Mental Fitness in Higher Education: Intervention Mapping Programme Design

Abstract:

Purpose: Higher Education Institutions observe that many students are experiencing mental health issues, such as high levels of anxiety and stress. Young adults are recognised as a vulnerable group who carry the burden of mental health problems worldwide. Mental health interventions can be effective in positively influencing students' emotional and behavioural wellbeing.

Methodology: In the current study, the principles of Intervention Mapping (IM) were applied to guide the development, implementation, and evaluation of a specifically tailored mental health programme for a selected student cohort in a large Higher Education Institute in Ireland. Mixed qualitative (Delphi technique and focus group discussions) and quantitative (survey) data were gathered to gain a broad perspective of mental health concerns and learning needs among a sample of higher education students (n = 99).

Findings: Existing evidence guided by theoretical frameworks were blended to create a specifically tailored mental health programme to meet the needs of higher education students in Ireland. Results indicate that the established six-stages of IM provide an empirical process that has the potential to effectively respond to the mental health needs of students in higher education. IM identifies the priority needs of students in higher education and ensures that suitable behaviour change techniques for mental health are addressed.

Originality: IM is a suitable method to critically and collaboratively develop a mental health intervention for the overall wellbeing of the general higher education student population, both nationally and globally.

Introduction

The inception of the State of Mind UK programme (2011) sought to increase awareness of mental health issues, and wellbeing among professional rugby league players, and their communities in England (Lawlor, Rae, Kelly, & Moriarty, 2015). More recently, the State of Mind Ireland (SOMI) programme was established in 2015, as an organically evolving development from State of Mind UK. SOMI has the primary aim of highlighting issues surrounding mental health in sporting communities across Ireland through enhancing mental health literacy (Lawlor et al., 2015). SOMI has been identified as a skill-enhancing programme, aimed to increase levels of 'mental fitness' in young adults (Breslin et al., 2018; Lawlor et al., 2015). The term 'mental fitness' is accepted as emotional agility to stressful life events, defined as the "the modifiable capacity to utilise resources and skills to flexibly adapt to challenges or advantages, enabling thriving" (Robinson et al., 2016, p. 89). Ongoing and existent SOMI research with a selected student-athlete population deem 'mental fitness' as approachable terminology, and it is specifically seen as less stigmatising for student-athletes in higher education (Breslin et al., 2018). This SOMI research, specific to higher education student-athletes, determines that sport-specific mental health programmes can increase the effectiveness of mental health help-seeking behaviours, and to a lesser extent, knowledge of mental health disorders (Breslin et al., 2018; Breslin, Shannon, Haughey, Donnelly, & Leavey, 2017). In light of the present article, it is important to contextualise that SOMI research has since targeted the general population of higher education students in Ireland, specifically as a long-term strategy to address the mental health, and wellbeing climate of

students within the higher education environment (Houghton, Keane, Murphy, Houghton, & Dunne, 2011; Karwig, Chambers, & Murphy, 2015a;. Murphy, McKernan, & Heelan, 2016).

A nationwide study on young people in Ireland has previously revealed that approximately 40% of young Irish adults experience elevated levels of anxiety and depression (Dooley & Fitzgerald, 2012). Murphy et al., (2016) further described that the number of students in Ireland attending higher education with a formally declared mental health problem is as an 'overwhelming tsunami'. Higher education has significant potential to positively impact the mental health of young adults, through the provision of mental health knowledge, and the skills of wellbeing for large cohorts of young adults (Hunt & Eisenberg, 2010; Karwig et al., 2015). However, academic demands have also been found to be a contributing factor to mental distress among students higher education world-wide (Thorley, 2017; Usher, 2019) Several studies show rising levels of anxiety and depression among higher education students when compared to secondary school contexts (Bewick, Koutsopouloub, Miles, Slaad, & Barkham, 2010; Dooley & Fitzgerald, 2012). It has been proposed that Higher Education Institutions (HEI's) play an important role in responding to the mental health needs of students (Hunt & Eisenberg, 2010; Thorley, 2017).

Mental health promotion interventions for young people can have significant positive effects on students' emotional, and behavioural wellbeing, including reduced depression, anxiety and improved coping skills (Barry, Clarke, Jenkins, & Patel, 2013; Doyle et al., 2017; Winzer, Lindberg, Guldbrandsson, & Sidorchuk, 2018). In a study investigating the recognition of depression, help-seeking intentions, beliefs about interventions and stigmatising attitudes, Reavley et al. (2012) highlighted that there is a need for mental health literacy interventions, specifically targeting higher education students in Australia. Low mental health knowledge and help-seeking are reported among younger age groups, with student males less likely to

recognise depression and most likely to associate with stigmatising attitude to mental health problems (Reavley et al., 2012;). The study concludes that interventions need to address stigma and not merely educate on the symptoms of depression in order to reduce barriers to help-seeking. Other research suggests that skills orientated programmes are effective in demonstrating the benefits for wellbeing, and have successfully improved students' social and emotional skills, by enhancing their self-perceptions, and reduced subsequent levels of emotional distress, including depression, anxiety, and stress (Conley, Durlak, & Dickson, 2013; Karwig, Chambers, & Murphy, 2015). Murphy (2017) recommends that the promotion of mental health be included as part of compulsory induction programmes to higher education, while also advocating for the delivery of support services for all students be provided. In supporting research addressing the barriers to responding to students with mental health difficulties in higher education, Murphy (2017) further advocates that 'whole college' approaches are required, specifically to ensure equity of participation for all students. Thorley (2017) maintains that buy-in and direction from senior leadership are a particularly integral component when considering the wellbeing and mental health needs of students in higher education.

State of Mind Ireland as a national programme recognises the well-established, and strong positive associations between mental health and physical activity (PA) (Hegberg & Tone, 2015; Malcolm, Evans-Lacko, Little, Henderson, & Thornicroft, 2013; Mikkelsen, Stojanovska, Bosevski, & Apostolopoulos, 2017; Peluso & Guerra de Andrade, 2005; Portugal et al., 2013). Participation in regular PA for higher education students has proven to enhance wellbeing (Malcolm et al., 2013), increase resilience through protective factors (Hegberg & Tone, 2015), and alleviate symptoms of anxiety, depression and stress states (Mikkelsen et al., 2017) through a number of factors, which include biological, social and physiological health improvements. The most recent Student Activity and Sports Study

Ireland (SASSI) report found that 71% of males, and 58% of females, attending higher education were categorised as highly active, when compared to the 36% (29% male: 42% female) who were identified as insufficiently active in terms of meeting the recommended PA guidelines for health (Murphy et al., 2016). Studies continue to show that sustained PA engagement among young adults in higher education can improve subjective wellbeing in young adulthood, despite the transitional nature of this stage of life (Cekin, 2015; Murphy et al., 2018).

The purpose of this study is to provide an innovative, research-based approach in the re-design and development of an existing mental health and PA education intervention for higher education students in Ireland. This article documents the evidence-based process, and protocol associated with the Intervention Mapping (IM) technique, as used through a case-study approach in a large, higher education university context in the Republic of Ireland (Bartholomew Eldridge, Markham, Ruiter, Gerjo, & Parcel, 2016). The article will guide the reader through the key features of quality associated with the revised SOMI programme for higher education students. Using IM, the programme has been designed for the general higher education population, and has been specifically developed to influence the complex determinants of mental health issues experienced by the priority population. IM may be well suited for designing higher education interventions, as the process is a multi-faceted practical approach tailored to the needs of a specific population, and has been used in similar contexts previously (Ammendolia et al., 2016; Boucher, Gagné, & Côté, 2015). SOMI will be referred to as SOMI-Higher Education (SOMI-HE) for the remainder of this study to distinguish the previous research undertaken in SOMI (Breslin et al., 2018).

Methodology

Participants and Recruitment – Prior to the IM Process

The ethical approval for the SOMI-HE study was obtained from the Social Research Ethics Committee (SREC) at University College Cork, in April 2017. Ninety-nine participants assisted and contributed to the IM exercise, specifically as part of the re-design process to the SOMI programme. All participants were provided with an ethics information sheet, and consent form by the Principal Investigators (PI's), prior to their participation in the research. An expert planning team was also established prior to the data collection phases, comprising of a psychiatrist, two psychologists, a mindfulness teacher, a higher education student, five clinical mental health nurses, a higher education lecturer (with PA-specific expertise), a community health project manager and two researchers.

Intervention Mapping (IM)

IM is a health promotion planning framework, comprising of several tasks (Bartholomew & Mullen, 2011). This framework ensures effective decision making, appropriate theoretical selection, and the practical application of methodological considerations during each stage of an intervention design (Bartholomew Eldridge et al., 2016). There are six chronological steps associated with the IM process. Figure 1 details the specific requirements within each of the IM phases and these phases create a layered blueprint of theoretically supported components, which address the associated causes and determinants of health, and the corresponding practical mechanisms to health behaviour change (Bartholomew & Mullen, 2011). IM has been tendered as a suitable systematic tool for developing innovative health promotion programmes for complex health problems through a comprehensive theoretical approach (Ammendolia et al., 2016; Koekkoek, Van Meijel, Schene, & Hutschemaekers, 2010; Mceachan, Lawton, Jackson, Conner, & Lunt, 2008; Van Stralen et al., 2008). As part of this study's methodology, the six steps of IM will be outlined in the context of the revised SOMI-HE intervention.

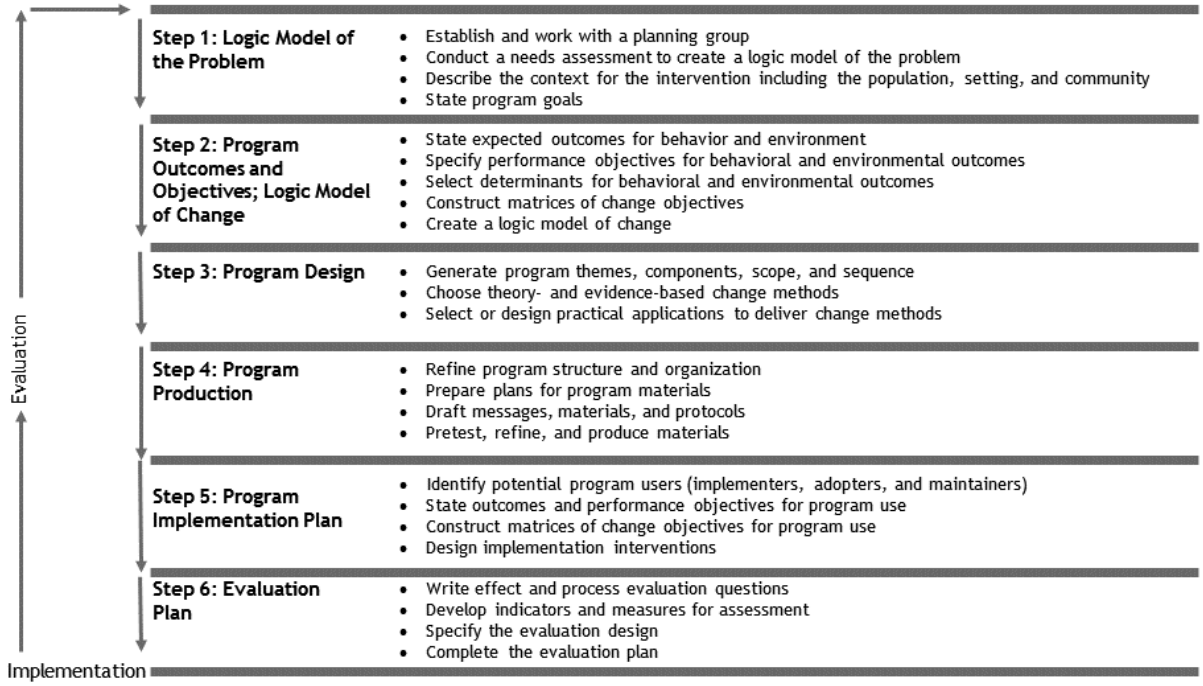


Figure 1. The associated IM Steps (taken from Bartholemew, 2016, p. 13)

IM Step 1: Needs assessment, and the logic model of the problem

The first step of IM, as part the revised SOMI-HE programme was to establish a planning group to work with throughout the project, and to conduct a needs assessment of the targeted cohort, as a means of creating a logic model to the identified problem. The intervention aims to address the low levels of wellbeing and high levels of mental health issues among higher education students through an educationally robust programme.

'Changing something requires understanding it first' (Kok et al., 2016) Conducting a needs assessment to create a logic model of the problem for the SOMI-HE programme design included an assessment of multiple components, comprising of scientific, epidemiological, and behavioural perspectives of the at-risk group through 1) a comprehensive literature search of the mental health problem among higher education students, 2) gathering expert opinion through a Delphi-exercise on the programme content, methods to address the mental health problem and the personal determinants of risky and health-promoting behaviour 3)

identifying the behavioural determinants associated with low levels of higher education students mental health through focus group discussion 4) evaluating the student feedback on the strengths and needs of a previously used SOMI programme.

1) Literature review

The first element of the needs assessment involved a comprehensive literature review undertaken by the PI's and research team, who assessed the population, their risk, and the specific low levels of mental health among higher education students. The literature review served to understand the current national mental health and PA trends, their associated health determinants, and the barriers connected with mental health issues surrounding stigma and lack of PA among young adults. Literature was gathered from existing databases with research-informed Irish data featuring as an important part of step one. Prevalent themes were selected and included; mental health literacy, wellbeing, resilience, help-seeking, and the PA participation of young adults.

2) Delphi-exercise

Traditional to the Delphi method, the literature review informed the development of the Delphi-exercise (Dalkey & Helmer, 1962).The Delphi technique is a group process used to survey, and elicit the opinions of experts on a particular subject (Yousuf, 2007). In this research, the Delphi-exercise was used to formulate an empirical consensus of the SOMI-HE programme content through collating data from a panel of discipline-specific experts (n = 14) (Linstone & Turoff, 2002). The Delphi method is recognised as a suitable research and educational planning tool (OBrien, 1978). Delphi method is usually an anonymous process, however, in this study anonymity was not necessary as all stakeholders preferred to contribute to a common goal of improving higher education student mental health through open discussion. Anonymity can reduce the credibility of the study, making experts

inaccessible for future consultation and research development (Green, 2014). Typically used as a quantitative technique (Rowe & Wright, 1999), this research used the Delphi methods as part of a qualitative approach to holistically engage participants (Fletcher & Marchildon, 2014). The non-anonymised Delphi process was modified through facilitating two rounds of structured panel discussions based on repeated open-ended questions within the domains of mental health and PA participation of young adults. Data collected in the literature review were presented to the panel. Stakeholder opinions were specifically collected based on five themes; including 1) mental health literacy, 2) wellbeing, 3) resilience, 4) help-seeking, and 5) the PA participation of young adults. Using an innovative method, the facilitator gathered consensus on these themes through asking the expert panel to respond to the repeated open-ended questions mapped on a KWL chart in both rounds of the Delphi exercise. KWL (Ogle, 1986) explores comprehension and activates background knowledge of a topic through investigating: What we know, want to know, and what we have learned. In other studies, a similar qualitative approach to the Delphi Method has proven to be a reliable means of hearing practitioners and the students lived experience, bringing evidence-based practice to the real world (Sharkey & Sharples, 2001). A modified Delphi exercise, adapted from Hiriscau (2016), followed six phases over a nine-month period (see figure 2.).

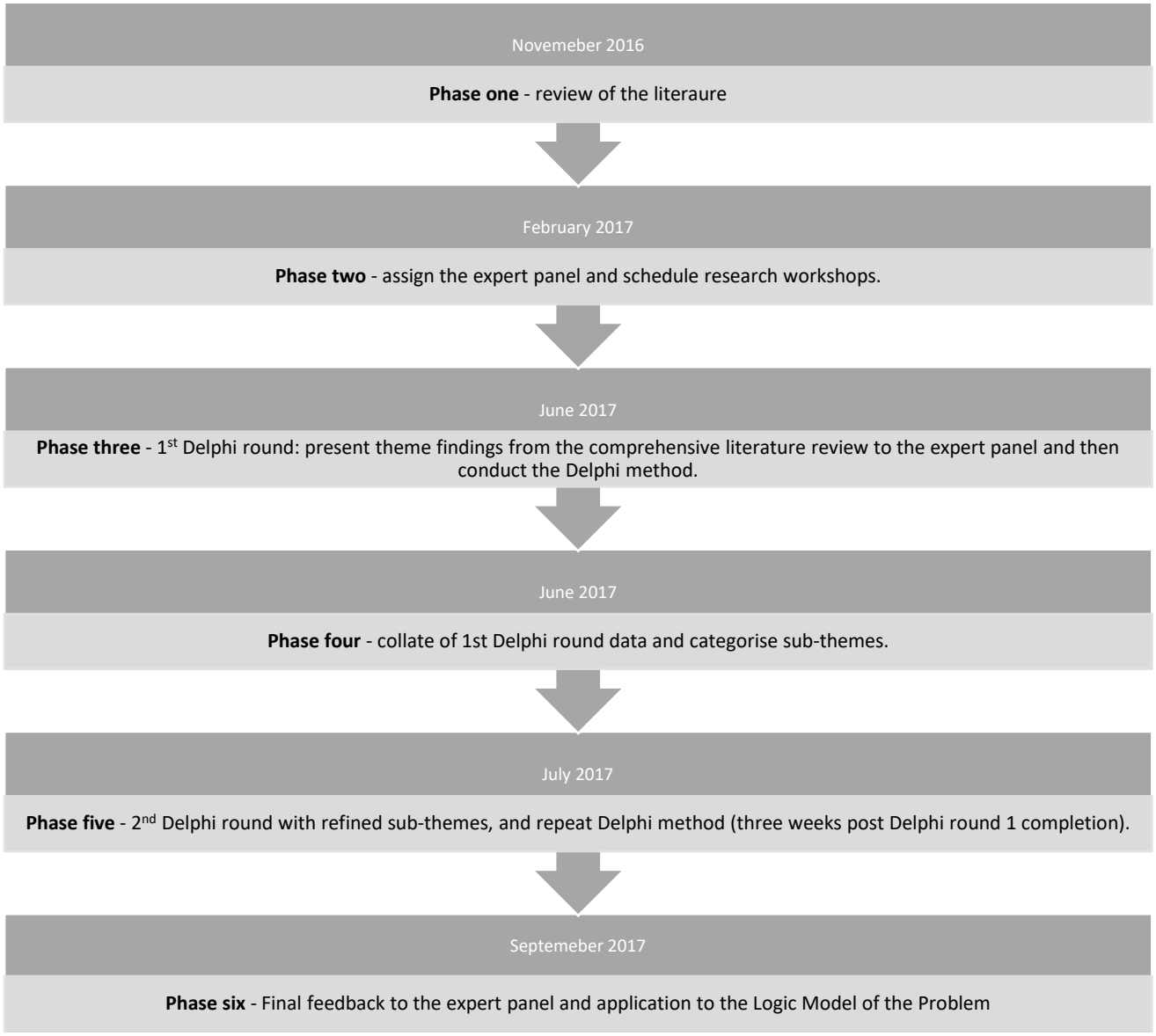


Figure 2. Delphi exercise, adapted from Hiriscau (2016)

3) Student Focus Group

The third element of the needs assessment data collection for SOMI-HE consisted of focus group (FG) interviews, with a representative sample of higher education, mixed-gender students (n = 6). Two semi-structured FG interviews were conducted on campus with students who had completed the previously established and existing SOMI programme in March 2017. The focus group aimed to a) understand what students liked and disliked about the original SOMI and b) what were the determinants and barriers to positive mental health

behaviours, such as help-seeking and PA participation in higher education. Lasting approximately one hour in duration, the FG's were held shortly after the students received the existing SOMI programme. The first five questions were selected specifically to learn about what students wanted from a mental health education and PA promotion programme in higher education (Krueger & Casey, 2015). The remaining five questions designed by the research team aimed to further understand issues and determinants surrounding students' mental health behaviours. These questions were created based on the emergent themes from the comprehensive literature review, including mental health literacy, wellbeing, resilience, help-seeking, and the PA participation of young adults.

4) Student Evaluation Questionnaire of existing SOMI Programme

The final element of the SOMI-HE needs assessment included an evaluation questionnaire designed to capture higher education student feedback immediately after participants had completed the existing SOMI programme. Summary findings were sought through closed, and open-ended questions from a convenience sample (n = 99). The evaluation instrument measured participants satisfaction with the existing SOMI programme duration, location, facilities, timing, presentation style, training aids, discussion opportunities, and training objectives through the use of a five-point rating scale (excellent, very good, good, fair, needs improvement). Three open-ended questions investigated participants' opinions on what aspects of the programme were useful, unhelpful, and needed change.

IM step two: Identification of programme outcomes, performance objectives and developing a matrix of change objectives.

The Logic Model of change designed in step two of the IM process for SOMI-HE provides the intervention with a solid foundation, specifying who and what will change as a result of the intervention (Bartholomew Eldridge et al., 2016). In step two, the determinants of both

risky and health-promoting behaviours are analysed. These behaviour determinants are understood as generic, modifiable, aggregates of beliefs' specific to the target population (Kok et al., 2016). Behaviour determinants usually include cognitive process such as knowledge, beliefs, attitudes, values, self-efficacy, outcomes expectations and skills (Bartholomew Eldridge et al., 2016). These determinants are matched to appropriate theories that may effectively change the behaviours identified (Kok, Bartholomew, Parcel, Gottlieb, & Fernández, 2014).The product of IM step two is a set of matrices outlining the behavioural change determinants required to achieve the desired mental health and wellbeing outcomes. These outcomes are more specific than traditional programme goals and objectives, these matrices are exact intervention foci statements of what participants should accomplish in the completion of the revised SOMI-HE programme (Bartholomew Eldridge et al., 2016; Bartholomew & Mullen, 2011).

IM step three: designing the programme using theory and practical strategies

In step three of IM for SOMI-HE, the logic model of change, as created in step two informed the generation of programme ideas, themes, components, scope, and sequences for the revised SOMI programme. Behaviour change theories suitable to the target population, programme duration, and style of delivery were identified as evidence-based approaches and transformed into Behaviour Change Techniques (BCT's) to address the programme objectives (Abraham & Michie, 2008b; Bartholomew Eldridge et al., 2016; Bartholomew & Mullen, 2011; Hagger, Keatley, & Chan, 2014; Kok et al., 2016). Conditions for the effective selection of BCTs must: (1) target a determinant that predicts behaviour; (2) be able to change that determinant; (3) be translated into a practical application tailored to the learning needs and context of the higher education student population (Kok et al., 2016).

IM step four: Production of the Revised SOMI-HE Programme

Step four of the IM process was a creative phase, in which the research team used the core BCT's, as outlined in step three to produce messages, resources, and activities. Step four's pilot testing of the SOMI-HE programme was implemented by exposing key components to a small sample of higher education students (n = 50), and to a selected sample from the Delphi expert panel (n = 4). An anonymous evaluation feedback sheet asked the participants from the pilot programme production exercise for their thoughts and recommendations.

IM step five: programme implementation plan

The fifth step of the IM process for SOMI-HE requires the implementation of another matrix development, similar to step two (Bartholomew Eldridge et al., 2016). As part of this stage, the research team is advised to conduct a needs assessment for the implementation of performance objectives, with personal and external determinants. The research team accessed the students through local-level approaches, making formal links with selected academic departments and individual lecturers in the selected higher education setting. Through this collaborative and local-level approach, adoption of the programme depended on the uptake of an interested programme co-ordinator and/or lecturer within the university. The PI's refer to this as 'championing' in the research.

IM step six: evaluation plan

The final step six of the IM process for SOMI-HE comprises of the evaluation plan for the revised SOMI programme. A quasi-experimental pre and post-test study was conducted with two groups of postgraduate degree student teachers, repeated over two years, specifically to determine whether the programme reached its goals in changing the behaviours associated with the determinants, using a mixed-methods research design.

Data analysis

The multi-stage, mixed methods data collection described in step one and the design of SOMI-HE (steps two to six) were completed over a fifteen-month period (November 2016 to February 2018). The first stage of data collection in the IM process as parts of the needs assessment, the literature review, was completed using empirically robust and peer-reviewed sources only. Key themes from the literature review were identified through summarising studies relative to the mental health and PA levels among higher education students. Furthermore, the data from the first and second round of the Delphi process were analysed using a thematic approach (Braun & Clarke, 2006; Maguire & Delahunt, 2017). Thematic content analysis is effective for Delphi research studies in mental health education (Sharkey & Sharples, 2001). To ensure the trustworthiness of the qualitative data in both rounds, themes identified were reviewed by the two other senior researchers. Additionally, further validity in terms of the thematic content analysis was sought from members of the expert panel. The semi-structured FG interviews were recorded via Digital Dictaphone (Olympus Digital Voice Recorder WS-852), transcribed verbatim, and anonymised. An inductive thematic analysis was used to identify themes, organise, describe and interpret data in rich detail (Braun & Clarke, 2006)).The analysis followed a six-step procedure as outlined by Maguire & Delahunt (2017). Finally, the SOMI evaluation survey was analysed descriptively using Statistical Package for the Social Sciences (SPSS). The open-ended questions from the evaluation form were analysed using similar thematic approaches, as applied in the Delphi Method and the semi-structured FG interviews. The data retrieved from step one of the IM exercise specifically informs the results for the design and implementation of the SOMI-HE programme to follow.

Results

Outcomes from the IM process for SOMI-HE are described in this section, according to the previously identified six steps of the (Bartholomew Eldridge et al., 2016) protocol. Step one

of the results from the IM process provides data from the needs assessments and the design of the logic model of the problem (see Figure 1). Each of the remaining IM steps (two to six), are then informed by the results from step one of the IM process for SOMI-HE.

IM step one: Needs assessment, and the logic model of the problem results

1) Logic Model of the Problem: Literature Review Results for SOMI-HE.

The literature review investigated the mental health and PA levels of students attending higher education. Five key themes were identified; 1) mental health literacy, 2) wellbeing, 3) resilience, 4) help-seeking, and 5) PA participation of young adults in higher education. Substance use, social support, knowledge, skills, stigma, attitudes, barriers and mental health literacy were prominent cognitive, social and behavioural determinants of positive mental health among young adults attending higher education (Davoren, Fitzgerald, Shiely, & Perry, 2013; DeBate, Gatto, & Rafal, 2018; Reavley et al., 2012; Kickbusch, 2008; Bröder et al., 2017; Gulliver et al., 2012). Social support, gender, sedentary behaviour, planning with others, knowledge, skills, self-efficacy, motivation, perceived barriers and substance-use were common determinants of PA engagement in the general and young adult population (Condello et al., 2017; Deliens, Deforche, De Bourdeaudhuij, & Clarys, 2015; Rovniak, Anderson, Winett, & Stephens, 2002; Vainshelboim, Brennan, LoRusso, Fitzgerald, & Wisniewski, 2019).

2) *Logic Model of the Problem: Delphi Method Results for SOMI-HE.*

The expert panel responses to the KWL activity highlighted issues of priority under the concept of mental health literacy. The expert panel emphasised how the college social system can impact low help-seeking behaviour, and low use of resilience-building strategies, asserting that mental health literacy and sign-posting are major areas of importance for early intervention. The expert panel determined that there is a need to normalise and give students

the language to recognise mental health in order to raise awareness, reiterating the concept that *we all have mental health*. Under the theme of wellbeing, the expert panel discussed students experiencing high levels of stress and anxiety. They recognised PA as a method to enhance wellbeing through increased connections with others, and as a strategy to reduce stress/anxiety. Teaching students' mindfulness was another consensus strategy, which was consistently identified as a method to engage higher education students to pay attention to their own mental health and as a strategy to increase their sense of wellbeing. Under the resilience theme, the panel emphasised that during the higher education cycle, students have the absence of *one good adult*. In each round of data collection, the association between 'one good adult' and higher levels of resilience were consistently outlined. The theme of resilience overlapped with the fourth theme, help-seeking. The panel continually referred to other Irish research (Dooley and Fitzgerald, 2012) indicating the association between having one good adult and positive, protective indicators of mental health. Finally, PA for positive mental health was identified as a key area for content development in SOMI-HE. The expert panel also agreed that motivation to begin and sustain PA behaviours were problematic for many higher education students, many of which commented that in stressful times, PA was most likely to *drop off*. The emerging behaviour determinants extrapolated from these themes included the environment, knowledge, skills, self-efficacy, motivation, outcome expectations, risk perception, and perceived barriers; these themes were mapped accordingly onto the logic model of the problem (see figure 3) and incorporated into the subsequent IM steps for SOMI-HE.

3) Logic Model of the Problem: Focus Group Results for SOMI-HE.

Focus groups interviews were held to evaluate student reflections and feedback on the original SOMI. Doing so was complimentary to the above Delphi findings, offering students an opportunity to elaborate on their experience of participating in a mental health intervention

programme. These findings indicate that students determine there is a need for such programmes, however, if programmes are not tailored to the needs of students, they are less likely to find the programme engaging and therefore less effective.

Provision is compassion. This first theme determined by the FG research was the students expressed the need for mental health interventions for themselves and other young adults attending higher education. Students discussed the challenges of stigma and the necessity to offer more support to students through increasing mental health literacy. One female postgraduate student highlighted what it meant to be allocated the time-out from regular lectures to learn about wellbeing. Expressing that she appreciated the priority and attention shown to the student cohort by providing them with the opportunity to complete the programme she asserted: I think a lot of us know a lot about wellbeing, but I think it is nice actually to get the terms and get the actual information'. Another female participant stated: 'Yes. There could be people in our class that are struggling and don't recognise they are struggling, but if they went to the course, they could see that they are…'

Reducing barriers - stigma is work in progress: When asked whether programmes can reduce mental health stigma, participants maintained they felt programmes like SOMI would be effective in reducing stigma but also felt that higher education mental health services still needed to develop this area for students. A male postgraduate participant gave his general overview of mental health stigma, expressing:

> I think they (HEI's) have got an awful lot better… but I think there is still a long way to go. I think mental health issues still exist. We are open to talk about it now but we weren't before.

His female postgraduate peer reiterated his point and shared a common perspective: 'Something is still wrong. The stigma is still there but I think the programmes… are helping. It is getting there'. For this reason students suggested that programmes should be mandatory

for all to attend so that the reach and effect of the programme are maximised. Two female participants conversed and exchanged the view that if the programme is left voluntary for students to attend, it would not be as effective. One female postgraduate student stated if the programme was optional: ‘the same kind of people are going to come, the problem is the people that you are not going to be able to reach’. While her undergraduate peer agreed: ‘I think it should be mandatory in your course, and it should be mandatory to go’.

Students revealed they enjoyed learning new concepts and language, emphasising that terminology used in SOMI, such as ‘mental fitness’ was seen as a merit of the programme as it was less stigmatising. One female undergraduate student announced: ‘when you say something like “fitness” everybody knows what physical fitness is and when you say mental fitness it may prompt you more to look after yourself’. Her peer concurred and responded: ‘It sounds nicer. When people hear the words “mental health” they think about the negative disorders that people have. Whereas the word fitness is more positive, so people may have less stigma towards it.’. Participants predominantly reported that they felt ‘talking’ was the most important factor in maintaining wellbeing. Poor communication, knowledge, skills, and access to services were seen as barriers to maintaining positive mental health.

We need to connect: This theme explored the students want for connection and active engagement with the programme material. Participants felt they had little time for discussion in the previously delivered SOMI programme stating: ‘we could have had more of an open discussion, more time for feedback and opinions’. The students discussed at large that the programme did not help them to connect with one another and engage in a meaningful mental health discussion. A female postgraduate participant suggested: ‘Maybe reduce the PowerPoint’s because there was a lot of slides’. This theme also highlighted the necessity for relatable material and resources to be considered as relevant to the revised SOMI-HE. The previously existing SOMI programme was originally designed for sporting communities,

therefore, there were many components of the programme that the selected sample of higher education students could not identify with. One undergraduate female participant reported: 'I just didn't connect with it…'

Mindfulness: The fourth theme indicated participant enjoyment of learning about and using mindfulness. A female undergraduate student expressed how she enjoyed the effect of mindfulness:

> I think talking about the ways that you could improve your mindfulness (was interesting). I really `liked the way that you actually went through it (mindfulness) and did the exercise because I felt relaxed doing it. I was almost falling asleep; I was really relaxed.

This feedback emphasised the extent to which practical strategies and skills can enable students to experience the perceived outcomes from participating in positive health behaviours.

Exercise is good for your health. The final theme captured student recognition of the benefits of PA for wellbeing. Students described already knowing PA is good for their health, however, there are barriers to success in achieving the benefits of PA. For example, students felt they cannot prioritise PA. A postgraduate student expressed how she felt PA was another stressor that would inhibit her academic progress:

> We all know we should (exercise), but it is doing it (is the problem). We all have lessons to plan and reflections to write and they all have to be done before tomorrow, and if you go for a walk first and you do feel better when you come back but you also know that you are going to be up past 12, 1 o'clock.

In this case, there was tension between the perceived benefits and the perceived drawbacks of taking the time to be physically active. Students perceived both time limitations and a heavy workload as inhibiting factors to increasing PA, directly expressing that: 'it's just finding the time to do it… it sounds like an excuse but it is just so hard'. Social influence and appearance

were seen as motivators that increase student PA, whereas limited time, fear of judgement, knowledge, access to facilities, lack of routine and motivation were seen as barriers. Behavioural determinants of positive wellbeing strategies themed from the FG discussion include the environment, knowledge, skills, motivation, self-efficacy, poor attitudes and perceived barriers.

4.) *Logic Model of the Problem for SOMI-HE: Evaluation Form Results*

The descriptive evaluation questionnaire data from SOMI revealed that participants' had their highest satisfaction with the 'SOMI presenter' (M = 4.6 out of a max value of 5.0, SD = 0.730) and had their lowest satisfaction with the 'discussion opportunities' (M = 3.0 out of a max value of 5.0, SD = 1.07). The qualitative data from the open-ended questions in the SOMI evaluation questionnaire presented similar findings to the previously mentioned semi-structured SOMI FG. Data analysis suggests that higher education students were most satisfied with how the programme raised awareness of stress and the overall benefits of PA participation. Existing SOMI components, such as the 'Five-ways to Wellbeing' (Aked, Marks, Cordon, & Thompson, 2008), mindfulness, 'one good adult' (Dooley & Fitzgerald, 2012) and neuroplasticity emerged as the most helpful components of the existing SOMI programme. Participants reported an appreciation towards the friendliness of the presenter and their normalisation of attitude towards mental health. The least helpful elements of the programme included a lack of engagement and discussion, limited time and an absence of clear take-away resources. Participants reported dissatisfaction towards accessing the programme around their formal academic time-table, and the provision of unrelated sporting orientated material. .

The combination of results from all four methods of the needs assessment data collection were combined and mapped to create the Logic Model of the Problem in step two of the IM

process for SOMI-HE (see Figure 3). Determinants were triangulated, prioritised and matched to their changeable behaviours within the reach of the intervention programme. The final selected determinants comprised of knowledge, skills, self-efficacy, motivation, risk perception, poor attitudes, barriers and outcome expectations.

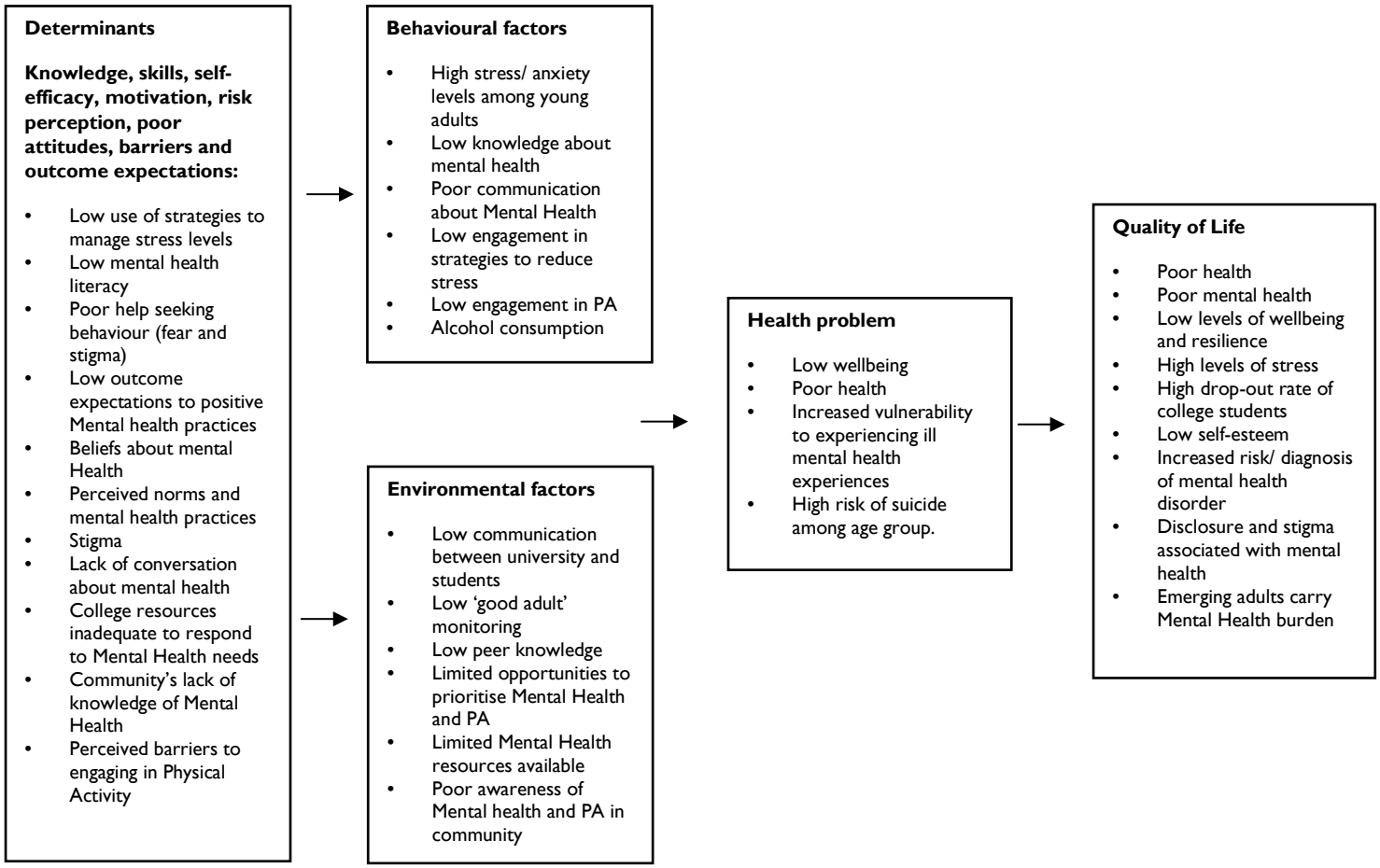


Figure 3. SOMI-HE Logic model of the problem mapped from the data collected in step one of IM (Bartholomew Eldridge et al., 2016)

IM step two: Identification of programme outcomes, performance objectives, and change objectives results

Based on the needs assessment, as carried out through the robust protocol in step one of the IM process for SOMI-HE, the overall behaviour outcomes for the students in higher education were defined as follows:

- Develop knowledge and application of positive mental health strategies to increase mental fitness through evidence-based practices.
- To reduce mental health stigma among higher education students and promote help-seeking behaviour.
- To increase levels of PA according to the international guidelines.

Matrices of change were designed to address the selected changeable determinants identified in the Logic Model of the Problem. Through writing specific change objectives as exemplified in table 1, the programme designer can clarify explicitly what needs to change in both the behaviour and the environment to improve health and quality of life.

Table 1 Example Matrix of Change created in SOMI-HE

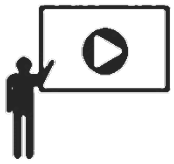
Outcome 1*: To gain knowledge and practical application of positive mental health strategies and increase student awareness of their mental health needs*

Performance/ behaviour objectives	**Determinant 1 Knowledge/ Awareness**	**Determinant 2 Attitudes and barriers**	**Determinant 3 Skills**	**Determinant 4 Self- efficacy**	**Determinant 5 Outcome expectations/ motivation**
Have increased knowledge of positive mental health, stress and resilience	• Express on the concept of positive mental health and wellbeing	• Understand that stress is a normal part of life	• Recognise that students already maintain some positive mental health strategies and highlight the need to use other varied methods	• Belief in the ability to monitor and manage stress with mindfulness	• Explain that discussing mental health is important to normalise and destigmatise mental health conversations

IM step three: Designing the programme using theory and practical strategies results

The revised SOMI HE programme was designed to be delivered to a maximum of 150 students per sitting, with a dosage of to 2 x 90-minute sessions across two weeks – this revision increased the dosage and duration of the existing SOMI programme from a standalone 75-minute intervention. This revised programme duration and dosage alteration was in response to the findings of the student FG's in parallel to the advice from the expert panel as part of the Delphi-exercise. The revised SOMI-HE programme was created as an interactive learning experience in direct response to the proposals made throughout the research process in step one of the IM i.e. the needs assessment. An additional interactive higher education student workbook was also designed to complement the revised audio-visual programme, specifically as a strategy to increase active student engagement.. Some relevant components from the existing SOMI programme were maintained in the re-design phase of SOMI-HE. For example, 'The Five Ways to Wellbeing' (Aked et al., 2008) and 'One good adult' (Dooley & Fitzgerald, 2012) were the preferred components of the existing SOMI programme, which were favoured by the students, as indicated by the results of step one's needs assessment (Aked et al., 2008) Guided by the research informed data from Bartholomew and colleagues (Abraham & Michie, 2008a; Bartholomew Eldridge et al., 2016; Kok et al., 2016), the most suitable theoretical models were chosen to identify appropriate theoretical determinants. From the theories selected, a list of BCT's, as applicable to the SOMI-HE content were selected from the taxonomies produced by Abraham & Michie (2008b), Bartholomew Eldridge et al, (2016), Bartholomew & Mullen (2011), Hagger et al., (2014), Kok et al., (2016). The BCT's were then developed into icons as coding indicators, later used as a further strategy for the development of a facilitator's manual in the revised SOMI-HE programme. A sample taxonomy of the BCT's in SOMI-HE are exemplified in table 2 (see below).

Table 2 Taxonomy of Behaviour Change Techniques - Samples from SOMI-HE

Icon	Taxonomy of behaviour change techniques (methods)	Theories
 **Elaboration**	Elaboration - Stimulating the learner to add meaning to the information processed. Methods used to elaborate are effectively encouraged through discussion. Discussion allows for thought processing of information and may help contribute to long term recall.	Social Cognitive Theory (Bandura, 1977) Operant conditioning (Skinner, 1938)
 **Guided practice**	Guided Practice- Prompt individuals to rehearse and repeat the behaviour various times, discuss the experience, and provide feedback.	Social Cognitive Theory (Bandura, 1977)

Theoretically sound intervention strategies to impact behaviour change were included in this stage of the programme design for SOMI-HE. Bartholomew Eldridge et al.(2016) assert this enables planners to develop a solid foundation in theory and evidence through ensuring that planners select methods that are congruent with scientific evidence. Each of the behaviour outcomes and the associated theoretical methods were matched with their determinant, along with an application strategy that was deemed appropriate to positively impact the determinant (See table 3.). These strategies often incorporate student-related workbook (WB) activities, completed by the participants as the SOMI-HE programme unfolds.

Table 3 Methods and application strategies to address behavioural outcomes and their determinants in SOMI-HE

Behavioral outcome	Determinants and change objectives	Method	Application	Slide	Workbook
Have increased knowledge of positive mental health, stress, resilience and positive mental health strategies	Knowledge on the concept of positive mental health and its impact on wellbeing	Elaboration	The word tree (group brainstorm – what is mental health). Highlight perspective of mental health can be negative.	Slide 4 Slide 5	WB p.3

IM step four: Programme production for the revised SOMI programme results

The interactive SOMI-HE presentation, alongside the two developed student workbooks, were piloted with a sample of n = 30 undergraduate university students in January 2018. Students were exposed to short segments of the SOMI-HE programme for 20 minutes over a six-week block, typically before the end of a weekly lecture. Student participants who completed the pilot of SOMI-HE reported enjoyment in these revised presentation and wellbeing components, however, feedback suggested that there was a mismatch between the volume of group activities between sessions one and two. The revised theoretical structure of the SOMI-HE programme appealed to the expert panel of members, and the revised interactive application strategies were seen as coherent and engaging.

IM step five: programme implementation plan results

As this IM process for SOMI-HE was part of a single site, convenience sample, case-study approach in a higher education setting, the programme implementation plan consisted of contacting four respective academic departments within the university. E-mail correspondence comprised of contacting each department administrator and providing information about the SOMI-HE programme and research. If the department expressed interest in championing the SOMI-HE programme, and allocating provision for programme delivery to students in higher education within the formal lecture timetable, the research team proceeded to meet face-to-face with the head of department, and the teaching faculty. The research team and the department worked together to schedule advertisement visits and programme delivery days during allocated lecture time slots. Two of the four contacted academic departments successfully agreed to allocate the intended 2 x 90 minutes sessions of the SOMI-HE intervention to their higher education enrolled students. The research team

continues to develop and amend step five's programme implementation plan, as the impact of the programme depends not only on its effectiveness of design but also the effectiveness of its dissemination (Bartholomew Eldridge et al., 2016).

IM step six: evaluation plan

In the sixth step of the IM process for SOMI-HE, the evaluation and data collection plan were developed to determine the programme efficacy for the revised SOMI-HE, in an attempt to add to the body of research that defines evidence-based interventions (Bartholomew Eldridge et al., 2016). The evaluation process is currently under review as part of a separate study within the SOMI-HE research.

Discussion:

This study documents the research-informed IM process for the re-design and development of a mental health and PA promotion intervention programme for higher education students, known as SOMI-HE. The systematic steps of IM used as part of the SOMI-HE programme have successfully drawn on a variety of pedagogical approaches, through using evidence-based decision-making protocol, identified at each stage of the programme design (Bartholomew Eldridge et al., 2016). Through the research-informed process of IM, the alignment of the SOMI-HE programme to the objectives, methods, and evaluation strategies has allowed for the creation of a rigorous and robust programme, aimed specifically at the targeted higher education student population. The research employed as part of step one in IM involved an extensive investigation into the modifiable determinants, regarding the low levels of mental health and PA participation among young adults (students) in higher education. The most prominent modifiable determinants for mental health and PA, selected as part of this study, include knowledge, attitudes, barriers, skills, motivation, outcome expectations, self-efficacy, and the perceived environment. These specific determinants

concur with previously acceptable international wellbeing intervention studies (Ammendolia et al., 2016).

IM as part of the revised SOMI-HE programme compelled the research team to foster innovative problem solving, however, the lengthy duration required in each of the steps in the design stage, particularly step one was of concern in terms of fluid research dissemination. The IM process, as part of the revised SOMI-HE programme, took approximately sixteen months for research design, development time, and the evaluation procedure as part of step six in the IM process is currently ongoing. This extended timeline for programme design and evaluation has been identified as a challenge by other researchers in the field, using IM (Ammendolia et al., 2016; Mceachan et al., 2008; Van Stralen et al., 2008). In response to this lengthy duration of IM, the research team endorses that the process helped to minimise error, and fulfil a rounded, ecological perspective of the health problem, as part of the revised SOMI programme.

IM acknowledges that humans and human behaviours are part of a complex system (Kok, 2014), therefore, there are specific limitations within the environmental conditions of meaningful and sustainable behaviour change. An effective environment, or organisational level response for higher education students is to integrate the intervention within university/college courses, specifically as means of improving the outcome, as previously done within the PA-promotion construct (Plotnikoff et al., 2015). In the current study, however, the research team did not have an association with the environmental agents of higher education for organisational change. In combat to this barrier, the revised SOMI-HE programme utilised an array of multi-theoretical approaches for intended personal behavioural changes (Kok, 2014), and worked locally to evaluate the programme.

In terms of sustained behavioural changes to mental health and PA participation for young adults, this IM process has found that the revised SOMI-HE programme could have been lengthened in terms of duration and dosage of frequency to improve the programme's potential impact to influence positive behavioural change. For example, within the field of mindfulness (a component of the revised SOMI programme), research suggests that even 3-4 brief sessions of mindfulness training can buffer negative mental health ill effects (Creswell, 2017). The current revised SOMI-HE intervention is only in a position to offer an experience of learning mindfulness twice, and therefore, has a low dosage of intervention exposure.

At this stage of the IM process, it is not possible to draw conclusions about the effectiveness of the revised SOMI-HE programme, however, the process is firmly rooted through a theoretically designed and research-informed approach. In terms of viability, the ratio of time spent designing the revised SOMI-HE programme, in comparison to the dosage and delivery time is exceptionally disproportionate in the context of higher education. Although the research team found the IM process to be exceptionally thorough and research-informed, specific stages, such as step three's creation of the matrices were challenging.

Conclusion

In this study, the authors provide a detailed description of how HEI's can use IM to develop a mental health, and PA programme, which specifically seeks to respond to the wellbeing needs of young adults in higher education . IM provides an opportunity to theoretically support intervention programmes for large cohorts of young adults in HEI's. This SOMI-HE three-hour programme is an innovative learning pathway for students, specifically the rigorous planning undertaken, research-derived protocol, and theoretically, novel pathways created between problems experienced by the target population, and their proposed solutions. The final product detailed in this study of the IM process is a blueprint to a programme

known as SOMI-HE, which is created through intelligent design and content development, by various and relevant multi-sectoral stakeholders, invested in the wellbeing of young adults. The subsequent actions to follow include step five's implementation plan to create a method of effectively disseminating SOMI-HE, and step six's evaluation plan for examining the effectiveness of SOMI-HE. This will most likely require 'buy-in' from senior leadership for the prioritisation of student wellbeing as an integral component of university strategic planning and policy, as previously flagged in the literature (Murphy, 2017; Thorley, 2017).

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