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Title	Practice-based personas: integrated user and practice models
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Publication date	2015-05
Original Citation	O'LEARY, C., MTENZI, F., MCAVINIA, C. 2015. Practice-based personas: integrated user and practice models. In: DONNELLAN, B., GLEASURE, R., HELFERT, M., KENNEALLY, J., ROTHENBERGER, M., CHIARINI TREMBLAY, M., VANDERMEER, D. & WINTER, R. (eds.) At the Vanguard of Design Science: First Impressions and Early Findings from Ongoing Research Research-in-Progress Papers and Poster Presentations from the 10th International Conference, DESRIST 2015. Dublin, Ireland, 20-22 May. pp. 93-100
Type of publication	Conference item
Link to publisher's version	http://desrist2015.computing.dcu.ie/
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Download date	2026-09-21 22:20:22
Item downloaded from	https://hdl.handle.net/10468/1812

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Practice-Based Personas: Integrated User and Practice Models

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Abstract. Practices are routinised behaviours with social and material components and complex relationships over space and time. Practice-based design goes beyond interaction design to consider how these components and their relationships impact on the formation and enactment of a practice, where technology is just one part of the practice. Though situated user-centred design methods such as participatory design are employed for the design of practice, demand exists for additional methods and tools in this area. This paper introduces practice-based personas as an extension of the persona approach popular in interaction design, and demonstrates how a set of practice-based personas was developed for a given domain – academic practice. The three practice-based personas developed here are linked to a catalogue of forty practices, offering designers both a user perspective and a practice perspective when designing for the domain.

Keywords: Practice-oriented design, practices, personas

1 Introduction

Practice-based approaches to the design of software systems have attracted increased attention in the fields of information systems [1], human-computer interaction (HCI) [2], [3] and computer-supported collaborative work (CSCW) [4], [5] over the past decade. These approaches go beyond designing for human interaction with a software artefact, to consider instead how the human, the software and multiple other actors contribute to the formation of a *way of doing* something. The interest in designing for practice follows the so-called *turn to practice* in the social sciences [6] and in studies of technology [7]. This approach decentres the human and assumes an analytical symmetry between the social and material components of the practice, arguing that such components are *constitutively entangled* in the formation of practice [8].

Kuutti and Bannon [2] distinguish between the *interaction paradigm* and the *practice paradigm* in HCI research and call for a formal practice based research agenda, proposing that the development of methodological tools and guidelines is the next step. Such tools should facilitate the observation and modelling of practice and the envisioning of future performances of practice as part of a creative process. As such, the tools and methodologies currently most popular for practice-based design involve

ongoing interaction with human actors in natural settings, typically under the banner of participatory design or action research (see [4] for example). Ongoing engagement with users throughout a design process is potentially expensive and often infeasible. Within the interaction paradigm, personas [9] have been adopted in some quarters as a way of addressing this cost. Personas are rich, data driven characters developed through user research. Well-developed personas can provide designers with user models to whom they can relate on a human level and for whom they can better predict behaviour in future scenarios, akin to characters in a book or movie.

This paper explores the requirements for adapting personas to the practice paradigm. While lacking in a formal definition, a practice based approach to design must consider a broad set of relationships that exist across space and time between humans, technology, material, meaning, and other co-existent practices. Practices are particular ways of doing things shared by practitioners who collectively create and respond to the *meaning* of the practice. A practice is not formed or performed by a single individual independently of a broad set of relationships, so the modelling of a practice requires more than the modelling of the individual, and thus requires an extension of the single-character persona approach.

This paper introduces *practice-based personas* as a tool for software design teams. Practice-based personas are developed by modelling the practices in a given domain and examining the bundling or clustering of practices by individual practitioners to form user models. Practice-based personas can potentially provide a means of switching between a *user perspective* – from which the benefits of the persona approach such as human empathy and envisioning of future behaviour can be embraced, and a *practice perspective* – from which the elements of social and historical motivation, the role of material and technology, and variation in performance can be explored.

The development of practice-based personas is demonstrated through the modelling of practices and practitioners in a given domain - academic practice. 150 lecturers in a higher education institute in Ireland were surveyed using a questionnaire with qualitative and quantitative components, and a further six lecturers were interviewed for a total of six hours. The data collected from this exercise was used to develop the first version of a practice catalogue for the domain under study, with forty separate practices identified for inclusion according to criteria set out in this paper. Each entry in the catalogue is documented according to its *description*, *meaning* (the reason for the existence of the practice), *material* (the things and technology that are needed for the practice) and *competence* (human skills and abilities) components, as well as its *career* (its history and relationship to other practices) and *variation* (differences in performance among practitioners and/or over time). This follows Shove et al's [10], [11] model of social practice which has been applied previously in HCI [12] and for the practice-oriented design of products [13].

The populated practice catalogue was used as a starting point for the development of the practice-based personas. These emerged from a clustering process which explored the performance of sets of practices by the survey respondents and interviewees. The study resulted in three personas, identified for the purpose of this paper as *traditional educator*, *fundamental educational technologist*, and *advanced educational technologist*.

By providing both a practice and a user perspective, practice-based personas have the potential to support the "*operationalization of practice-orientation in design projects*", as called for by practice-oriented product designers [14], designers of information systems [15] and interaction designers [2]. Practice-based personas, like Cooper's personas [9], [16] are generative tools that provide the designer with a way to creatively envision future enactments of practice. As Pruitt and Grundin put it "*Well-crafted Personas are generative: Once fully engaged with them, you can almost effortlessly project them into new situations.*" [17].

2 Practices

Practices are routinized behaviours with social and material, or technological, components. They are carried out by different people at different times in different places while remaining essentially the same as entities for long periods of time. Schatzki describes practices as "*a temporally and spatially dispersed nexus of doing things*" [6]. Reckwitz's widely used definition of practice defines them as "*a routinized type of behaviour which consists of several elements interconnected to one other*" [18]. Shove et al [11] identify these interconnected elements of practice as *meaning*, *competence* and *material*, with all three required to be present at the moment of doing for the enactment of the practice. *Meaning*, in this context, refers to the motivation for the practice – the shared understanding among practitioners of the reason why the practice exists. *Competence* refers to the skills, knowledge and abilities required by practitioners for the enactment of the practice. *Material* identifies the tangible entities – technological and otherwise – which form part of the practice. Practices, in Shove et al's model, possess *careers* which trace how practices-as-entities have evolved over time when repeatedly enacted by practitioners.

Bjorn and Osterlund [15] argue that practices are not designed but instead emerge from the enactment of their components. Their proposed *sociomaterial design* looks to design the components of practice, in particular the material components, to influence the emergent practice. This mirrors what Shove et al [10] describe as the "*indirect but potentially decisive hand in the constitution of what people do*".

Following Shove et al's model [11], our approach to cataloguing practices requires the identification of the following elements from the data collected form users:

- **Meaning**: What motivates enactment of this practice?
- **Material**: What material components are required for enactment of the practice?
- **Competences**: What skills and abilities are required for enactment of the practice?
- **Career**: How has the practice evolved, what has it replaced, why and how?
- **Variation**: Under what conditions does the practice vary when performed?

A practice catalogue is a collection of practices documented along these dimensions, accompanied by an illustrative narrative describing enactments of the practice, following the narrative approaches of Cooper et al [16]. In deciding whether a particular activity, routine or behaviour evident in the data represents a practice, the following filtering rules are applied:

- **Blackboxed**: Is this an atomic, recognisable, namable, practical entity?
- **Routine**: Has this been routinized? Is it repeated over time?
- **Recruitment**: Do several people perform this practice?
- **Meaning**: Does this practice have recognizable reasons to be performed?
- **Formation**: Would the practice be unformed by the disappearance of components?

There is a need, as Kuijer puts it, to "*operationalise a practice-orientation in design projects*" [14]. This, they argue, requires tools and methodologies, a point echoed by Kuutti and Bannon [2] in their research agenda for the practice paradigm in HCI. Such tools may include the *design fictions* of Wakkary et al [12], the *design case studies* of Wulf et al [4] and the *generative improv performances* of Kuijer et al [19], or a variation on the personas of Cooper et al, as argued for here.

3 Practice-Based Personas

Personas were introduced to the design community by Cooper et al [9] as a means to provide a "*precise description of our user and what he wishes to accomplish*". A persona is a named, composite, artificial user whose goals, motivations and other attributes are derived from ethnographic data collected from the user population. The persona is presented as an individual in order to encourage designers to develop a connection and empathy with the user, supporting designers as they envision future usage scenarios for the user with their product. Pruitt and Grundin [17] describe the use of personas in design processes in their organisation, highlighting how their personas are rigorously communicated throughout the design team and integrated throughout the design process. They relate personas to the creative aspect of design by showing how personas enhance the designer's ability to predict future behaviour.

Personas have been employed to model interaction with a particular product (see for example [20]–[23]), as per Cooper's goal-directed design methodology [16] and also to model users in a particular domain (see for example [24]–[27]). Criticisms often relate to their misapplication [28], for example, where they represent the only user centred aspect to a design project [20], [29], where they are only developed to address interface issues [21], or where they are superficial or stereotypical representations of users [30], [31]. Other criticisms of the persona approach include criticism of qualitiative data collection in general, and a perception that the use of personas mean that designers will never interact with real users [26], [32]. Bødker and Klokmose [33] introduced the *techsona* as an extension of the persona because they felt that personas alone did not sufficiently represent the material aspects of an interaction. Others have criticized personas for being too informally specified [34]. Faily et al [35] consider that personas are insufficient of their own to represent fully the tacit elements of a practice, describing them as "*problematic when accounting for hidden behaviours not obvious from their descriptions alone*".

Practice-based-personas are user models developed from the catalogue of practices documented for a given domain, rather than from simple behavioural patterns and goals. By mapping practices to users and identifying clusters, collections of practices are built up at successively higher levels. When no further clustering is possible, the

final clusters are developed as practice-based-personas, each defined by their practices, including the meaning, competence, material and other elements that constitute the practice. Selected personas can then be integrated into the design process as design targets, with the design team enabled to study the entanglements between their various practices, and how the meaning, competence and material components of those practices currently influence, and can potentially further influence, each other.

4 Demonstration

The demonstration presented here illustrates the development of a practice catalogue and practice-based personas to model the use of technology by lecturers in an academic working environment. User research was undertaken through a survey of academic staff in a third level institution and in-depth ethnographic interviews of six academic staff in the same institution. The survey explored the use of technology and its role in the formation of academic practice. The survey questionnaire was completed by 150 academic staff across 10 disciplinary areas, age groups from 20s to 60s, experience from 1 to 32 years and technology experience levels from newcomer to expert. The interview was based on Spradley's ethnographic interview approach [40].

In the first stage of the analysis, the transcripts of the six interviews and all data returned in answer to the open ended questions in the survey were coded line by line. This resulted in the identification of 465 separately coded processes which were engaged in by the interviewees and respondents, including for example: *looking things up*, *emailing students*, *reading journal papers*, *keeping notes*, *publishing marks*, *supervising*, *finding own files*, *managing time*. The following five categories of practice emerged from the further analysis of these processes: *communicating*; *collaborating and sharing*; *managing teaching, learning and assessment activity*; *sourcing and managing knowledge*; and *organising self*. Data initially coded to the processes in each of the categories were revisited, leading to the identification of potential practices in each category. Using the filtering rules introduced in section 2 above, 40 separate practices were identified which were each shared across significant numbers of individuals from the 156 interviewees and respondents. Each of the practices were catalogued as described in section 2. The full set is as follows:

- Communicating (5): exchanging-individual-email, group-emailing, posting-on-social-media-and-blogs, exch-messages-through-vle, comm-using-phone
- Collaborating and sharing (5): sharing-cloud-based-resources, sharing-wiki-resources, sharing-real-time-online-sessions, writing-documents-on-computer, exchanging-change-tracked-documents
- Managing teaching, learning and assessment activity (11): tracking-student-performance-and-engagement-with-technology, providing-student-feedback-online, providing-student-feedback-by-email, designing-and-developing-learning-activities-and-materials-using-software-tools, developing-and-administering-online-assessment, developing-and-delivering-rich-media, distributing-learning-materials-online, distributing-learning-materials-by-email, presenting-and-

facilitating-in-class-with-technology, facilitating-out-of-class-activity-with-online-resources, tutoring-and-guiding-students-through-electronic-communication
- Sourcing and managing knowledge (7): recording-ref-in-databases, rec-live-data-using-mobile-device, sourcing-publ-online, sourcing-mat-online, taking-online-training-and-courses-and-webinars, conducting-online-res, exploring-technologies
- Organising self (12): organising-files-on-cloud-space, back-up-files-on-hardware, developing-organised-folder-system, automatically-synchronising-multiple-devices, manually-synchronising-multiple-devices, managing-home-work-environment, remotely-access-work-resources, managing-email, loc-res-from-email, keeping-notes-for-self, using- calendar, using- to-do-list-and-reminders

Practices in each category were clustered by analyzing each of the 156 interviewees and respondents and clustering their practices by applying the K-Means algorithm. Clusters at that level represent types of persona but only for a given category of practice. They do not, for example, capture the relationship between communication practices and teaching practices. The clusters for each of the five categories are provided below. Each of the 14 clusters listed represents a distinct collection of practices in that category for which there is evidence in the data.

- Communicating: multi-m. communicator, vle communicator, trad. communicator
- Collaborating and sharing: multi-m. collaborator, cloud collab., document collab.
- Managing teaching, learning and assessment activity: learning author, learning administrator, learning enabler
- Sourcing and managing knowledge: online searcher, research locator, re-searcher
- Organising self: proactive resource manager, file manager

In the final step the personas are developed. Each persona is a top level user model who embodies practices in each of the identified categories. The K-Means algorithm and further analysis were again employed to cluster users according to which of the clusters for each of the five categories represented their practice in that category. The three personas which emerged had the following profile across the five categories:

- **Traditional Educator**: traditional communicator, document collaborator, learning author, research locator, file manager
- **Fundamental Educational Technologist**: vle communicator / traditional comm., cloud collab., learning administrator, re-search locator, proactive resource manager
- **Advanced Educational Technologist**: vle communicator / multi-media communicator, multi-media collaborator / cloud collaborator, learning administrator / learning enabler, online searcher, proactive re-source manager

5 Summary and Future Work

This work introduces *practice-oriented personas*, the *practice catalogue* and a demonstration of the development of both. It additionally describes the development of *practice-oriented personas* for a given domain – academic practitioners and their

use of technology. This paper presents a typology of practices and users for the domain being studied and demonstrates how these can be linked, documented and have the potential to be used as part of the design process.

Each of the three personas developed here can be linked to their constituent practices at successive levels, providing the designer with an opportunity to understand the persona through the accumulated characteristics collected from their practices, and to understand a given practice at the moment of design. The next stage of this research is to engage the practice and persona models in design activities whereby, for example, opportunities will be sought for existing collaboration practices to influence the development of knowledge sharing practices, and existing teaching practices are redesigned through their material components in the context of co-occurring practices. The personas provide an accurate view of the co-occurring practices for given user types. The practice models provide an accurate view of the material, meaning and competence components of the practice. Both views are grounded in data.

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