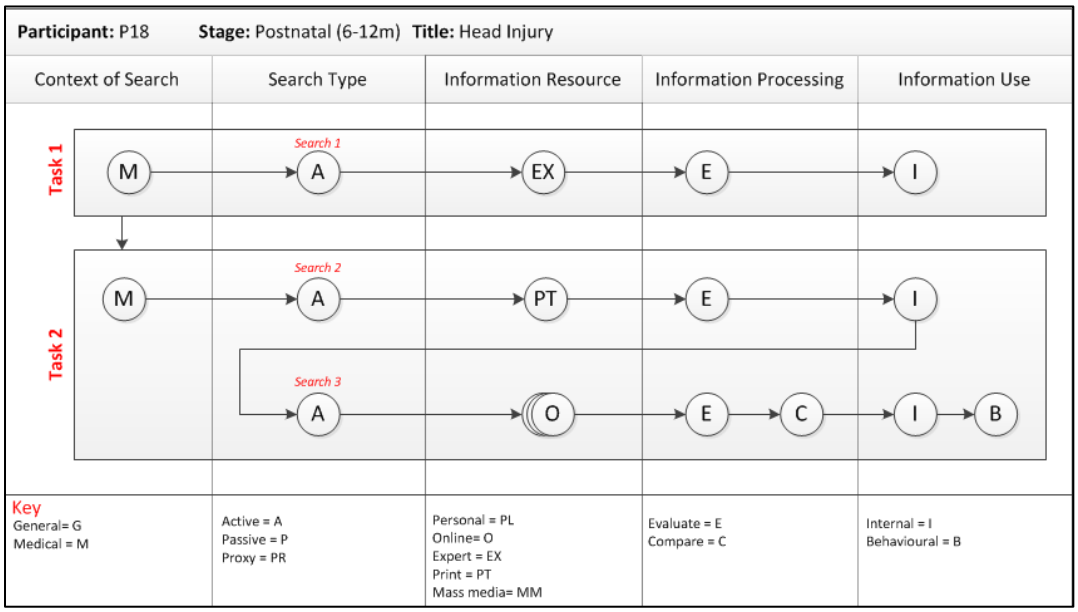


Figure C-36 P18: Head Injury (Postnatal 6-12m)

The episode contains two medical tasks, three active searches and a mix of expert, print and online resources. P18's daughter fell and hit her head just as she was approaching her first birthday. The aim of the first task was to rule out a concussion or something more series.

- **Search 1**: P18 took her daughter to the hospital. This was a stressful experience as P18 found the wait to see the doctor to be long. P18 also stated that she only got to see the doctor for 5 minutes, which did not allow much time to gather information. However, the doctor did use glue to close the cut on the child head and felt she was okay to go home.

The aim of the second task was to investigate how to look after the child immediately after her accident.

- **Search 2**: The hospital had provided P18 with a leaflet with five do's and don'ts. This was the first place that she looked for information. P18 stated that the leaflet was not particularly helpful because it was not very detailed. For example, the leaflet stated not to get the wound wet but did not provide tips on how to keep it dry in the bath/shower.
- **Search 3**: P18 decided to turn to the mothers in her Facebook group for advice. P18 did not find much that they have much information either, although they offered some solutions on how to keep the wound dry. Ultimately, P18 decided to just avoid washing the front of her child's hair for the week, as she was fearful of scaring.

Teething

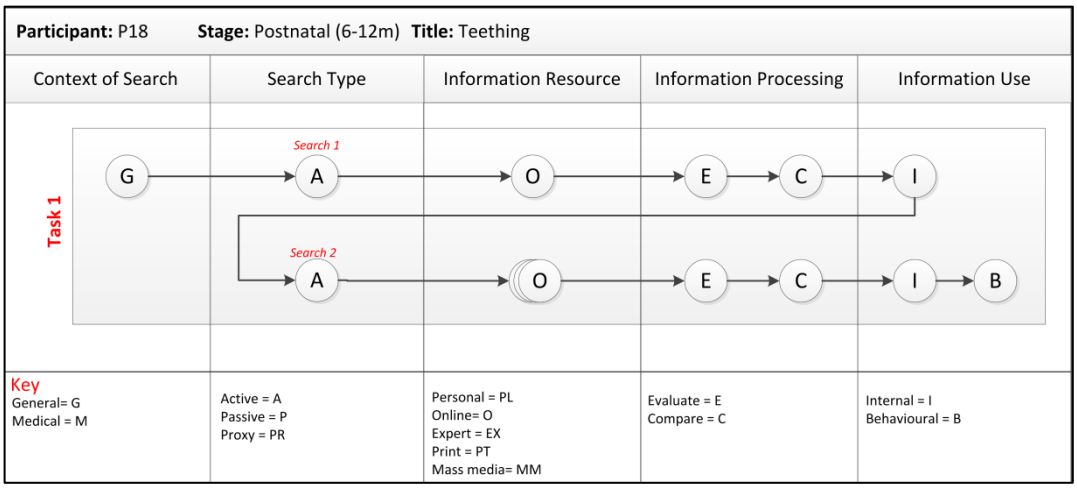


Figure C-37 P18: Teething (Postnatal 6-12m)

The episode contained one genera task and two active searches. P8 consulted only online information resources during the episode. The aim of the task was to find options to making teething easier for her daughter.

- **Search 1**: In the first search, P18 discussed teething with the other mothers in her Facebook group. During the discussion a soothing gel for the child's gums was suggested, Calgel. P18 had tried this previously with her older son but had not found it helpful. However, she was informed during the discussion that it was now more effective due to a new ingredient.
- **Search 2**: As Calgel was not available in the Republic of Ireland, P18 did a Google search to try and find an alternative method of procuring the product. P18 found a pharmacy online where she could order the product and decided to purchase it.

Swine Flu

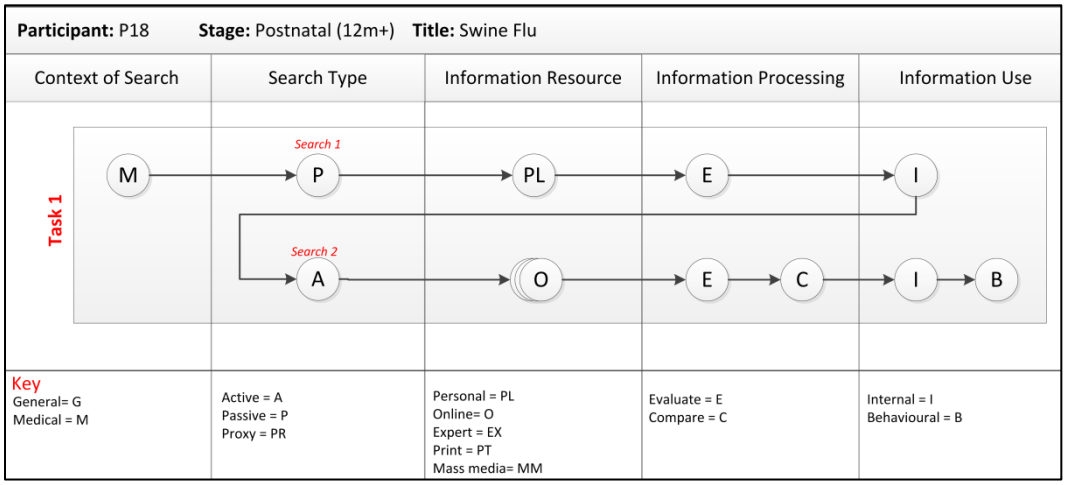


Figure C-38 P18: Swine Flu (Postnatal 12m+)

The episode contained one medical task, a passive and active, and a mix of personal and online information resources.P18's daughter was more susceptible to infection because of the hole in her heart. This made P18 more cautious when her daughter was ill and also led her to try and keep her daughter away from sick people. During the course of a conversation with a friend P18 discover that her daughter had accidently been exposed to somebody who had swine flu. The aim of the task was to investigate the signs and symptoms of swine flu.

- **Search 1**: The first search was a passive search. P18's friend informed P18 that that the friends mother had swine flu. This was a concern for P18 as her daughter had recently been in contact with both women. P18 was also informed that there were 36 people in Cork with swine flu.

- **Search 2**: The second search involves P18 searching online to find the symptoms of swine flu so she would know if her daughter started to develop them. P18 stated that she relied on the "*doctor kind of sites*" (P18) as she perceived them to be more accurate. P18 found a site that she found particularly useful as it provided a list of facts, things she could watch out for.

Appetite

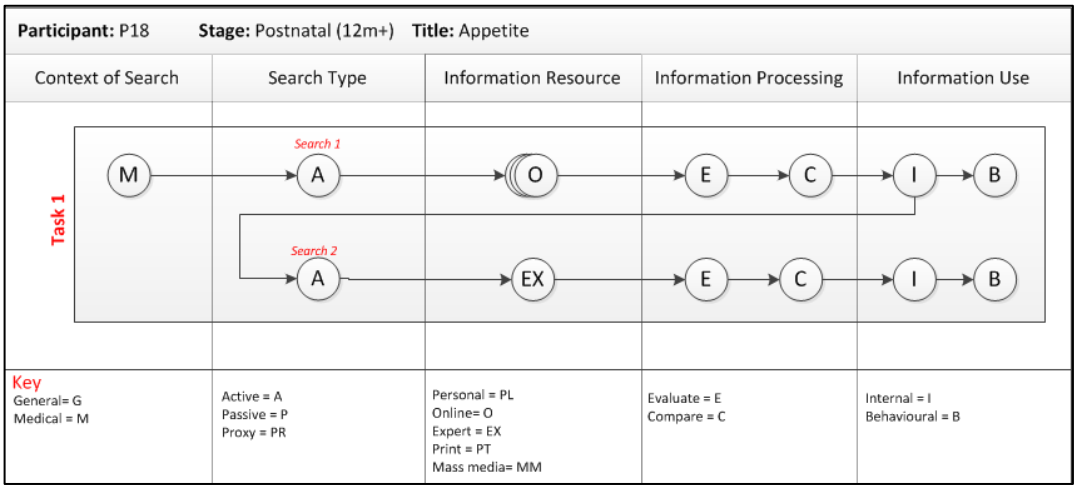


Figure C-39 P18: Appetite (Postnatal 12m+)

The episode contained one medical task, two active searches and mix of online and expert sources. P18's daughter had picked up several viruses, such as the vomiting bug. As a result both her appetite and energy levels were low. The aim of the task was to find ways to improve her daughter's energy levels and appetite.

- **Search 1**: The first search involved P18 consulting the other mothers in her Facebook group. P18 stated that they were very helpful. She received tips on what fruits were best for giving energy. She was also provided an advice on a product that was available in pharmacies that could help improve her daughter's appetite. P18 took the advice on the fruit and decide to consult with a pharmacist on the other product.
- **Search 2**: The second search involves P18 discussing her daughter with a pharmacist. P18 mentioned the product and the pharmacist stated that it would be a good idea, and that it would also improve her immune system. P18 decided to purchase it.

Grommets

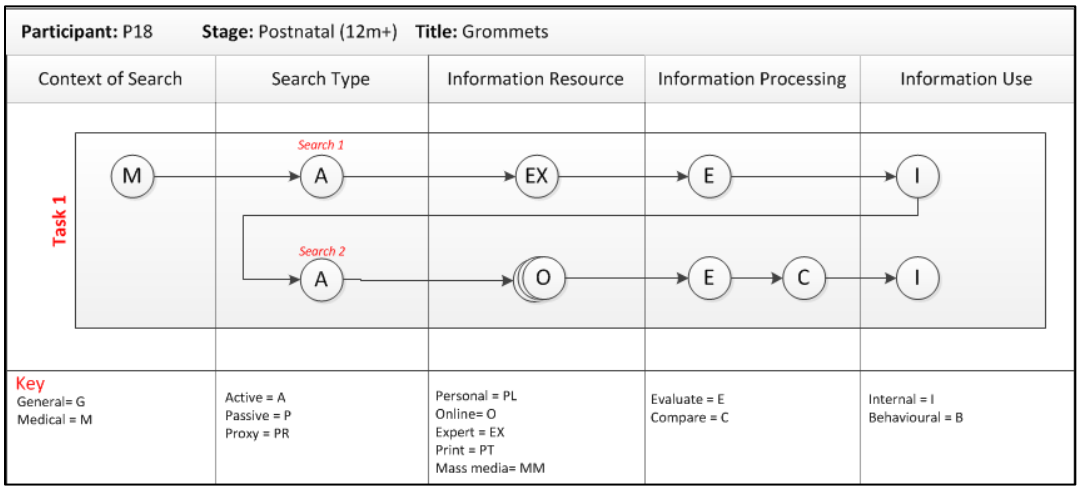


Figure C-40 P18: Grommets (Postnatal 12m+)

The episode involved one medical task, two actives searches and a combination of expert and online resources. P18's daughter was having problems with her ears; her daughter had suffered from a number of ear infections which were affecting her eardrums. The aim of the task was to discover a solution to her daughter's problems.

- **Search 1**: The first search involved P18 visiting the GP. The GP informed P18 that her daughters eardrums may be bleeding and that she might require Grommets if the problems continued.
- **Search 2**: P18 felt that the GP "*wasn't giving [her] the full information*" (P18), she felt "*in a panic*" (P18). P18 turned to her Facebook group for advice. She found the mothers in the group to be reassuring because they could speak from personal experience. She also valued that they spoke in terms that she could understand, instead of using "*big medical terms that you have to google and you're not sure you heard it right or if you're spelling it right"* (P18).

Appendix: D - Subjective Assessment Criteria

Information Resource Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Credibility	*X*					*"My sister gave me great advice, she just had a baby now. So we're always swapping stories and exchanging advice between us. My mother is great too. "*
		X	*X*			*"When I look for information, I go online, I ask my sister and I talk to friends. But if it was a medical problem I would ring the doctor, I wouldn't go online. My doctor is great."*

Table D-1 P1: Information Resource Subjective Assessment Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Convenience			*X*	*X*		*"It was handier to get the book than the laptop when the book was here. I just looked it up quickly."*
			X			*"No it just comes to my phone and if I am on the toilet I can read it. So if I only had it on my laptop and my box was full of newsletters then it might be a nuisance but is comes to my phone so it is very handy."*
			X			*"Babycentre is so easy for me and I know it so I just go there."*
Credibility	*X*					*"Well my sister-in-law is a midwife and she has two kids herself so she's a great source"*
	X					*"My sister in-law was the most useful. She had breastfed and she is a midwife"*
	X					*"I would say I am probably talking to friends more. You know because now it is about feeding and what they are eating and what should they be eating. Your friends would have kids and they would have been feeding their kids."*
Format			*X*			*"Babycentre is quite good because they have all the pictures and everything for you so you can kind of figure out yourself anyway."*
Perceived utility			*X*			*"There are nurses in the Facebook group as well and sometimes if a mum puts up a pic of an ant bite or something and there would be a nurse or doctor on that site who would say "that's that" and that would be handy. If something happens later on you can recognise what it is if something did happen to her just because of the experiences."*

Table D-2 P7: Information Resource Subjective Assessment Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Convenience			*X*	*X*		*"I used to get books on everything, but it is just easier to go directly online, rather than to read a whole book."*
Credibility	*X*					*"Most of the time I trust my sister most, because she has had three children and she is my sister. Oh, and she is a brilliant nurse as well, so. Plus her husband is a GP**. "***
		X	*X*			*"If it was something that I was worried about I wouldn't go to a forum, I wouldn't take strangers words over a doctor you know. Because that is all they are really, you don't know who is sitting behind the computers."*
			X			*"I try to find articles that have been featured in medical journals and things like that, rather than some stay at home Mom who is just blogging about something, you know. But I wouldn't be that selective, I wouldn't go out of my way to look for something, but I would check the source"*
	X	*X*				*"I tend to trust my sister a lot more than doctors. She is very critical about things she reads and very up to date. I would be ringing her and saying to her 'the doctor says I have this, what do you think?'"*
	X		*X*			*"I think since I became a mum I trust other mums more than I would online pages if that makes sense. They have the experience."*
	X	*X*				*"I figure that if a mum who is still breastfeeding her child who is three years old if she is telling me something then I am going to go more with her advice than my male GP whose wife breastfed for five months"*
		X				*"I trust my GP when it comes to illnesses and things like that but breastfeeding advice not so much, and parenting – No."*
	X					*"My sister is nurse so she has another medical point of view, he needs iron and he needs this and that. I say that he is getting all that from my breast milk and she says that starts to decline at six months, but the milk changes it composition as the baby grows. Because she weaned at eight months she doesn't have that information."*
	X					"I would check the information, because I know she would be influenced by friends and family who haven't breastfed. It is not because I don't trust her but because I don't trust people who advise her."
			X			*"It is medical based and science based research and facts. So it just the latest facts and it is very accurate and I would trust that. I think it's a blog actually. I would 150% trust that more than I would trust a doctor in a hospital."*
Format			*X*			*"It might be a bit judgemental, but it also depends on what the site looks like as well. How it is formatted. If it is clean looking. Do you know? If it is very messy looking I will just move on."*
Usability						*"The site would have to be structured and organised and easy to find. "*
						"The overall design and the layout. It is very easy to navigate."

Table D-3 P12: Information Resource Subjective Assessment Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Credibility			*X*			"It would be more governmental sites that I trust more so than any other ones"
	X					"If their parenting style matched mine I would be inclined to trust the information more. As opposed to somebody who bottle-fed their baby or put them on solids before they were ready"
			X			"When you are on a forum you don't put in your real name, you have a nickname or a pseudonym whereas on Facebook they are using like Wendy English or Aideen Ni Ghallachoir. You feel it's okay, that they are a real person"
		X				"I feel as though doctors are more qualified and dealing with a broader spectrum of children and I suppose they are just more medically trained… Whereas I find some of the public health nurses can be quite dismissive and they are giving you advice but I don't know if they are giving you advice based on their own personal experience or if it is based on medical advice."
Perceived utility			*X*			"My newsfeed would automatically come up and I would read it and if anything is of interest to me I will read through the advice and the information that the other people have given….. That's the kind of thing which I find really useful so I suppose you feel more of a connection than you do with the Babycentre ones that I used to use before."

Table D-4 P14: Information Resource Subjective Assessment Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Convenience			*X*			"I think because I'm already signed up to Facebook. If you go on the forums you have to sign up and answer questions from e-mails. It takes twenty minutes before you can even write something. So it would take too long if something was in your head and you wanted to say it."
			X			"I always just use google because it's easier, it's on my phone"
Credibility		*X*				*"My doctor is a woman and she is a mum herself so I find her very good."*
				X		*"I don't trust the books anymore; no two children are the same."*
		X				*"The public health nurse didn't have children either which annoyed me. That is my first my question, because if they are a mother, I think fair enough they know."*
		X				*"I don't normally trust the doctor. I trust someone who has been there and done that, whereas doctors are reading from text books and they are not always right."*
		X				*"I am very lucky with my doctor he specialised in paediatrics so he's very good with the kids and he knows what he is talking about."*
			X			*"I go to the Mummy Pages because there are two new midwifes after joining and they're very good. They are very helpful especially for the pregnant ladies. They have been there, they're mammies themselves.*
Format			*X*			"We went for the doctor kind of sites; they looked more professional and seemed more accurate."
Rank on Search List			*X*			"Two pages, I wouldn't go further than two pages on Google"
			X			"I would look at the top ones on the search list. I mainly go to the top three and if they are unhelpful I would go down. They say the best ones are the top three don't they?"

Table D-5 P18: Information Resource Subjective Assessment Criteria

	Over 35			**Under 35**					
	First-Time	Has Children		First-Time			Has Children		
	P8	P1	P10	P4	P7	P12	P5	P14	P18
Convenience	4		3	1	3	1	1		2
Credibility	5	2	5	4	3	10	4	4	6
Format	1			3	1	1	4		1
Perceived utility				1	1			1	
Rank on Search List			1	1			2		2
Security				1					
Usability			1	1		2	1		

Table D-6 Count of Information Resource Subjective assessment Criteria Quotes by Participant

Information Content Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Complete		*X*				*"Oh every sort of information on any concern that you have and every query you have the midwife has an answer. She's great as a back-up system."*
Currency				*X*		*"With a lot of books it's a long time since they were published. But it does matter, because it is nice to have the new updated information."*
			X			*"Well you know, a lot of the stuff on the internet is very up to date, it is all very new. Whereas books you could be going back at least ten years, easily. With the internet, rollercoaster is another website there and sure that is a lot of information on that and it is all very new."*
Relevance	*X*					*"I take a lot of stuff with a pinch of salt. You can't take everything people say as gospel. They are bad stories half the time. You just take the information you need and be positive about things, don't dwell on things."*
Reliability			*X*			*"I suppose, sometimes I just put stuff into Google. Whatever would come up I would browse through it. But I would nearly just go for the same sources because they have been reliable sources for me"*
	X					*"I would find reliable sources through talking to people, you know, people I trust"*

Table D-7 P1: Information Content Subjective Assessment Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Complete			*X*			*"The websites I found for the local mother and baby groups didn't have much information other than where the groups met and at what time. I just wanted something I would be interested in. I wouldn't go to a group where people are with their friends. I would rather go to a group where there is information."*
Concise			*X*			*"If it is handed to me all neatly on one page I would like it but if I had five or ten pages to read through probably not."*

Table D-8 P7: Information Content Subjective Assessment Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Complete		*X*				"The midwife definitely gives me more information than the hospital ever did. Whether she is for or against she will tell me both and lets me decide then. It makes me trust her more, because I know if she is against it she will still tell me."
			X			"Sometimes I will just look at basic information and not go into the detail, because it will make me worry"
Currency			*X*			*"I would look at more recent information. I know there were a few articles on the safe co-sleeping that were written in like 2000, and I just kinda disregarded them. I skimmed through them but I didn't really look at them much. I try to look for more recent research."*
Freedom from Bias			*X*			"This website Kelly mom, it's fantastic. It's a mum and lactation consultant. She has her own website and she has gathered everything there is to know about breastfeeding. It's all in there and it's very objective. She is not sponsored by anyone."
			X			"There is one website here in Ireland call Mumslikeus.ie and it's about breast feeding and it says 'We're here to support women breastfeeding and then it's sponsored by Cow and Gate or SMA or something so you wonder how supportive they would be. They probably want to you breastfeed for four months and then go onto formula. I haven't read anything on it. I saw the sponsor's logo and I went straight off it".
			X			"I think it has a hidden agenda because it sponsored by formula companies. They want to make money and they won't make money from mums' breastfeeding so they give out poor advice. So some people supplement with formula".
Relevance			*X*			"The American apps would give you different information because they have different practices; for example they tell you, you don't need to bring anything to the hospital because your insurance covers everything but here you have to bring everything. "
	X					"I think I listen a bit more to my friends and family now because when I was pregnant they were all against what I was doing, my whole natural approach to everything with the home birth plans and all that. I was on a different on a wave length. But now that he is here I am pretty much like everyone else. So we tend to have more in common again and we are able to talk more calmly without shouting."

Table D-9 P12: Information Content Subjective Assessment Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Complete			*X*			"It is too general and they lump together say weeks twenty four to twenty eight"
			X			"The American sites don't provide as much detail in the medical information. They are more based on emotions and use more emotive language rather that explaining why something is happening or what you should do."
Concise			*X*			*"There is about two or three websites that I would go to quite regularly because they give you the facts. They tell you what you want to know and there is no kind of emotion and emotive language attached to it. They are just factual and to the point and give you the information that you want."*
Currency			*X*			*"I don't check how old online information is. I suppose I should do really but I think when you are typing something quite general into Google (maybe I'm wrong) that it gives you the newest information first."*
Relevance			*X*			"It is easy to find information; the difficultly is scrolling through to find what is relevant to you. If you put into Google "Placenta Previa" all these different things come up and you are trying to whittle it down and narrow it down. There is just so much there and you are trying to tailor it to fit your pregnancy and what you are going through at that time."
			X			"Information online is just too general; it gives you the whole set of scenarios. It is not specific to me and my needs."
			X			"I have been to my GP a few times with her bowel issues and with her croup. They gave me information as much as they can I suppose. But then I put questions on the extended breastfeeding group on Facebook asking other mums their opinions on what to do or what their experience was with chronic constipation and got different advice back. I found it a lot more useful and a lot more relevant to my situation."
			X			"I haven't been using the app as often either. I find that it is a bit shallower. When I was pregnant it was very interesting but now I find it is almost like it is searching for information to give you but it doesn't really apply. "
Use of Language			*X*			"They are American ones and just the language and the tone they use is kind of condescending I feel anyway. I don't go onto those websites anymore because they just irritate me."

Table D-10 P14: Information Content Subjective Assessment Criteria

Criteria	Information Resource					Illustrative Quote
	PL	EX	O	PT	MM	
Currency			*X*			"Some of the sites are really dated; some of them go back to 2005/2004, so I go for the latest if possible."
			X			"A lot of the stuff I find online dates back to 2009, so it is outdated."
Relevance			*X*			*"I flick through different webpages to see which is more relevant."*
			X			*"I am still on the Facebook group, the Mum's page and we still help each other. All our kids are the same age, so we are going through the same things, so it is handy."*
			X			*"I found EuMom brilliant and the Facegroup moms group, I think teething is very personal and every child is different. I don't think you can listen to the medical sites because they are telling you every child is the same and they are not."*
Use of Language		*X*	*X*			"I had protein in my urine and the doctor was saying this is wrong and that is wrong. So I Googled it to so that I would understand it, to make it understandable for me. I wouldn't know the medical terms. So I would have to go looking."
			X			"American sites are very different. Half the time I don't even know what they are saying. They have different terminology."
			X			"I just find the mothers on the Facebook group more down to earth than the doctors. They will just explain it in a way that you can understand rather than being told things in big medical terms that you have to Google and you're not sure you heard it right or if you're spelling it right."

Table D-11 P18: Information Content Subjective Assessment Criteria

	Over 35			Under 35					
	First-Time	Has Children		First-Time			Has Children		
	P8	P1	P10	P4	P7	P12	P5	P14	P18
Complete	2	1	1	1	1	2	5	2	
Concise					1			1	
Currency		2	3	5		1	2	1	2
Freedom from Bias	1					3			
References	2								
Relevance	2	1	1	4		2	4	4	3
Reliability	2	2					1		
Use of Language	3		2			1		1	3

Table D-12 Count of Information Subjective assessment Criteria Comments by Participant

Appendix: E - Coding of Information Use Outcomes

Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking			
A2	Cognitive use resulting in behaviour change	Homebirth	1	1
		Weaning	1	2
A3	Cognitive use resulting in positive affect	Postnatal Support	1	1
		Breastfeeding	1	1
A4	Cognitive use resulting in negative affect	Weaning	1	1
A5	Negative affective resulting in behaviour change			
A6	Positive affect resulting in behaviour change			
A7	Positive affect resulting in information-seeking			
A8	Negative affect resulting in information-seeking	Weaning	1	1
A9	Behavioural change resulting in cognitive use			

Table E-1 P1: Information Use

Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking	Flu Vaccine	1	1
A2	Cognitive use resulting in behaviour change	Trouble Sleeping	1	1,2
		Diet during Pregnancy	1	1,2
		Flu Vaccine	1	2
		Rash	1	4
		Fever	1	3
		Weaning	1	2
		Sunken Frenulum	1	1
A3	Cognitive use resulting in positive affect	Rash	1	2
		Breastfeeding	1	4
		Signs of a Concussion	1	1
A4	Cognitive use resulting in negative affect			
A5	Negative affective resulting in behaviour change			
A6	Positive affect resulting in behaviour change	Rash	1	4
		Breastfeeding	1	4
A7	Positive affect resulting in information-seeking			
A8	Negative affect resulting in information-seeking			
A9	Behavioural change resulting in cognitive use			

Table E-2 P7: Information Use

Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking	Flu Vaccine	1	1
		SPD	1	1
		Tongue Tie	1	2
		Tongue Tie	1	3,4
		Weaning	1	1
A2	Cognitive use resulting in behaviour change	Migraine	1	1
		Migraine	1	3
		SPD	1	1
		Salmonella	1	3
		Tongue Tie	1	5
		Weaning	1	2
		Teething	1	1,2,3
A3	Cognitive use resulting in positive affect	Braxton Hicks	1	1
		Flu Vaccine	1	2
		Calpol Reaction	1	1
A4	Cognitive use resulting in negative affect	Migraine	1	2
		Salmonella	1	1
		Salmonella	1	2
		Weaning	1	3
A5	Negative affective resulting in behaviour change	Weaning	1	3
A6	Positive affect resulting in behaviour change	Braxton Hicks	1	1
		Flu Vaccine	1	2
A7	Positive affect resulting in information-seeking			
A8	Negative affect resulting in information-seeking	Migraine	1	2
		Salmonella	1	1
		Salmonella	1	2
A9	Behavioural change resulting in cognitive use	Flu Vaccine	1	2
		SPD	1	1

Table E-3 P12: Information Use

Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking	Placenta Praevia	1	1
		Pelvic Pain – SPD	1	1
		Baby Slings	1	1
		Baby Slings	1	2
		Croup	1	1
		Croup	1	2
		Chicken Pox	1	2
A2	Cognitive use resulting in behaviour change	Pelvic Pain – SPD	1	1
		Pelvic Pain – SPD	1	2
		Baby Slings	1	1
		Baby Slings	1	3
		Weaning	1	1
		Weaning	1	2
		Croup	1	2
		Croup	1	3
		Chicken Pox	1	2
		Chicken Pox	1	3
		Recipe Ideas	1	1
		Rotavirus	1	2, 3 & 4
A3	Cognitive use resulting in positive affect	Placenta Praevia	1	3
		Chicken Pox	1	1
A4	Cognitive use resulting in negative affect	Placenta Praevia	1	2
		Pelvic Pain – SPD	1	3
		Weaning	1	1
		Rotavirus	1	1
A5	Negative affective resulting in behaviour change			
A6	Positive affect resulting in behaviour change			
A7	Positive affect resulting in information-seeking	Chicken Pox	1	1
A8	Negative affect resulting in information-seeking	Weaning	1	1
		Rotavirus	1	1
A9	Behavioural change resulting in cognitive use	Weaning	1	1

Table E-4 P14: Information Use

Code	Description	Episode	Task Num	Search Num
A1	Cognitive use resulting in information-seeking	Vomiting Bug	1	1
		Head Injury	2	2
		Teething	1	1
		Appetite	1	1
A2	Cognitive use resulting in behaviour change	Vomiting Bug	1	2
		Sun Factor	1	1,2
		Head Injury	2	2,3
		Teething	1	1,2
		Swine Flu	1	2
		Appetite	1	1
		Appetite	1	2
A3	Cognitive use resulting in positive affect	Protein in Urine	1	2
		Grommets	1	2
A4	Cognitive use resulting in negative affect	Protein in Urine	1	1
		Heart Condition	1	1
		Heart Condition	1	2
		Head Injury	1	1
		Swine Flu	1	1
		Grommets	1	1
A5	Negative affective resulting in behaviour change			
A6	Positive affect resulting in behaviour change			
A7	Positive affect resulting in information-seeking			
A8	Negative affect resulting in information-seeking	Protein in Urine	1	1
		Heart Condition	1	1
		Head Injury	1	1
		Swine Flu	1	1
		Grommets	1	1
A9	Behavioural change resulting in cognitive use			

Table E-5 P18: Information Use

Code		Over 35			Under 35					
		First-Time	Has Children		First-Time			Has Children		
Number	*Name*	P8	P1	P10	P4	P7	P12	P5	P14	P18
A1	Cognitive use resulting in information-seeking	17	0	5	12	1	5	12	7	4
A2	Cognitive use resulting in behaviour change	10	2	9	18	7	7	14	12	7
A3	Cognitive use resulting in positive affect	9	2	10	9	3	3	6	2	2
A4	Cognitive use resulting in negative affect	8	1	6	5	0	4	7	4	6
A5	Negative affective resulting in behaviour change	4	0	1	1	0	1	1	0	0
A6	Positive affect resulting in behaviour change	4	0	4	3	2	2	1	0	0
A7	Positive affect resulting in information-seeking	3	0	1	3	0	1	2	1	0
A8	Negative affect resulting in information-seeking	5	1	3	3	0	3	5	2	5
A9	Behavioural change cognitive use	3	0	3	4	0	2	1	1	0

Table E-6 Count of Information use outcomes by Participant

Appendix: F - Coding of Information-Seeking Episodes

General Information-Seeking

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Baby Movement	A			x			Developmental Information
Development	A			x			Developmental Information
Preparing Siblings for new arrival	A	x		x			Parenting strategies
Sourcing a pool	A		x				Researching products prior to purchase
Childminding	P(0-6m)	x					Childcare & Education
Developmental Stages	P(0-6m)	x		x	x		Developmental Information
Breastfeeding	P(0-6m)	x	x				Diet and Exercise (Baby)
Weaning on to Bottles	P(0-6m)			x			Diet and Exercise (Baby)
Weaning on to Solids	P(0-6m)			x			Diet and Exercise (Baby)
Slings and baby carriers	P(0-6m)			x			Researching products prior to purchase

Table F-1 P1: Summary of General Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Baby Development	A			x	x		Developmental Information
Exercise During Pregnancy	A				x		Diet and Exercise (Mother)
Diet in Pregnancy	A			x			Diet and Exercise (Mother)
Hospital Bag	A	x		x			Pregnancy & labour prep
Newborns	A	x					Pregnancy & labour prep
Baby baths	A	x		x			Researching products prior to purchase
Car seats	A		x	x			Researching products prior to purchase
Maternity Clothes	A			x			Researching products prior to purchase
Nursery designs	A			x			Researching products prior to purchase
Travel Systems	A	x	x	x			Researching products prior to purchase
Developmental Stages	P(0-6m)			x	x		Developmental Information
Breastmilk coming in	P(0-6m)	x	x	x			Diet and Exercise (Baby)
Weaning	P(0-6m)	x	x	x	x		Diet and Exercise (Baby)
Activities	P(0-6m)			x			Parenting strategies
Feeding and Sleeping Routines	P(0-6m)		x	x	x		Parenting strategies
Baby Clothes	P(0-6m)			x			Researching products prior to purchase
Toys	P(0-6m)			x			Researching products prior to purchase
White Noise Apps	P(0-6m)			x			Researching products prior to purchase
Developmental Stages	P(6-12m)				x		Developmental Information
Snacks for Crèche	P(6-12m)			x			Diet and Exercise (Baby)
Weaning	P(6-12m)			x	x		Diet and Exercise (Baby)
Sleep	P(6-12m)	x		x	x		Parenting strategies
Baby Clothes	P(6-12m)			x			Researching products prior to purchase
Birthday decorations	P(6-12m)			x			Researching products prior to purchase
Nursery designs	P(6-12m)			x			Researching products prior to purchase
Toddler Books	P(12m+)	x					Researching products prior to purchase
Walking reins	P(12m+)			x			Researching products prior to purchase
Developmental Stages	P(12m+)			x	x		Developmental Information

Table F-2 P4: Summary of General Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Baby's Development	A			x	x		Developmental Information
Kicking Patterns	A				x		Developmental Information
Diet in pregnancy	A			x			Diet and Exercise (Mother)
Importance of Iron in diet	A			x			Diet and Exercise (Mother)
Double Strollers	A	x		x			Researching products prior to purchase
Baby Development	P(0-6m)				x		Developmental Information
Weaning 1	P(0-6m)	x			x		Diet and Exercise (Baby)
Mobile Bottle Warmer	P(0-6m)			x			Researching products prior to purchase
Preparing for Crèche	P(6-12m)			x			Childcare & Education
Baby Development	P(6-12m)				x		Developmental Information
teething	P(6-12m)	x	x	x			Developmental Information
Weaning 2	P(6-12m)	x	x	x	x		Diet and Exercise (Baby)
Siblings Sharing Room	P(6-12m)			x	x		Parenting strategies
Birthday Presents	P(6-12m)			x			Researching products prior to purchase
Baby Development	P(12m+)				x		Developmental Information
Food and balanced diet	P(12m+)			x			Diet and Exercise (Baby)
Weaning 3	P(12m+)	x		x			Diet and Exercise (Baby)
Age appropriate toys	P(12m+)			x			Researching products prior to purchase

Table F-3 P5: Summary of General Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Can I eat hollandaise	A	x		x			Diet and Exercise (Mother)
What should I be eating during pregnancy?	A			x	x		Diet and Exercise (Mother)
Eye colour	P(0-6m)			x			Developmental Information
Milestones	P(0-6m)				x		Developmental Information
Teething	P(0-6m)			x	x		Developmental Information
Teething	P(0-6m)				x		Developmental Information
Breastfeeding	P(0-6m)	x		x	x		Diet and Exercise (Baby)
Breastfeeding	P(0-6m)	x					Diet and Exercise (Baby)
Breastfeeding and impact on sleep habits	P(0-6m)	x					Diet and Exercise (Baby)
How often should I feeding the baby	P(0-6m)		x				Diet and Exercise (Baby)
Making own baby food	P(0-6m)				x		Diet and Exercise (Baby)
Weaning	P(0-6m)	x	x		x		Diet and Exercise (Baby)
What should my child's poo look like	P(0-6m)			x	x		Diet and Exercise (Baby)
When to introduce water/juice	P(0-6m)				x		Diet and Exercise (Baby)
Is it okay to have a glass of wine while breastfeeding	P(0-6m)		x	x			Diet and Exercise (Mother)
Books to read to child	P(0-6m)		x				Parenting strategies
Can child go into a swimming pool	P(0-6m)		x				Parenting strategies
How many hours should the child be sleeping	P(0-6m)			x			Parenting strategies
Is it okay for the child to fly	P(0-6m)	x		x			Parenting strategies
When is it okay for the child to come in contact with a dog	P(0-6m)		x				Parenting strategies
Leg length	P(6-12m)	x		x	x		Developmental Information
Milestones	P(6-12m)				x		Developmental Information
Sleeping Pattern	P(6-12m)	x		x			Developmental Information
Teething	P(6-12m)	x					Developmental Information
What to expect after 6 months	P(6-12m)	x					Developmental Information
Best yogurt for age group	P(6-12m)	x					Diet and Exercise (Baby)
Can she drink cow's milk	P(6-12m)	x		x			Diet and Exercise (Baby)
Follow on milk	P(6-12m)	x					Diet and Exercise (Baby)
Formula or cow's milk on cereal	P(6-12m)	x			x		Diet and Exercise (Baby)
How much should she be eating	P(6-12m)	x			x		Diet and Exercise (Baby)
Introducing formula	P(6-12m)	x					Diet and Exercise (Baby)
Introduction to solid food	P(6-12m)				x		Diet and Exercise (Baby)
Signs ready for solid food	P(6-12m)				x		Diet and Exercise (Baby)
Weaning	P(6-12m)	x					Diet and Exercise (Baby)
What to introduce dairy	P(6-12m)	x					Diet and Exercise (Baby)
When can child eat chocolate	P(6-12m)	x					Diet and Exercise (Baby)
When can child have tea	P(6-12m)			x			Diet and Exercise (Baby)
When can she drink tap water	P(6-12m)			x			Diet and Exercise (Baby)
Which formula to use	P(6-12m)	x					Diet and Exercise (Baby)
Baby exercise	P(6-12m)			x			Parenting strategies
Best games to play with 9month old	P(6-12m)			x			Parenting strategies
Baby Shoes	P(6-12m)	x		x			Researching products prior to purchase
Educational toys	P(6-12m)	x		x	x		Researching products prior to purchase
When should child start wearing shoes?	P(6-12m)	x	x	x			Researching products prior to purchase
Local schools	P(12m+)			x			Childcare & Education
Mammy and toddler groups	P(12m+)			x			Childcare & Education
Average age for babies to start walking	P(12m+)	x		x			Developmental Information
Milestones	P(12m+)			x			Developmental Information
Sleeping Habits	P(12m+)			x			Developmental Information
Age appropriate games	P(12m+)			x			Parenting strategies
Age appropriate games	P(12m+)			x			Parenting strategies
Best night time routine	P(12m+)			x			Parenting strategies
Games for 13m old	P(12m+)			x			Parenting strategies
Games to play with 12m old	P(12m+)			x			Parenting strategies
How to make a long flight easier on child	P(12m+)	x		x			Parenting strategies

Things to watch with babies and dogs	P(12m+)			x			Parenting strategies
Best educational toys for 12m old	P(12m+)			x			Researching products prior to purchase
Educational toys	P(12m+)			x			Researching products prior to purchase
What shoes to buy and when	P(12m+)	x	x	x			Researching products prior to purchase

Table F-4 P7: Summary of General Information-Seeking Episodes

Information-Seeking Episodes	**Period**	***Information Resource***					**Code**
		PL	*EX*	*O*	*PT*	*MM*	
Pregnancy this week	A			x			Developmental Information
Nesting	A	x		x	x		Parenting strategies
Create Birth Plan	A			x	x	x	Pregnancy & labour prep
Labour Preparation	A			x			Pregnancy & labour prep
What to bring to hospital	A				x		Pregnancy & labour prep
Developmental Milestones	P(0-6m)	x		x	x		Developmental Information
Weaning	P(0-6m)	x		x	x		Diet and Exercise (Baby)
Sex After Childbirth	P(0-6m)	x		x			Fertility issues
Sleep Problems	P(0-6m)			x			Parenting strategies
Travel Tips	P(0-6m)	x		x			Parenting strategies
Aistear: the Early Childhood Framework	P(6-12m)			x			Childcare & Education
Looking for Childcare	P(6-12m)	x		x			Childcare & Education
Developmental Milestones	P(6-12m)			x	x		Developmental Information
Weaning	P(6-12m)	x		x	x		Diet and Exercise (Baby)
Getting back in shape for getting pregnancy	P(6-12m)		x	x	x		Fertility issues
Separation Anxiety	P(6-12m)			x			Parenting strategies
Developmental Milestones	P(12m+)			x	x		Developmental Information
Childhood Emotions	P(12m+)			x	x		Parenting strategies
Saying No	P(12m+)			x			Parenting strategies
Ways to avoid Spoiling your child	P(12m+)			x			Parenting strategies

Table F-5 P8: Summary of General Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
What to bring to hospital	A	x					Pregnancy & labour prep
Baby Monitors	A			x			Researching products prior to purchase
Baby Monitors	A						Researching products prior to purchase
Buggies	A		x				Researching products prior to purchase
Car Seats	A		x				Researching products prior to purchase
Cots	A				x		Researching products prior to purchase
High Chair	A		x				Researching products prior to purchase
Mattress for Cots	A			x			Researching products prior to purchase
Mosses Basket Covers	A			x			Researching products prior to purchase
Pregnancy clothes	A			x			Researching products prior to purchase
Au-pair	P(0-6m)	x	x	x			Childcare & Education
Weaning 1	P(0-6m)		x		x		Diet and Exercise (Baby)
High Chairs	P(0-6m)		x				Researching products prior to purchase
Nursing tops	P(0-6m)			x			Researching products prior to purchase
Weaning 2	P(6-12m)				x		Diet and Exercise (Baby)
Wonder bibs	P(6-12m)	x		x			Researching products prior to purchase

Table F-6 P10: Summary of General Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Child Benefit	A			x			Administrative Tasks
Registration of baby	A			x			Administrative Tasks
Breastfeeding	A		x				Diet and Exercise (Baby)
Where to buy prune juice	A			x			Diet and Exercise (Mother)
Safe co-sleeping	A			x			Parenting strategies
Delayed cord clamping	A		x	x			Pregnancy & labour prep
Hypno-birth	A			x			Pregnancy & labour prep
Car systems	A			x			Researching products prior to purchase
Moby wrap sling	A			x			Researching products prior to purchase
Nursing Bras	A			x			Researching products prior to purchase
Where to buy dry wipes for babies	A			x			Researching products prior to purchase
How to get medical records from the hospital	P(0-6m)			x			Administrative Tasks
Developmental Milestones	P(0-6m)			x	x		Developmental Information
Teething	P(0-6m)	x	x	x			Developmental Information
Baby-led weaning	P(0-6m)	x					Diet and Exercise (Baby)
Breastmilk storage	P(0-6m)			x			Diet and Exercise (Baby)
Fast milk let down	P(0-6m)	x		x			Diet and Exercise (Baby)
Public Health Nurse	P(0-6m)	x					Diet and Exercise (Baby)
Swimming with the baby	P(0-6m)	x	x		x		Diet and Exercise (Baby)
Weaning	P(0-6m)	x	x				Diet and Exercise (Baby)
Baby TV	P(0-6m)	x					Parenting strategies
Baby Slings	P(0-6m)			x			Researching products prior to purchase
Cloth nappies	P(0-6m)			x			Researching products prior to purchase
Developmental Milestones	P(6-12m)			x	x		Developmental Information
Car Seats	P(6-12m)		x	x			Researching products prior to purchase

Table F-7 P12: Summary of General Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Baby Development	A			x			Developmental Information
Pregnancy and Baby	A					x	Pregnancy & labour prep
What to pack for hospital	A			x			Pregnancy & labour prep
Breastfeeding	P(0-6m)	x		x			Diet and Exercise (Baby)
Night weaning	P(0-6m)			x			Diet and Exercise (Baby)
Weaning	P(0-6m)		x	x			Diet and Exercise (Baby)
Exercise after C-section	P(0-6m)			x			Diet and Exercise (Mother)
Baby slings	P(0-6m)	x		x			Researching products prior to purchase
Parenting Strategies	P(6-12m)			x	x	x	Parenting strategies
Recipe Ideas	P(12m+)			x			Diet and Exercise (Baby)

Table F-8 P14: Summary of General Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Breastfeeding	A		x	x			Diet and Exercise (Baby)
Feeding	P(0-6m)		x	x			Diet and Exercise (Baby)
Sun Factor	P(0-6m)			x			Researching products prior to purchase
Teething	P(6-12m)	x		x			Developmental Information
Diet	P(12m+)			x			Diet and Exercise (Baby)

Table F-9 P18: Summary of General Information-Seeking Episodes

Medical Information-Seeking

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Homebirth	A	X	X	X			Medical conditions (Mother)
Labour Prep	A		X				Medical conditions (Mother)
How to relieve back/leg pain	A		X				Medical conditions (Mother)
How to relieve pelvic pain	A		X				Medical conditions (Mother)
Water birth	A		X		X		Medical conditions (Mother)
Varicose veins	A		X	X			Medical conditions (Mother)
Baby Hiccups	A			X			Medical conditions (Mother)
Labour Signs	A			X			Medical conditions (Mother)
Postnatal Care	P (0-6m)		X				Medical conditions (Mother)
Vaccinations	P (0-6m)	X					Medical conditions (Baby)

Table F-10 P1: Summary of Medical Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Cramps on left side	A			X			Medical conditions (Mother)
Heparin	A		X	X	X		Medical conditions (Mother)
Morning Sickness	A	X					Medical conditions (Mother)
Gastritis in pregnancy	A		X	X			Medical conditions (Mother)
Labour	A	X	X	X	X		Medical conditions (Mother)
Strong Uncomfortable Kicks	A	X	X	X			Medical conditions (Mother)
Rib Pain	A	X	X	X	X		Medical conditions (Mother)
Toe Nails Falling off During Pregnancy	A			X			Medical conditions (Mother)
Episiotomy	P (0-6m)	X	X	X			Medical conditions (Mother)
Haemorrhoids	P (0-6m)	X	X	X			Medical conditions (Mother)
Tailbone Pain	P (0-6m)	X	X	X			Medical conditions (Mother)
Blood Pressure	P (0-6m)	X	X	X			Medical conditions (Mother)
Iron Levels	P (0-6m)	X	X	X			Medical conditions (Mother)
Heparin	P (0-6m)	X	X	X			Medical conditions (Mother)
Baby Mucus	P (0-6m)		X				Medical conditions (Baby)
Jaundice	P (0-6m)		X				Medical conditions (Baby)
Belly Button	P (0-6m)	X	X				Medical conditions (Baby)
Craniosacral therapy	P (0-6m)		X	X			Medical conditions (Baby)
Constipation	P (0-6m)	X	X	X			Medical conditions (Baby)
Vaccinations	P (0-6m)				X		Medical conditions (Baby)
Reflux	P(6-12m)		X	X			Medical conditions (Baby)
Croup	P(6-12m)	X	X	X			Medical conditions (Baby)
Unnamed condition	P(12m+)		X				Medical conditions (Baby)
Rash	P(12m+)	X	X	X			Medical conditions (Baby)

Table F-11 P4: Summary of Medical Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Nausea in pregnancy	A			X			Medical conditions (Mother)
Anomaly scanning	A	X		X			Medical conditions (Mother)
Labour	A				X		Medical conditions (Mother)
Placenta Previa	A	X	X	X	X		Medical conditions (Mother)
Back pain in pregnancy	A	X	X	X			Medical conditions (Mother)
C-Sections	A				X		Medical conditions (Mother)
Blood Transfusion	P (0-6m)		X	X			Medical conditions (Mother)
Developmental Assessment	P (0-6m)		X	X			Medical conditions (Baby)
Colic	P (0-6m)		X	X	X		Medical conditions (Baby)
Baby Immunisation	P (0-6m)				X		Medical conditions (Baby)
Croup	P (0-6m)		X	X			Medical conditions (Baby)
Reflux	P (0-6m)	X		X			Medical conditions (Baby)
Atrovent inhaler	P(6-12m)			X			Medical conditions (Baby)
Ear infections	P(6-12m)		X				Medical conditions (Baby)
Allergies	P(6-12m)	X	X	X			Medical conditions (Baby)
12m Immunisation pain relief	P(12m+)	X	X	X			Medical conditions (Baby)
Rashes in young babies	P(12m+)		X	X			Medical conditions (Baby)
Asthma	P(12m+)			X			Medical conditions (Baby)

Table F-12 P5: Summary of Medical Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Should I get the flu vaccine	A	X	X				Medical conditions (Mother)
Itchiness	A		X				Medical conditions (Mother)
Trouble sleeping	A	X	X				Medical conditions (Mother)
Feeling out of breath	A		X				Medical conditions (Mother)
Perineum massage	A			X			Medical conditions (Mother)
Stages of labour	A		X	X			Medical conditions (Mother)
Labour Positions	A		X				Medical conditions (Mother)
When does the baby's head engage	A		X	X			Medical conditions (Mother)
Pressure on my groin	A		X				Medical conditions (Mother)
Do sweeps help?	A			X			Medical conditions (Mother)
Inductions	A			X	X		Medical conditions (Mother)
What are the after effects of a C-section	A		X				Medical conditions (Mother)
Baby Wind	P (0-6m)		X				Medical conditions (Baby)
Reflux	P (0-6m)		X				Medical conditions (Baby)
What does project vomiting mean	P (0-6m)				X		Medical conditions (Baby)
Shakes in child's legs	P (0-6m)		X				Medical conditions (Baby)
Rash	P (0-6m)	X	X	X	X		Medical conditions (Baby)
I am still bleeding, is it normal	P (0-6m)		X				Medical conditions (Baby)
Flat head	P (0-6m)	X		X			Medical conditions (Baby)
Colic	P (0-6m)				X		Medical conditions (Baby)
Vaccinations	P (0-6m)	X		X			Medical conditions (Baby)
2 month Vaccinations	P (0-6m)	X		X			Medical conditions (Baby)
Mastitis	P (0-6m)	X			X		Medical conditions (Mother)
Illness to watch out for	P (0-6m)			X	X		Medical conditions (Baby)
Signs of diarrhoea	P(6-12m)			X	X		Medical conditions (Baby)
Vaccinations	P(6-12m)	X					Medical conditions (Baby)
Vaccinations	P(6-12m)	X	X		X		Medical conditions (Baby)
Sunken Frenulum	P(6-12m)			X			Medical conditions (Baby)
Vaccination	P(12m+)	X					Medical conditions (Baby)
Signs of an allergic reaction	P(12m+)	X		X			Medical conditions (Baby)
Signs of a concussion	P(12m+)			X			Medical conditions (Baby)

Table F-13 P7: Summary of Medical Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Diagnosing abdominal Pain	A	X	X	X			Medical conditions (Mother)
Labour Fears	A	X	X		X		Medical conditions (Mother)
Homebirths	A	X					Medical conditions (Mother)
Asthma in Pregnancy	A		X				Medical conditions (Mother)
Back Pain – Bra Support during Pregnancy	A		X				Medical conditions (Mother)
Cold & Flu in Pregnancy, natural remedies	A		X	X	X		Medical conditions (Mother)
Pelvic Girdle Pain	A				X		Medical conditions (Mother)
Cholestasis in pregnancy	A		X				Medical conditions (Mother)
Strep B during Pregnancy	A	X	X	X			Medical conditions (Mother)
Labour research	A	X	X	X	X		Medical conditions (Mother)
Infection factors in infants	P (0-6m)	X	X				Medical conditions (Baby)
Ways to relieve colic in infants	P (0-6m)		X				Medical conditions (Baby)
Mastitis (1)	P (0-6m)	X	X				Medical conditions (Mother)
Mastitis (2)	P (0-6m)	X	X	X			Medical conditions (Mother)
Mastitis (3)	P (0-6m)		X				Medical conditions (Mother)
Haemorrhoids	P (0-6m)	X		X			Medical conditions (Mother)
Hyperlactation	P (0-6m)		X	X			Medical conditions (Mother)
Suspected Mastitis	P (0-6m)		X				Medical conditions (Mother)
Vaccinations	P (0-6m)		X	X			Medical conditions (Baby)
Liver haemangioma	P(6-12m)		X	X			Medical conditions (Mother)
Calpol Alternative	P(6-12m)	X		X			Medical conditions (Baby)
Nurofen Alternative	P(6-12m)		X	X			Medical conditions (Baby)
Baby Cough	P(6-12m)			X			Medical conditions (Baby)
Trying to get pregnant	P(6-12m)		X	X			Medical conditions (Mother)
Possible second bout of Chicken Pox	P(12m+)			X			Medical conditions (Baby)
What is Calamine Lotion	P(12m+)			X			Medical conditions (Baby)
Treatments for Diarrhoea in children.	P(12m+)			X			Medical conditions (Baby)

Table F-14 P8: Summary of Medical Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	*EX*	*O*	*PT*	*MM*	
Maternal Age Related Risk Factors	A		X		X		Medical conditions (Mother)
Palpitations	A		X				Medical conditions (Mother)
Varicose veins	A	X	X				Medical conditions (Mother)
Postnatal bleeding	P (0-6m)			X	X		Medical conditions (Mother)
Contraception	P (0-6m)		X				Medical conditions (Mother)
Fatigue	P (0-6m)		X	X	X		Medical conditions (Mother)
Postnatal Depression	P(6-12m)	X	X	X	X		Medical conditions (Mother)
Migraines	P(12m+)	X	X	X			Medical conditions (Mother)

Table F-15 P10: Summary of Medical Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	EX	O	PT	MM	
Natural constipation remedies	A	X		X			Medical conditions (Mother)
How to relieve sciatica	A		X	X			Medical conditions (Mother)
Panic attacks in pregnancy	A	X		X			Medical conditions (Mother)
Braxton Hicks	A			X			Medical conditions (Mother)
Flu Vaccine	A		X	X			Medical conditions (Mother)
Eye migraines	A			X			Medical conditions (Mother)
Migraine	A		X				Medical conditions (Mother)
SPD	A		X	X			Medical conditions (Mother)
Whooping cough vaccine side effects	A			X			Medical conditions (Mother)
Winter vomiting buy incubation	A			X			Medical conditions (Mother)
Salmonella incubation period	A	X	X	X			Medical conditions (Mother)
Strep B infection	A		X				Medical conditions (Mother)
Third stage of labour	A		X	X			Medical conditions (Mother)
Membrane sweep	A			X			Medical conditions (Mother)
Itch in pregnancy	A			X			Medical conditions (Mother)
PEP	A		X				Medical conditions (Mother)
Induction	A		X				Medical conditions (Mother)
Pictures of PEP post pregnancy	P (0-6m)			X			Medical conditions (Mother)
White nipple after breastfeeding	P (0-6m)			X			Medical conditions (Mother)
Vasospasm	P (0-6m)			X			Medical conditions (Mother)
Tongue Tie	P (0-6m)	X	X				Medical conditions (Baby)

Table F-16 P12: Summary of Medical Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	EX	O	PT	MM	
Placenta Previa	A		X	X			Medical conditions (Mother)
Pelvic Pain	A		X	X			Medical conditions (Mother)
Signs of Labour	A			X			Medical conditions (Mother)
Swelling	A			X			Medical conditions (Mother)
Wind	P (0-6m)		X	X			Medical conditions (Baby)
Baby acne	P (0-6m)			X			Medical conditions (Baby)
Croup	P(6-12m)		X	X			Medical conditions (Baby)
Constipation	P(6-12m)		X	X			Medical conditions (Baby)
Chicken Pox	P(12m+)		X	X			Medical conditions (Baby)
Rotavirus	P(12m+)	X	X	X			Medical conditions (Baby)

Table F-17 P14: Summary of Medical Information-Seeking Episodes

Information-Seeking Episodes	Period	*Information Resource*					Code
		PL	EX	O	PT	MM	
Protein in Urine	A		X	X			Medical conditions (Mother)
Bringing on Labour	A			X			Medical conditions (Mother)
Heart Condition	P (0-6m)		X				Medical conditions (Baby)
Allergy	P (0-6m)		X	X			Medical conditions (Baby)
Vomiting Bug	P(6-12m)	X	X				Medical conditions (Baby)
Head Injury	P(6-12m)		X	X	X		Medical conditions (Baby)
Vomiting Bug	P(12m+)		X				Medical conditions (Baby)
Swine Flu	P(12m+)	X		X			Medical conditions (Baby)
Virus	P(12m+)		X	X			Medical conditions (Baby)
Appetite	P(12m+)		X	X			Medical conditions (Baby)
Grommets	P(12m+)		X	X			Medical conditions (Baby)
Nappy Rash	P(12m+)			X			Medical conditions (Baby)

Table F-18 P18: Summary of Medical Information-Seeking Episodes