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An evaluation of the SPARX-R computerised mental health programme for improving mental health and wellbeing among adolescents attending alternative education

Thesis submitted for the Degree of Doctor of Philosophy

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Submitted February 2018
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Tuuli Kuosmanen, Galway, October 2017
Abstract

Introduction

International evidence suggests that youth who leave mainstream education early have poorer mental health and social outcomes than their peers. In the European Union, 11.1% of youth leave mainstream education before completing upper-secondary school. Early school leaving is associated with challenging home environments and parents’ socio-economic background, and is likely to result in further disadvantage by limiting the young person’s access to employment or further education and training.

In Ireland, an alternative education (AE) programme, Youthreach, provides an opportunity for young people who have left school early to achieve second level qualifications and vocational training. However, the social, personal and educational challenges experienced by many of these young people highlight the need for effective strategies to build resilience and improve the mental health and wellbeing among AE students to ensure successful completion of their studies and prevent mental health problems.

Computerised mental health programmes for preventing anxiety and depression have been shown to be effective and acceptable with young people. However, the delivery of such programmes universally and to more vulnerable groups of young people needs to be further studied. Furthermore, the high drop-out and low engagement rates attributed to computerised mental health interventions call for increased implementation research to understand reasons behind disengagement.
Aims

The overall aim of this thesis is to examine the feasibility of delivering computerised mental health programmes within the AE setting in order to improve student mental health and wellbeing and prevent mental health problems. The aim of Paper I is to review the literature on the effectiveness of computerised mental health promotion and prevention interventions with youth in order to identify evidence-based programmes and gaps in the existing knowledge base. Paper II explores the needs and preferences of AE students and staff in relation to the implementation of computerised mental health programmes, to guide the implementation and evaluation of these programmes in the AE setting. The aim of Paper III is to examine the effectiveness of SPARX-R computerised cognitive behavioural therapy (cCBT) programme for preventing depression and improving wellbeing among young people attending AE. Finally, Paper IV examines user views on the implementation of SPARX-R, particularly focusing on factors that may have influenced programme engagement and drop-out.

Methods

This study incorporates a systematic literature review (Paper I), a qualitative requirement analysis of the needs and preferences of AE students (age 15-20 years) and staff in relation to the delivery of computerised mental health programmes (Paper II), and a randomized controlled trial (RCT) with integrated implementation research to examine the effectiveness (Paper III) and implementation (Paper IV) of SPARX-R cCBT in alternative education.

In Paper I, the effectiveness of online mental health promotion and prevention interventions with youth (12-25 years) is examined by means of a systematic literature review. Outcomes of interest included indicators of mental health (e.g. depression and anxiety) and social and emotional wellbeing (e.g. self-efficacy, self-esteem and coping skills).
RCTs, quasi-experimental studies and experimental studies without a control group were included in the review.

In *Paper II*, student and staff needs are assessed using the Requirements Development Approach (Van Velsen et al., 2013). First, an online staff survey (n = 16) was conducted to provide information on the Youthreach staff and students. Stakeholder requirements were further explored in four student workshops (n = 32) and staff discussions (n = 12).

*Paper III* reports on a cluster RCT (n = 146) with an intervention (SPARX-R) and no-intervention control condition. Measurements were taken at baseline and post-intervention, including indicators of positive mental health (general mental wellbeing, coping and emotion regulation) and mental health problems (depression and anxiety). Participants that provided data at post-assessment (n = 66, 45.2%) were included in the outcome analysis. Implementation research was integrated in the trial and the findings are reported in *Paper IV*. The implementation research consists of a post-intervention implementation questionnaire (n = 28), process evaluation questionnaires and post-intervention open-ended responses (n = 12). Furthermore, the staff moderators completed a staff feedback questionnaire (n = 6) with three staff members also participating in interviews.

**Results**

In *Paper I*, the results show that computerised mental health promotion and prevention interventions are effective in improving mental health and wellbeing and reducing symptoms of anxiety and depression in youth. However, high dropout and low engagement rates were consistently reported in studies, indicating a need for increased implementation research to better understand the factors determining engagement. Furthermore, most studies were conducted with
university student or secondary school student populations, with no studies focusing on more vulnerable groups of young people, who are at a greater risk for mental health problems.

*Paper II* showed that AE student and staff have quite specific needs and preferences that need to be met in delivering computerised mental health programmes, arising from issues with low levels of literacy and concentration, and the vulnerability of the students. Thus, programmes need to be customisable, fun and interactive and not text-heavy, use a positive strengths-based approach and ensure confidentiality and optional attendance. Staff need to be able to monitor and support students and require structure and timetabling to ensure sustained delivery, while also allowing for flexibility in delivery taking into consideration the needs of individual students.

In *Paper III*, a significant improvement in emotion regulation strategies was detected, with expressive suppression decreasing significantly in the SPARX-R group in comparison to the control (\(-2.97, 95\% \text{ CI} -5.48 \text{ to } -0.46, p = 0.03\)). No significant changes were detected on other outcome measures. High levels of attrition and low levels of engagement were reported, with a dropout rate of 55\% and only 30\% (n = 9) of participants completing the entire programme.

The findings from *Paper IV* indicate that the reasons for low engagement and high dropout as reported in the RCT, were related to the programme and the context of delivery. Technical issues, lengthiness and the lack of positive focus, as well inconsistencies in student attendance and interruptions in the curriculum were reported as the main reasons for disengagement. However, the findings also show that SPARX-R is easy to use for youth with low levels of literacy. Increased staff training and integrating the programme into face-to-face sessions may improve engagement rates and programme satisfaction.
Conclusions

This study adds to the existing literature by providing novel insight into the factors that need to be considered when developing and/or implementing computerised mental health programs with more vulnerable groups of young people. Few studies to date have examined, in such detail, user views on the implementation of computerised mental health interventions, or the use of such programmes with more vulnerable youth. The findings indicate a need for increased focus on developing computerised mental health promotion programmes that are based on building social and emotional skills. Young people attending AE, in spite of being at a higher risk for mental health problems, prefer universal programmes that are positive, and strengths-based rather than problem-based. Although further studies with larger samples are needed, the serious gaming approach used in SPARX-R shows potential as an easy to use and effective way of improving student wellbeing with populations with low levels of literacy. However, the findings also highlight the importance of contextual factors, such as staff training, integrating programmes into a dedicated mental health curriculum and complementing them with face-to-face interaction, in supporting effective delivery of computerised mental health programmes in the AE setting.
Overview of papers

A flow chart of the papers and their aims is presented in Figure 1.

Figure 1. An overview of the papers in this thesis

Paper I: A systematic review of online youth mental health promotion and prevention interventions

Contribution: Contributed towards devising the review protocol and search methods, conducting the systematic search and quality assessment of evaluation studies and writing up the findings.
**Paper II: The use of computerized mental health programs in alternative education: understanding the requirements of students and staff**


**Contribution:** Devising the research methodology, developing student and staff questionnaires and discussion protocols, recruitment of study participants, data collection (questionnaires and student and staff discussions), transcribing data from student and staff discussions, data analysis and write-up of findings.

**Paper III: A pilot evaluation of the SPARX-R gaming intervention for preventing depression and improving wellbeing among adolescents in alternative education**


**Contribution:** Devising study methodology, selection of outcome measures, recruitment of participants, day-to-day coordination of the study (contact with Centres, visiting each Centre at the start of the programme, resolving technical issues etc.), data collection (online) and analysis, write-up of findings.

**Paper IV: The implementation of SPARX-R computerized mental health program in alternative education: exploring the factors contributing to engagement and dropout**

**Contribution:** Devising study methodology, development of implementation measures, recruitment of participants, data collection (implementation questionnaire and student and staff discussions), data analysis and write-up of findings.
1. Introduction

The importance of good mental health and wellbeing in adolescence to ensure healthy development and positive health and social outcomes in adulthood is being increasingly recognised (WHO, 2013). Most mental health disorders have their first onset between the ages of 12-25 years (Hickie, 2004; Kessler et al., 2005) and tend to persist into adulthood (Costello et al., 2006). Worldwide, 10–20 % young people experience mental health problems (Kieling et al., 2011), with those experiencing social and economic disadvantage being disproportionately affected (Reiss, 2013). Education, particularly, has a protective role over the mental health and wellbeing of young people (Cutler & Lleras-Muney, 2006), with young people who leave school prematurely being at a greater risk of poor social and health outcomes than their peers in mainstream education (Freudenberg & Ruglis, 2007).

In Ireland, an AE programme, Youthreach, provides an opportunity for young people who have left school early to achieve second level qualifications and vocational training. However, the social, personal and educational challenges experienced by many of these young people highlight the need for effective strategies to build resilience and improve the mental health and wellbeing among AE students to ensure successful completion of their studies and prevent mental health problems. Approaches that focus on promotion and prevention and that are delivered in a youth-friendly and accessible ways are important, particularly for the more hard-to-reach and vulnerable groups of young people, such as early school leavers (Allen et al., 2014). The use of innovative strategies such as delivering programmes using computers may improve the relevance of mental health resources to youth and increase young people’s access to these resources. This doctorate study examines the use of a computerised mental health programme for preventing symptoms of depression and promoting mental wellbeing in the AE setting in Ireland.
Promoting youth mental health and wellbeing

Several recent international policy documents identify the promotion of youth mental health as one of the key public health concerns of our time, calling for an increased focus on the mental health of young people and the need for promotion and prevention strategies alongside treatment approaches (WHO, 2013; EU, 2016; OECD, 2015). Mental health promotion is separate to, although related to and overlapping with, the prevention of mental disorders (WHO, 2004). Mental health promotion aims to promote positive mental health and build competencies and resources, whereas prevention is concerned with reducing the incidence, prevalence and seriousness of specific mental health disorders, such as depression and anxiety (National Research Council and Institutes of Medicine, 2009).

Regarding youth mental health, improving the development of social and emotional skills, such as enhancing positive self-esteem, advancing the management of feelings and thoughts, building positive social relationships, and fostering the ability to learn and acquire education, is of particular importance (WHO, 2013; Osher et al., 2016). It has been shown to result in better academic achievement, reduced problem behaviours and reduced emotional distress (Barry & Dowling, 2015; Durlak et al., 2011).

The mental health of young people in Ireland

In Ireland, the mental health and wellbeing of young people aged 12-25 years is examined in a national study, the My World Survey (n = 14,306; Dooley & Fitzgerald, 2012). According to the My World Survey, young people in Ireland have generally good mental health and wellbeing, with 82% of adolescents (age 12-19 years) in secondary schools exhibiting normal to mild (11%) levels of depression, 75% reporting normal to mild (7%) levels of anxiety and 94% experiencing normal to mild (14%) levels of stress. However, mental health difficulties increase
in late teens and early twenties, coupled with a decrease in positive mental health and wellbeing. These figures are consistent with European level estimates, of 10-20% of youth experiencing mental health difficulties (Ravens-Sieberer et al., 2008; WHO, 2009).

The Irish national mental health policy framework, *A Vision for Change* (Department of Health and Children, 2006), and *The Healthy Ireland* framework for improved public health and wellbeing (Department of Health, 2013) advocate for a community-based model of mental health services, focusing on providing age specific mental health promotion and prevention strategies across the lifespan, particularly targeting at risk groups. In terms of adolescence specifically, it is recommended that evidence-based mental health promotion programmes be implemented in primary and secondary schools, and educational programmes be provided for more disadvantaged youth who leave school prematurely (Department of Health and Children, 2006).

The recently published national guidelines for promoting mental health and wellbeing in post-primary schools (Department of Education and Skills, Health Service Executive & Department of Health, 2013) support a whole-school approach and intersectoral collaboration in promoting the mental health and wellbeing of all students, while also providing more targeted support for at risk students. A Practice Manual for promoting youth mental health and wellbeing for those working in the youth sector has also been developed (National Youth Health Programme, 2013). A crucial part of the mental health promotion strategy is Social, Personal and health Education (SPHE)\(^1\), which is part of the national primary- and secondary-school curriculum, with the aim of building skills and competencies in areas such as building positive relationships, communication, self-management, emotional health and decision-making.

\(^1\) For further information please see www.sphe.ie
Socio-economic status as a determinant of mental health and wellbeing is well acknowledged (WHO & Calouste Gulbenkian Foundation, 2014). Socio-economic disadvantage is linked to increased risk factors for poor mental health such as, poor living and working conditions and inadequate education (Patel et al., 2007). Moreover, mental health disorders also contribute to low educational achievement and limited access to employment and therefore, deepen the socio-economic disadvantage. Mental health problems have been shown to be two to three times more common in young people from socially and economically disadvantaged families than in youth from families with high socio-economic status (Lemstra et al., 2008; Reiss, 2011). In Ireland, socio-economic disadvantage has been linked to higher levels of psychological distress and lower levels of positive mental health on a national level (Department of Health and Children, 2009).

On the contrary, education has a protective role for mental health and healthy behaviours (Cutler & Lleras-Muney, 2014). Education offers access to the job market, ensuring better income in adulthood and thus increasing the protective factors for positive mental health and wellbeing and reducing the risk factors for mental health disorders. Additionally, education may result in improved social networks, improved motivation for looking after one’s health and increase the ability to access and use of health related information (Cutler & Lleras-Muney, 2006).

Consequently, in order to support healthy development and positive life outcomes for all young people, international policy focuses strongly on keeping young people in education and facilitating the transition to employment, by providing health promotion and prevention strategies in education (OECD, 2015). Emotional and behavioural problems in youth are related to poor academic performance (McLeod & Kaiser, 2004), whereas positive mental health is associated with improved
school success and fewer risky health behaviours (Hoyt et al., 2012; Kirkwood et al., 2008).

*Early school leaving and mental health*

International evidence indicates that youth who leave mainstream education prematurely have poorer mental health and social outcomes than their peers (Freudenberg & Ruglis, 2007). In the European Union, 11.1% of youth leave mainstream education before completing upper-secondary school (European Commission, 2015). There is increasing policy focus on reducing the rates of early school leaving within the EU countries in order to provide equal chances for employment to all young people and to brake the cycle of economic deprivation and social exclusion experienced by many young people (European Commission, 2013; OECD, 2015).

The link between early school leaving and poor mental health is complex. Mental health difficulties can negatively influence school success (WHO, 2003) and thus contribute to school drop-out, and can also be the result of, or exacerbated by, leaving school early (Kaplan et al., 1994). Negative experiences in mainstream education (McHugh, 2014) and the decision to leave school can create feelings of inadequacy and worthlessness, uncertainty about the future and social isolation (Reay, 2004). Furthermore, many of these youth are also exposed to stress created by low socio-economic status and challenging home environments, both of which are linked to school drop-out (Byrne & Smyth, 2010; Garnier et al., 1997; Jimerson et al., 2000).

*Alternative education*

In Ireland, a Second-Chance Education Program, Youthreach, provides an alternative route for second-level education for youth aged 15-20 years who have left school. Youthreach delivers the National second level curriculum and examinations and vocational training, using an
approach that is less structured than in mainstream education and catered towards the individual needs of the students.

There is no one reason why young people in Ireland decide to leave mainstream education, but rather, early school leaving is influenced by a matrix of factors such as learning difficulties, poor peer relationships and bullying, socioeconomic disadvantage and dysfunctional family backgrounds (Stokes, 2003). Social and educational disadvantage is common among the students, with an estimated half of the students coming from dysfunctional family backgrounds and nearly a third (32%) having difficulties with literacy and numeracy. Furthermore, nearly a third (30%) of these young people have been estimated to be in need of psychological support (WRC Social and Economic Consultants, 2007), which can make the progression in one’s studies difficult and continuing on to further education and training more challenging.

Although the youth attending second chance education have an increased need for mental health support, adequate resources in many cases are not in place. Furthermore, stigma and previous negative experiences with adult service providers may inhibit help seeking (McHugh, 2014; Fleming, Lucassen, et al., 2016). Programmes are needed that improve the social and emotional skills and resilience of these young people in order for them to successfully transition to further education and employment and to reduce the risk for mental health disorders. However, creative approaches to mental health promotion are needed that are engaging and acceptable to these vulnerable young people.

*Mental health promotion*

This thesis is situated in a mental health promotion perspective. Mental health promotion is concerned with the promotion of positive mental health and improving the quality of life of the general population,
including those at high risk of or experiencing mental health problems (Barry & Jenkins, 2007). Mental health promotion aims to improve population mental health and wellbeing by addressing individual skills and competencies as well as improving peoples’ social, physical and economic environments to be more conducive to health.

Mental health promotion draws from the principles and strategies of health promotion (Barry, 2009; Barry & Jenkins, 2007; Herrman et al., 2004). Health promotion aims to improve positive mental health and reduce health inequities by taking action on the determinants of health and increasing the control of individuals and communities over their health (WHO, 1997). The Ottawa Charter for Health Promotion (WHO, 1986) identifies five action areas for health promotion: Building healthy public policy, create supportive environments, strengthen community action, develop personal skills and reorient health services. Thus, health promotion works at different levels ranging from developing social and emotional skills and resilience on an individual level to advocating for the development of healthy public policy.

Positive mental health

Following the theories of mental health promotion, in this study, mental health is understood as a positive concept that is of vital importance to the overall health and functioning of a person as well as the social capital and economic development of the wider society. The World Health Organization has defined mental health as “a state of emotional and social well-being in which the individual realises his or her own abilities, can manage the normal stresses of life, can work effectively, and is able to play a role in his or her community” (WHO, 2001, p. 1).

Positive mental health is usually conceptualised as encompassing of different aspects of wellbeing (Barry & Friedli, 2008). Keys (2007), for example, talks about positive mental health as flourishing, comprising of psychological wellbeing, emotional wellbeing and social wellbeing.
Supported by empirical evidence, Keyes argues that mental health and mental illness are separate but related concepts, with the absence of positive mental health (languishing) being linked to decreased productivity and increased risk of mental illness and all case mortality, (Keys, 2005; Keys & Grzywacz, 2005; Keys et al., 2010; Keys & Simoes, 2012).

Furthermore, current research distinguishes between two dimensions of positive mental health or wellbeing: the hedonic dimension relates to the way people feel about themselves and their lives, and eudaimonic dimension concerns the way in which people function in their lives (Ryan & Deci, 2001). Therefore, having positive mental health can be considered as feeling good in a life in which one functions well. Positive mental health also incorporates the concept of resilience to manage negative feelings and life events and to bounce back in the face of adversity (Friedli, 2009; Huppert, 2009).

Several measures of positive mental health and wellbeing exist, including, for example, indicators of self-esteem, resilience, coping, self-efficacy, life satisfaction, hopefulness and sense of coherence (Parkinson, 2008).

Mental health promotion and prevention in the educational setting

There is a growing evidence base showing that mental health promotion and prevention interventions can have a lasting positive impact on young people’s mental health and social outcomes (Durlak et al., 2011; Jané-Llopis et al. 2005; Clarke, Morreale et al., 2015). The evidence on the effectiveness of mental health promotion and prevention interventions when delivered in the school setting is particularly strong (Barry et al., 2013; Weare & Nind, 2011). The educational setting offers an opportunity to promote the positive mental health and wellbeing of all students through the use of universal
approaches, as well as prevent mental health problems by the use of more targeted, preventative approaches.

Mental health promotion programmes that teach social and emotional skills show significant improvements in students’ emotional and behavioural wellbeing, including improvements in areas such as self-esteem and coping skills, as well as improvements in academic outcomes (Barry et al., 2013; Durlak et al., 2011; Taylor et al., 2017). Such programmes are particularly suited for universal delivery, improving the social and educational outcomes for all students from diverse backgrounds. On the other hand, prevention approaches, particularly when based on cognitive behavioural therapy (CBT), have been shown to be particularly effective in addressing anti-social behaviour (Beelmann and Losel, 2006) and reduce depression and anxiety (Neil and Christensen, 2007; Waddell et al., 2007).

CBT skills building programmes that focus on developing problem-solving skills, social skills and communication skills, cognitive restructuring and relaxation, can be delivered as indicative or universal prevention programmes (Neil & Christensen, 2007). The impact of such programmes on the mental health and wellbeing of high-risk children is especially strong (Weare and Nind, 2011). For example, the FRIENDS for Life CBT programme to prevent anxiety in school-aged children has been shown to be effective in reducing symptoms of anxiety and depression, reducing peer and conduct problems and improving self-esteem and use of coping-skills among socioeconomically disadvantaged youth (aged 10–13 years) when delivered universally (Stopa et al., 2011).

*Mental health promotion and prevention in out-of-school settings*

The evidence is much weaker for the effectiveness of mental health promotion and prevention programmes in out-of-school and community settings, mainly due to the poor quality of the conducted
effectiveness studies (Barry & Dowling, 2015). Community and out-of-school programmes are often targeted at more vulnerable, at-risk youth, and involve activities such as sports, art, outdoor activities and mentoring. They have been shown to improve young people's social and emotional outcomes, reduce violence and risk behaviours and improve academic performance (Barry et al., 2013; Barry et al., 2017; Catalano et al., 2004; Melendez-Torres et al., 2016). CBT for preventing depression has also been shown to be effective when delivered in primary care to youth with elevated symptoms (Garber et al., 2009).

AE differs from mainstream education by adapting a less structured and more student centred approach, thus bearing some resemblance to the out-of-school youth setting. Limited amount of studies to date have examined the use of promotion and prevention strategies in the AE setting.

*Computerised mental health programmes*

The use of technology and the Internet, for delivering mental health promotion and prevention interventions, is gaining increasing interest among researchers and practitioners. In theory, computerised delivery is associated with improved cost-effectiveness and access to services (Bennett-Levy et al., 2010) and improved implementation fidelity, due to the limited input needed from programme moderators (Calear et al., 2009). Furthermore, computerised mental health programs can offer anonymity, which may alleviate some of the stigma and barriers related to help-seeking. The use of technology for mental health promotion seems particularly promising with young people, who are technology natives and already use technology to access mental health information (Dooley & Fitzgerald, 2012; Gould et al., 2002). Computerised programmes have been delivered in school settings as universal (Calear et al. 2009) or targeted programmes (Merry et al., 2012), in primary care as targeted interventions (Van Voorhees et al., 2009) or as self-directed programmes completed from home (Kenardy et al., 2003).
The effectiveness of computerised mental health promotion and prevention interventions with youth

There is a growing evidence-base showing that computerised mental health programs can be effective in improving mental health and wellbeing in youth. Module based online mental health promotion interventions delivered in the school setting show promise in terms of improving mental health literacy, psychological wellbeing and support seeking behaviour (Braithwaite & Fincham, 2007; Fridrici & Lohaus, 2009; van Vliet & Andrews, 2009) and computerised cognitive behavioral therapy (cCBT) interventions have been shown to significantly reduce symptoms of anxiety and depression in adolescents (Pennant et al., 2015). The cCBT program MoodGYM, is so far the most widely studied of such programs. It has been delivered in educational settings including secondary schools (Calear et al., 2009) and universities (Lintvedt et al., 2013; Sethi et al., 2010). However, its use with youth who are socially, economically or educationally disadvantaged remains unstudied.

The CBT based serious game for adolescents seeking help for depression, SPARX, appears to be the only computerised program so far that has been evaluated within an AE setting (Fleming, Dixon, Frampton & Merry, 2012). Fleming and colleagues (2014) define serious games as ‘interventions which are games or utilise elements of gaming as an integral and primary method for achieving their purpose’ (p. 229). SPARX incorporates elements of gaming, such as completing goals and challenges, presentation of a narrative and interaction with program characters, to improve engagement and facilitate learning. Fleming and colleagues (2012) found SPARX to be both effective in reducing symptoms of depression and acceptable to youth in AE. However, due to the small number of participants in this study (n = 32) the findings can only be considered indicative and also may not be replicable in other country contexts.
Need for implementation research

Although computerised mental health promotion programs show promise, high drop-out and non-completion rates are common (Christensen et al., 2011). This indicates the need for improved implementation research to better understand the reasons behind disengagement. The significance of implementation is particularly highlighted when considering delivering computerised programmes in AE, where students can be more difficult to engage due to behavioural and literacy issues. Implementation research should go beyond examining program acceptability, from exploring how well the program responds to the specific needs and preferences of the target audience (Van Gemert-Pijnen et al., 2011), to examining what implementation factors, such as adherence and program fidelity, may have moderated program impact (Durlak et al., 2011). This information is important in terms of understanding how programs should be developed to maximize engagement and impact and to understand what makes for good quality implementation (Weare, 2015).
2. Aims

The aim of this thesis is to examine the feasibility of delivering computerised mental health programmes within the AE setting in order to improve student mental health wellbeing and prevent mental health problems.

The aim of Paper I is to review the literature on the effectiveness of computerised mental health promotion and prevention interventions with youth in order to identify evidence-based programmes and gaps in the existing knowledge base. In Paper 2, the aim is to explore the needs and preferences of AE students and staff in relation to the implementation of computerised mental health programmes, in order to guide the implementation and evaluation of these programmes in the AE setting. The aim of Paper III is to examine the effectiveness of SPARX-R serious game for preventing depression and improving wellbeing among young people attending AE. Finally, Paper IV examines the views of young people and staff in AE settings on the implementation of SPARX-R, particularly focusing on factors that may have influenced programme engagement and drop-out.
3. Structure of thesis

The remaining chapters of the thesis consist of a review of the literature that informed the thesis, a summary of the methods used in each phase of the study, and the findings and their implications, as reported in each paper. The papers are included at the end of the thesis, followed by the appendices.

In Chapter 4, a review of the relevant literature is presented. This review has two specific sections; 1) a review of the evidence-base on computerised mental health promotion and prevention interventions (Paper I) and 2) a review of theoretical frameworks for evaluating computerised mental health interventions. The implications of the findings from each review for the development of the study rationale and methodology will be discussed.

In Chapter 5, the methods used in Papers II-IV are discussed. Chapter 6 offers a summary of the findings from Papers II-IV. Furthermore, findings from a study on the implementation of another cCBT programme, MoodGYM, are briefly reported. MoodGYM was originally included as a second experimental condition in Study III (as reported in Paper III), but was discontinued due to the participants’ inability to complete the programme because of issues with literacy. These findings have not previously been published.

In Chapter 7 the findings of the papers are discussed in the context of the existing literature, and methodological issues are considered. Final conclusions and implications for future research, programme development and programme implementation are discussed in Chapter 8.
4. Literature review

Reviews of the literature in two specific areas were undertaken in order to inform the rationale and methodology for the study. A review of the evidence-base (Paper I) was undertaken to examine the effectiveness of computerised mental health promotion and prevention interventions with youth in order to identify evidence-based interventions and discover gaps in the existing knowledge base. A review of theoretical frameworks was also conducted to explore the principles of implementing and evaluating computerised mental health interventions and to identify a theoretical framework to guide the study.
4.1. Review of the evidence-base

A systematic review of the effectiveness of online youth mental health promotion and prevention interventions (Paper I)


4.1.1. Aims and objectives

The aim of this systematic review was to review the existing evidence base on the effectiveness of computerised mental health promotion and prevention interventions with youth in order to inform the rationale for the study.

4.1.2. Methodology

This paper systematically reviewed the literature on the effectiveness of online youth (aged 12–25 years) mental health promotion and prevention interventions, conforming to the guidelines outlined by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) 2009 Checklist. Experimental study designs including RCTs, quasi-experimental study designs and experimental studies without a comparison group were included in the review. The primary outcomes of interest were mental health and social and emotional wellbeing outcomes, such as self-esteem, self-efficacy and coping skills. Negative indicators of mental health (such as depression and anxiety) and wellbeing indicators (e.g. social participation and support) were also of interest.

Search strategy

Academic and grey literature published from 2000 to 2013 was included in the review. Academic databases including Scopus, PubMed, PsychINFO, ISI Web of Science, EBSCO and Cochrane database of
systematic reviews were searched. Health Promotion and Public Health Review databases were also searched including Evidence for Policy and Practice Information and Coordinating (EPPI) Centre; University of York National Health Centre for Reviews and Dissemination; National Institute of Clinical Excellence (NICE); Effective Public Health Practice; Health Evidence Canada; WHO programs and projects (http://www.who.int/entity/en/). Additional sources included Google Scholar and reference lists of relevant articles, book chapters and reviews. A combination of search terms was used in the search strategy for electronic databases, including mental health terms, promotion and prevention terms, technology related terms, population terms, and intervention and study related terms.

Data analysis
The data were analysed using a narrative synthesis. The methodological quality of the studies was assessed using the Quality Assessment Tool for Quantitative studies developed by the Effective Public Health Practice Project (Jackson et al., 2004).

4.1.3. Findings
Eight studies evaluating six mental health promotion interventions and 20 studies evaluating 15 prevention studies were identified. The findings show that computerised CBT based interventions can be effective in preventing symptoms of depression and anxiety in adolescents, although future research is warranted. In terms of the computerised mental health promotion interventions, the heterogeneity across the programmes and poor methodological quality of most included studies limits the conclusions that can be drawn on their potential effectiveness. There was limited evidence of the effectiveness of computerised programmes when used with more disadvantaged young people, with most existing studies having been implemented with university or secondary school students. Overall, the findings
support module-based delivery in a supported environment, such as the education setting, to improve adherence.

The programme content and delivery across the studies varied considerably. Mental health promotion interventions ranged from school-based stress management interventions to relationship skills exercises delivered by email and a social media mental health literacy campaign. Mental health prevention interventions included cCBT to prevent depression and anxiety, depression education, mood monitoring using mobile phones and online support therapies.

The quality of the studies also varied, with many studies reporting high drop-out rates, small sample sizes and other study design issues, such as the lack of control group. The evidence was stronger for computerised mental health prevention interventions than for computerised mental health promotion interventions. The quality of studies assessing online mental health promotion interventions was moderate to weak, with only one study receiving a strong quality assessment rating (Van Vliet and Andrews, 2009). In this study, reporting on a school-based stress management course, significant improvements were detected on mental health literacy, psychological wellbeing, support seeking and avoidant coping and psychological distress.

In terms of the prevention interventions, eight of the twenty studies received a high quality assessment rating. The evidence was the strongest for CBT based prevention interventions, particularly for the MoodGYM programme. Significant positive effects on depression and anxiety were shown that were sustained up to 12 months after the intervention. Additional outcomes included increased social support, reduced self-harm thoughts and improved sense of control or mastery.
4.1.4. Implications for the current study

**Study rationale** The findings from this review highlighted the need to examine the use of computerised mental health programmes with a more varied group of young people, particularly those who are disadvantaged and among whom mental health difficulties are more common. Thus, the aim of this study was to examine the feasibility of delivering computerised mental health programmes to socially, economically and educationally disadvantaged young people attending AE.

**Programme selection** With the aim of selecting programmes with the strongest evidence-base of effectiveness, two module-based cCBT programmes, MoodGYM and SPARX-R were selected for this study.

**Programme implementation** As the review highlighted the importance of support in improving adherence rates, the programmes in this study were delivered in an AE setting with the presence of teacher moderators.

**Programme evaluation** A RCT design was selected to examine the effectiveness of computerised CBT in order to strengthen the evidence base on the effectiveness of computerised mental health interventions with youth. Most existing studies on the effectiveness of cCBT have focused on improving symptoms of depression and anxiety. This study set out to examine the universal delivery of cCBT, including both positive and negative indicators of mental health, to determine programme effectiveness. Building on the previous findings in relation to the need to understand user views and how context impacts programme delivery and impact, it was deemed important to integrate implementation research throughout the present study.
4.2. A review of theoretical frameworks

4.2.1. Aims and objectives

This review was undertaken to scope the theoretical frameworks used in the evaluation and development of online health resources. The aim of the review was to better understand the issues around implementation and user-interaction and to identify a methodological framework that could be used for the study.

The objectives of the review were to:

• Gain an understanding of theories, strategies and principles relevant to developing and evaluating online health resources
• Identify existing theoretical and methodological frameworks applicable to the development and evaluation of online mental health promotion interventions
• Explore the factors to consider in evaluating online mental health resources
• Identify methodologies that can be used in assessing the implementation of, and user-interaction with, an online mental health promotion programme

4.2.2. Methodology

For this general literature review, a non-systematic literature search was conducted using electronic databases Scopus and ISI Web of Science. Furthermore, relevant articles were identified from the Endnote database created for the systematic review on the effectiveness of mental health promotion and prevention interventions (Paper I) to identify any additional frameworks.

4.2.2.1. Search strategy

The search strategy for the electronic databases Scopus and ISI Web of Science included combining evaluation related terms (framework,
model, strategy, evaluation, outcome, impact, process) with mental health terms (mental health, mental health promotion, wellbeing, depression, anxiety) and technology related terms (internet, online, web, eHealth). Relevant cited and related articles were included using a snowball and cross-referencing methodology.

4.2.2.2. Inclusion criteria

Both peer reviewed articles and grey literature were included in the review. Articles were included in the review if they presented a framework that:

1. addresses the development, implementation or impact evaluation of online health applications
2. focuses on the development and evaluation of eHealth technologies in general or online mental health promotion and prevention applications specifically
3. provides practical guidelines or methodological approaches to developing or evaluating online health applications

eHealth frameworks that focus solely on the development of health informatics systems or those aimed at medical personnel were excluded from the review.

4.2.3. Findings

4.2.3.1. Search Results

A total of 33 articles were initially identified through Scopus and ISI Web of Science and exported to Endnote. A further 7 articles were identified from the existing Endnote database. Of these 40 articles 32 were excluded due to not presenting a framework or not meeting the inclusion criteria. A final eight articles presenting eight frameworks were included in the review. All searches were conducted before the 12th of March 2014.
4.2.3.2. **Description of included frameworks**

The review found eight methodological frameworks offering guidelines for the development and evaluation of eHealth resources throughout their life cycle from development to implementation and evaluation (Doherty et al., 2010; Hagen et al., 2012; Khoja et al., 2013; Mohr, Cheung et al., 2013; O’Grady et al., 2009; Ritterband et al., 2009; Skinner et al., 2006; Van Gemert-Pijnen et al., 2011). A description of the frameworks can be found in Appendix 1.

One framework focused on the development of computerised health promotion programmes particularly (Skinner et al., 2006). Two frameworks concerned the evaluation of eMental health resources specifically (Doherty et al., 2010; Hagen et al., 2012). Two frameworks considered the development and evaluation of behavioural intervention technologies (Mohr, Cheung et al., 2013; Ritterband et al., 2009). One of the frameworks provided guidelines to the evaluation of health websites with a special focus on collaborative, adaptive and interactive technologies, i.e. Web 2.0 applications (O’Grady et al., 2009). Two of the frameworks addressed the development and evaluation of eHealth technologies in general (van Gemert-Pijnen et al., 2011; Khoja et al., 2013) including a variety of technologies used in supporting health care and improving health and well-being, ranging from electronic health records, to online health portals and online health interventions.

4.2.3.3. **Strategies and principles in developing and evaluating eHealth technologies**

In this section, the key strategies and principles for developing and evaluating eHealth technologies, as proposed in the frameworks, will be presented.

**Use of participatory methods** Many of the frameworks acknowledged the need to make the eHealth resource relevant to the needs of the end-
user to achieve greater engagement with the resource. For this reason, stakeholder participation in all stages of the development process, from needs assessment to impact assessment, and the use of participatory and user-centric design principles were considered vital (Skinner et al., 2006; Hagen et al., 2012; Van Gemert-Pijnen et al., 2011; Doherty et al, 2010). Also, ideally the target audience should have ownership of the resource and be included in the maintenance of the resource to ensure continued engagement and sustainability.

The two frameworks focusing especially on developing online resources for young people both draw from the theories of action research and recommend including young people as active participants in the development process (Skinner et al., 2006; Hagen et al., 2012). Hagen et al. (2012) recognise the challenge of developing online interventions that are both effective and engaging for young people. Therefore, in their framework they integrate participatory design principles with evidence-based research approaches for the design of online mental health promotion interventions. They suggest that young people should be included in all stages of the design process, not only as participants but as co-designers. Although this framework focuses on the design phase, it notes that the same participatory approach can be adapted in the needs assessment and evaluation phases.

Doherty et al. (2010) point out that the use of user-centric design methodologies, although advisable, is not always possible when designing online mental health applications. This is due to ethical considerations and lack of access to vulnerable clinical populations.

**Continuous evaluation cycles** The frameworks depict the development of computerised health resources as a cyclic process with alternating phases of development and evaluation (Skinner et al., 2006; Khoja et al., 2013; Hagen et al., 2012; van Gemert-Pijnen et al., 2011, Doherty et al., 2006; O’Grady et al., 2009). Continuous evaluation throughout the development process is important to ensure that changes can be made
in a timely manner and that the developed applications remain relevant to the needs of the target audience. Mohr, Cheung et al. (2013) highlight the need for technology to evolve quickly to respond to the rapidly occurring changes in technology and consumer preferences. They propose that computerised interventions provide the opportunity to collect data on programme use and outcomes in a systematic and routine manner, thus allowing continuous programme updates.

Throughout their development cycle, interventions should be evaluated from the perspective of the end-user, whether they are found to be relevant, meaningful and engaging (Hagen et al., 2012). Furthermore, implementation should be intertwined with development, by way of taking into account the limitations in resources and personal skills in developing the resource (Van Gemert-Pijnen et al., 2011).

**Assess multiple parameters** Programme impact should be evaluated using multiple parameters related to the technology itself, the user and the environment. O’Grady et al. (2009) suggest in their framework that there is three core evaluation phases in the development of eHealth applications: formative evaluation, summative evaluation and outcome assessment. Formative evaluation relates to the initial resource development and laboratory testing, summative evaluation refers to field-testing, and outcome assessment to the overall impact of the finished product. Within these evaluation phases there are different evaluation parameters to consider in relation to the user, content, technology, computer-mediated interaction and health systems integration.

The Behavioural Change Model for Internet Interventions proposes that behaviour change is produced through nine nonlinear steps, all of which contain areas that can be monitored, assessed and manipulated to make the intervention more successful (Ritterband et al., 2009). The model suggests that the user comes into the intervention with a set of user characteristics which affect website use. Website use is also
influence by *website characteristics*, such as appearance, content and mode of delivery, and the *support* offered for using the intervention. Adherence to the website then leads to *behaviour change, symptom improvement* and *treatment maintenance* through specific *mechanisms of change* (e.g. skills building, information). Furthermore, *environmental factors* influence user characteristics, using the intervention and acquiring and maintaining behaviour change.

Van Gemert-Pijnen et al. (2011) propose a holistic approach to developing eHealth technologies, considering the interconnectedness of human, technology and environmental factors. They claim that a mixed-methods design with multiple data collection points is needed in evaluating the impact of eHealth technologies. A RCT design is not sufficient in examining what works in practice as there are too many confounding factors in the success of eHealth applications in relation to the user, the technology and the wider socioenvironmental context. Therefore, continuous evaluation during the development phases and the integration of process and outcome analysis methods are needed.

**Ethical considerations** Several frameworks advised that special consideration should be made in relation to ethical issues around eHealth research. The aspects to consider include unequal access due to differences in access to technology and literacy levels (Skinner et al., 2006; Doherty et al., 2009), anonymity and security (Khoja et al., 2013, Doherty et al., 2009, O’Gardy et al., 2009) and ensuring that the technology is not causing harm to the participants (Skinner et al., 2006; van Gemert-Pijnen et al., 2011).

**4.2.3.4. Holistic Framework to Improve the Uptake and Impact of eHealth Technologies**

Based on the review, the Holistic Framework to Improve the Uptake and Impact of eHealth Technologies (Van Gemert-Pijnen et al. 2011) was selected as the theoretical framework to guide this doctorate study,
and will be discussed here in more detail. This framework was chosen for several reasons. Firstly, it was developed using a comprehensive approach, including a review of existing eHealth evaluation frameworks, multidisciplinary theories and empirical evidence. Secondly, the Holistic Framework has a particular focus on improving programme uptake, by understanding the needs and preferences of the target audience, and unlike other frameworks, has a particular focus on integrating the technology in the desired context of delivery. Finally, the Holistic Framework offers a clear methodological guide for assessing the needs of the target audience and evaluating programme impact.

The Holistic Framework was developed to address the slow uptake of eHealth technologies in health care. Van Gemert-Pijnen and colleagues (2011) define eHealth as “information communication technology used for supporting health care and promotion a sense of well-being”. According to the Holistic Framework, the slow uptake and poor engagement with eHealth technologies to date can be attributed to the disregard of the interdependencies between technology, human characteristics and the socioeconomic environment. By reviewing existing eHealth evaluation frameworks and theories from human-centered design (Maguire, 2001), persuasive design technologies (Oinas-Kukkonen & Harjumaa, 2009) and business modeling (van Limburg et al. 2011), they propose a new holistic framework to assist in the development and implementation of eHealth technologies.

The Holistic Framework presents six strategies or principles for a holistic development approach:

eHealth technology development...

1. Is a participatory process (stakeholder participation at all stages of the development cycle)
2. Involves continuous development cycles (evaluation interwoven with all stages of development)
3. Is intertwined with implementation (conditions of implementation need to be considered from the start)
4. Changes the organization of health care (creates new process and infrastructure for health care)
5. Involves persuasive design techniques (can be customised and provides social support and motivation for change)
6. Needs advanced methods to assess impact (the use of mixed methods to assess the interaction between the technology, the person and the context of delivery)

The eHealth development, implementation and evaluation process, and related research activities are presented in the CeHRes (Center for eHealth Research) Roadmap (Figure 4.1).

**Figure 4.1. CeHRes Roadmap**

![CeHRes Roadmap](image)

*Van Gemert-Pijnen et al. 2011*

This roadmap highlights the importance of continuous formative evaluation throughout the five development stages. *Contextual inquiry* refers to the initial information gathering on the end users and the context of delivery. In *Value specification*, stakeholder values and requirements in relation to the technology are identified. This leads to the participatory *Design* phase, resulting in a prototype. *Operationalisation* refers to the integration of the technology in the context of delivery. *Summative evaluation* relates to the assessment of the uptake and impact of the technology.
**Requirement Development Approach**

Embedded in the Holistic Framework is the Requirements Development Approach (Van Velsen et al., 2013) for identifying end user values and requirements and evaluating how well the technology responds to these requirements. It consists of five phases. The first, preparation phase concerns the assembly of a multidisciplinary project team. This leads to the second phase of identifying and profiling of end users and stakeholders. In the third phase, stakeholder requirements are elicited by the use of qualitative methods, such as interviews or focus groups. In the fourth phase, the data from the requirement elicitation phase is translated into requirements using the requirements analysis approach. Three derivatives are determined for each need expressed by the stakeholders: value (an ideal or interest the stakeholder has or aspires to), attribute (summary of the expressed need), and requirement (technical translation of an attribute). In the final phase, the requirements are communicated to programme developers and other stakeholders and are used to evaluate the technology.

**Application of the Holistic Framework**

The Holistic Framework and Requirements Development Approach have been applied in involving end users in the development of eHealth technologies and applications in various health related areas, such as tick bite education (Van Velsen et al., 2015), pain management (Fledderus et al., 2015; Rothgangel et al., 2017), sexual health services (Gilbert et al., 2016) and cancer support and recovery (Harder et al., 2017; Timmerman et al., 2016; Winterling et al., 2016). In terms of e-mental health, the Holistic Framework has been used in the development of a parent resource for the prevention of adolescent depression and anxiety (Yap et al., 2017). These studies endorse the usefulness of the framework particularly in terms of collaborating with end users and considering programme implementation and organisational context in programme development, particularly
considering the lack of practical guidance on the implementation of eHealth technologies in healthcare. Although the studies offer very little critique on using the Holistic Framework in practice, they do draw attention to some of the challenges of developing eHealth technologies using an iterative user-centred design process, as advocated by the framework. These include knowing when to progress from developing a prototype to trial testing, prioritising requirements when resources are limited, and maintaining researcher objectivity when working closely with end-users.

The aforementioned studies discuss the development of new eHealth applications. To the author’s knowledge, there is no existing studies concerning the use of the framework for the implementation and evaluation of existing eHealth technologies. Although Van Gemert-Pijnen and colleagues state that the framework can be used in evaluating eHealth technologies from the view point of the key stakeholders, clear methodological guidelines as to how to conduct this evaluation is lacking. Furthermore, there appears to be no previous studies on the use of the Requirements Development Approach for assessing the needs of young people in relation to the implementation of computerised mental health resources. Therefore, this doctorate study offers novel application of the framework in terms of the target audience (young people) and the focus on implementation and evaluation instead of programme development.

4.2.4. Discussion

This review examined the theoretical frameworks that can be used in developing and evaluating online mental health promotion interventions. Overall, eight frameworks relevant to the development and evaluation of online health resources were included in the review. In line with the design models of human-computer interaction (Dix et al., 2004), the frameworks were based on theories and methodologies
from multiple disciplines, such as psychology, digital engineering and design, and business.

The findings from the review of the frameworks highlight the issues in relation to engagement, also identified in the systematic review of the effectiveness of online promotion and prevention interventions (*Paper I*). Low engagement rates with online interventions were largely explained by low user participation in the programme’s development phase, resulting in resources that are irrelevant and meaningless to the target audience. In order to ensure that the developed resource is relevant to the target audience’s needs, the frameworks recommended continuous formative evaluation, the use of participatory design methods, and stakeholder involvement at all stages of the development process. Furthermore, continuous formative evaluation also ensures that online interventions are developed and modified in a timely manner to respond to the fast occurring technological advances and changes in user preferences.

The review findings stress the importance of implementation research and the need for evaluation of online interventions on multiple levels. The effectiveness of online interventions is not only defined by the content of the intervention, but a combination of factors related to the user, the environment and the website itself which influence website use and therefore the effectiveness of the intervention. Thus, the evaluation of online interventions has to go beyond clinical effectiveness trials and also include multiple methods to assess user-interaction and implementation.

**4.2.5. Implications for the current study**

The findings from this review of the theoretical frameworks for developing and evaluating eHealth technologies highlight the importance of implementation research to better understand how programmes can be made responsive to the needs of the target
audience. In order to evaluate the impact of computerised programmes, it is important to first understand the needs of the target audience. Informed by these findings, participatory research methods were used in *Paper II* to examine user needs and preferences. The needs and preferences identified in *Paper II* were then used to evaluate the programme from the point of view of the user in *Paper IV*. User views were examined on multiple parameters related to programme look and feel, programme content and programme implementation. The Holistic Framework to Improve the Uptake and Impact of eHealth Technologies and the Requirement Analysis Approach (see chapter 4.4.) were employed in the study to inform this methodological approach.
5. Methods

5.1. Design

The design of this study was guided by the systematic review of the effectiveness of online mental health promotion and prevention interventions (Paper I) and the Holistic Framework to Improve the Uptake and Impact of eHealth Technologies (Van Gemert-Pijnen et al., 2011). A flowchart of the different stages of the study is presented in Figure 5.1.

**Figure 5.1. Flowchart of the four stages of the overall study**

<table>
<thead>
<tr>
<th>Evidence review (Paper I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method: Systematic literature review of the effectiveness of computerised youth mental health promotion and prevention programmes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirement analysis (Paper II)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method: Student and staff group discussions and questionnaires to explore the requirements in relation to computerised mental health promotion in the Youthreach setting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effectiveness trial (Paper III)</th>
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</thead>
<tbody>
<tr>
<td>Method: A randomised controlled trial examining the effectiveness of SPARX-R in improving student wellbeing and reducing symptoms of depression and anxiety</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Implementation research (Paper IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method: Student and staff questionnaires completed during and after the intervention to explore factors determining programme engagement. Complemented with written and verbal feedback.</td>
</tr>
</tbody>
</table>

Study II (Paper II) examined the requirements of students and staff, and the context of the Youthreach setting, for the delivery of computerised mental health programmes. Study III (Paper III) was designed as a randomised controlled trial (RCT) evaluating the effectiveness of two cCBT programmes (MoodGYM and SPARX-R). In Study IV (Paper IV),
the implementation of the programmes was examined using post-intervention implementation measures. The methods used in Papers II – IV are presented in Table 5.1.

**Table 5.1. Overview of methods used in Papers II – IV**

<table>
<thead>
<tr>
<th>Paper</th>
<th>Title</th>
<th>Design</th>
<th>Sample</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>The use of computerised mental health programmes in alternative education: understanding the requirements of students and staff (Paper II)</td>
<td>Qualitative analysis of student and staff requirements</td>
<td>Students (n = 38) Staff discussions (n = 12) and survey (n = 16)</td>
<td>Qualitative discussions (students and staff) Online staff questionnaire</td>
</tr>
<tr>
<td>III</td>
<td>A pilot evaluation of the SPARX-R gaming intervention for preventing depression and improving wellbeing among adolescents in alternative education</td>
<td>Cluster RCT – Pre-post-measures</td>
<td>N = 146 students</td>
<td>Outcome measures: depression, anxiety, mental wellbeing, coping, emotion regulation</td>
</tr>
<tr>
<td>IV</td>
<td>The implementation of SPARX-R serious game for preventing depression and improving wellbeing among alternative education students: Exploring the views of students and staff</td>
<td>Cluster RCT – implementation research at post-intervention</td>
<td>N = 28 students + Qualitative feedback from 12 students and 3 staff members</td>
<td>Post-intervention implementation questionnaire (students and staff) Qualitative feedback (students and staff)</td>
</tr>
</tbody>
</table>
5.2. Setting

Youthreach is the National Second Chance Education Programme for early school-leavers (age 15-20 years) in Ireland. The Youthreach setting was selected for this study in order to reach a group of more vulnerable young people. There is a hundred and ten (110) Youthreach Centres across the country, generally located in more disadvantaged rural and urban areas. There were 3266 young people (58.5% male) attending Youthreach in 2016 (Department of Education and Skills, 2016). The local Education and Training Boards govern the majority of Youthreach Centres, with some being governed by the National Youth Council. The students spend on average 1-2 years at the Centres on a full-time basis and receive an allowance from the government for attending the programme.

The Centres deliver the National Primary and Secondary level curriculum and examinations, as well as vocational training (FETAC\(^2\)) in areas such as childcare, woodwork and hairdressing. The curriculum is more flexible than in mainstream education, the class sizes are smaller and more one-to-one support is available.

5.2.1. Progression of students

The proportion of students who receive second level qualifications rather than vocational qualifications is relatively small, with only 7% of students receiving Leaving Certificate or Leaving Certificate Applied\(^3\).

\(^2\) FETAC awards fall into the categories 1-6 of the National Framework of Qualifications. FETAC refers to the former statutory body for awarding further education, the Further Education and Training Council (FETAC). For further information, please see www.qqi.ie.

\(^3\) Leaving Certificate Applied is a distinct self-contained Leaving Certificate Programme for those students who do not wish to directly proceed on to third level education.
6.8% receiving a junior certificate and 78.9% receiving FETAC level vocational qualifications (WRC Social and Economic Consultants, 2007). A substantial proportion (21.6%) of the students drop out of Youthreach before completing the programme, with males being slightly more likely to leave the programme early. Less than half (46%) of young people who leave the programme early progress onto employment or further education or training, compared to over 70% of those who complete the programme.

5.3. Programme selection

The original program selection was based on the review of the effectiveness of computerised mental health promotion and prevention interventions with youth (Paper I). Of the reviewed programmes, MoodGYM was found to have the most robust evidence base. However, due to the lack of studies examining the effectiveness of MoodGYM when used with more vulnerable young people, the high drop-out rates reported in existing studies and concerns about the appropriateness of the programme for young people with low levels of literacy, another programme was also selected, SPARX-R.

SPARX-R cCBT for low mood, stress and anger is a revised version of the original SPARX cCBT game for depression in youth. To date, there have been no other published studies examining the effectiveness of SPARX-R. However, the original SPARX was found to be effective in reducing symptoms of depression in adolescents (Merry et al., 2012), including youth attending AE in New Zealand (Fleming, Dixon, Frampton & Merry, 2012). The content of SPARX is very similar to other cCBT programmes, such as MoodGYM, designed to prevent depression and anxiety. However, in the effectiveness studies, as mentioned above, SPARX-R was also selected.

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4 Drop out is determined as leaving Youthreach before completing at least 75% of the programme.
SPARX was framed as a treatment intervention, and therefore, the programme was not identified in the systematic review using the prevention and promotion focused search terms.

SPARX-R was developed based on the feedback of AE students in New Zealand, preferring an approach that was less exclusive about depression (Fleming, Lucassen et al., 2016). The programme was considered particularly fitting for the current study, considering the similar target group used in the two studies.

5.3.1. SPARX-R

SPARX-R was developed in the University of Auckland, New Zealand. SPARX-R (version 1.0) is a revised version of the original SPARX (version 1.1) CBT-based self-help intervention, designed to treat symptoms of mild to moderate depression in adolescents seeking help for depression using a serious gaming approach (Merry et al., 2012). The content is in essence the same, however, SPARX-R is framed as a preventative programme; instead of focusing exclusively on depression, SPARX-R is aimed for young people who ‘feel down, stressed or angry’. The skills taught in SPARX-R include psychoeducation, relaxation skills, activity scheduling, problem solving, cognitive restructuring, interpersonal skills, help seeking, and dealing with strong emotions (Merry et al., 2012).

SPARX-R incorporates elements of gaming, such as completing goals and challenges, presentation of a narrative and interaction with program characters, to facilitate learning. The programme characters are presented in Figure 5.2.

The programme has seven sequential levels (Table 5.1.), each taking approximately 20-30 minutes to complete. At the beginning of each level, the user completes a Mood Quiz and is able to track their mood levels as they progress with the program. The user starts each level by
interacting, in the first person, with a character called the ‘Guide’, who
reviews the content from the previous level and sets the agenda for the
current level. The user is then ‘transported’ into the game world, where
their avatar undertakes interactive challenges while trying to find and
obtain a ‘Power gem’ from each level. Finally, the user is transported
back to the Guide, and the lessons learned in the game are put into real
life context by completing interactive exercises.

Figure 5.2. SPARX-R programme characters

Effectiveness of SPARX

Merry et al. (2012) conducted a randomised controlled non-inferiority
trial (n=187, age 12-19 years, 35% male) comparing the effectiveness
of SPARX to treatment as usual (mainly face-to-face counselling).
SPARX was found to be non-inferior to treatment as usual on all
measures, with significant reductions in depressive symptoms in both
groups. Furthermore, remission rates were significantly higher in the
SPARX intervention group and significantly greater improvements were
also detected on hopelessness, and symptoms of anxiety and
depression. There were further improvements on most measures at
three-months follow-up.
Table 5.1. Summary of the content in each level of SPARX-R

<table>
<thead>
<tr>
<th>Level</th>
<th>Content and core skills</th>
</tr>
</thead>
</table>
| **Level 1 Cave province:** Finding hope | Introduction to:  
• Feeling down, angry or stressed  
• CBT model  
• GNATs (Gloomy negative automatic thoughts)  
• Hope  
Relaxation (controlled breathing) |
| **Level 2 Ice province:** Being active | Activity scheduling and behavioural activation  
Relaxation (progressive muscle relaxation)  
Basic communication and interpersonal skills |
| **Level 3 Volcano province:** Dealing with emotions | Dealing with strong emotions (anger and hurt)  
Interpersonal skills (assertiveness, listening and negotiation) |
| **Level 4 Mountain province:** Overcoming problems | Problem solving  
Cognitive restructuring (identifying positive thoughts) |
| **Level 5 Swamp province:** Recognizing unhelpful thoughts | Cognitive restructuring (recognizing different types of GNATS) |
| **Level 6 Bridgeland province:** Challenging unhelpful thoughts | Cognitive restructuring (challenging negative thoughts)  
Interpersonal skills (negotiation skills) |
| **Level 7 Canyon province:** Bringing it all together | Review of all skills  
Mindfulness (tolerating distress)  
Asking for help |

*Adapted from Merry et al., 2012*

Fleming and colleagues (2012) studied the use of SPARX in an AE setting with young people alienated from mainstream education (N=30, age 13 – 16 years, 56 % male). Significant improvements in symptoms of depression in the SPARX intervention group in comparison to a waitlist control group were detected. Furthermore, the intervention group was significantly more likely to be in remission or to have had a clinically significant reduction in symptoms after the intervention than the control group. Effects were maintained at 10 weeks follow-up and
improvements were seen in the waitlist control condition after receiving the intervention.

5.3.2. MoodGYM

MoodGYM (mark III; www.moodgym.anu.edu.au) is an automated self-directed cCBT program designed to prevent and decrease symptoms of anxiety and depression in youth. The programme aims to teach the user to recognise and change negative thinking patterns, build self-esteem, and improve problem-solving, relaxation and relationship skills (Calear et al., 2009). It consists of five interactive modules (Table 5.2.) to be completed in order.

**Table 5.2. Summary of the content in each module of MoodGYM**

<table>
<thead>
<tr>
<th>Module</th>
<th>Content and core skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feelings: Why you feel the way you do</td>
<td>Introduction to the programme and the CBT model</td>
</tr>
<tr>
<td></td>
<td>Coping with day-to-day challenges</td>
</tr>
<tr>
<td>Thoughts: Changing the way we think</td>
<td>Identifying unhelpful thoughts</td>
</tr>
<tr>
<td></td>
<td>Challenging unhelpful thoughts</td>
</tr>
<tr>
<td></td>
<td>Identifying areas of vulnerability and improving self esteem</td>
</tr>
<tr>
<td>Unwarping: Changing warped thoughts</td>
<td>Modifying thinking (changing unhelpful thoughts)</td>
</tr>
<tr>
<td></td>
<td>Review areas of vulnerability and how to improve them</td>
</tr>
<tr>
<td></td>
<td>Activity scheduling</td>
</tr>
<tr>
<td>De-stressing: Knowing what makes you upset</td>
<td>Introduction to stress</td>
</tr>
<tr>
<td></td>
<td>Identifying personal stressors</td>
</tr>
<tr>
<td></td>
<td>Examining family relationships</td>
</tr>
<tr>
<td></td>
<td>Relaxation</td>
</tr>
<tr>
<td>Relationships: Relationships and how they work</td>
<td>Relationship problems and how to cope with them</td>
</tr>
<tr>
<td></td>
<td>Problem solving</td>
</tr>
</tbody>
</table>

Each module starts with a depression and anxiety assessment. MoodGYM uses six fictional characters to help users identify unhelpful thinking patterns and how they effect emotions and behaviour. The user progresses through each module by completing activities (most of
which incorporate reading or writing). Each level takes approximately 30-40 minutes to complete. A screenshot of one of the activities is presented in Figure 5.3.

**Figure 5.3. Screenshot of MoodGYM**

![Screenshot of MoodGYM](www.moodgym.anu.edu.au)

**Effectiveness of MoodGYM**

MoodGYM has been evaluated with a general adolescent sample (Sethi, 2013), secondary school male (O’Kearney et al., 2006) and female (O’Kearney et al., 2009) students, mixed gender classes (Calear et al., 2009; Lillevoll et al., 2014) and with University students (Lintvedt et al., 2011; Sethi et al., 2010; Sethi, 2013; Ellis & Campbell, 2011). The age of the participants ranges from 12-25 years. The majority of these studies employed young people with low to moderate levels of depression and/or anxiety, sample sizes ranging from 38 to 1477 participants. The programme was either self-administered, participants completing it in
their free time (Lindvedt et al., 2011; Lillevoll et al., 2014), or delivered in school, University or community centre, where programme completion was monitored.

MoodGYM has been shown to reduce symptoms of anxiety and depression in young people (Calear et al., 2009). However, some studies have only shown significant effect for anxiety and not for depression (Ellis et al., 2011; Sethi, 2013), where as others have reported high attrition and low engagement rates (Lillevoll et al., 2014; O’Kearney et al., 2006; O’Kearney et al., 2009). Indeed, a recent meta-analytic review indicated that MoodGYM is more effective in reducing symptoms of anxiety than depression (Towmey et al., 2016). Furthermore, there is a lack of studies examining the use of the programme with more disadvantaged youth (see Paper I). Thus, further research is needed to establish the effectiveness of this programme, particularly with more vulnerable youth.

5.4. Recruitment

In Spring 2014, the researcher contacted the National Coordinator of Youthreach to secure his support for the study. The National Coordinator provided the researcher with the contact details for each Centre coordinator (n = 110). Each of the Coordinators was then contacted individually by email (Appendix 2) and/or by phone in August 2014 at the beginning of the academic year with the aim of holding qualitative workshops (Paper II) in Autumn 2014 and conducting a trial of one of the programmes (Papers II and IV) in Spring 2015.

The 21 Centres who agreed to participate in the study, were sent an online staff survey (Paper II). Four of these Centres were selected for the student workshops and staff discussions (Paper II) based on their location and size. The aim was to recruit Centres of different size, from
each of the four provinces in Ireland and from rural and urban areas. Workshops were held in three of these Centres in Autumn 2014, however, the final workshop was postponed to June 2015 due to difficulties in timetabling. The staff was asked to select a group of approximately eight students for the workshop. The study information sent to staff can be found in Appendix 3.

Two Centres were selected to pilot SPARX-R based on their readiness to deliver the programme in Autumn 2014. Because of technical issues (the programme not being compatible with the computers in one Centre, and issues with the programme not saving user progress) the completion of the pilot was delayed and the start of the trial postponed from Spring 2015 to Autumn 2015. Furthermore, due to concerns in relation to the ability to provide technical assistance to all participating Centres, another trial arm was included in the study, MoodGYM. MoodGYM is available online and is technically more stable than SPARX-R. It was expected that the Centres delivering MoodGYM would require little technical assistance and, therefore, make study implementation more feasible. However, the MoodGYM trial arm was later stopped due to the students’ inability to complete the programme because of low levels of literacy.

A second phase of recruitment took place in August 2015. The Centres who had already agreed to take part were contacted again to ensure that they were still willing to participate in the research. Furthermore, all the remaining Centres were again invited to participate in the trial via email. The staff was asked to select the participants for the study depending on the size of their computer suite and timetable. Due to issues with scheduling, the last Center did not start SPARX-R until May 2016.
5.5. Ethics

Ethical approval for the study was provided by the NUI Galway Research Ethics Committee (ref: 14/MAY/11). Participant consent (student and staff) was a requirement for all phases of the study. Furthermore, all parents were informed of the study and the parent/guardians of those under the age of 18 years were asked to provide passive consent. Students participating in the workshop (Paper II) provided written consent and those participating in the trial (Papers III & IV) provided consent online. Participant and parent Information Sheets and Consent Forms are available in Appendices 4A and 4B.

5.6. Design of Study II (Paper II)

In Study II (as reported in Paper II), student and staff needs were assessed using the Requirements Development Approach (Van Velsen et al., 2013). There were two main elements to Study II: 1) mapping the context of delivery using an online staff survey, and 2) exploring the needs and preferences of Youthreach students and staff in student and staff group discussions. The study explored three areas: 1) What computerised mental health programs should look like (programme views); 2) What they should do (programme content); and 3) How they should be implemented (programme implementation).

5.6.1. Participants

Sixteen staff members responded to the online staff survey (76%; 12 Centre Coordinators and 4 teachers). Overall, 38 students (52.6% male, mean age 16.73 years) took part in a total of four workshops. Two semi-structured group discussions and two interviews were held with Youthreach staff (n = 12, 25% male). The staff participants included four Youthreach Coordinators, six teachers and two student trainees.
5.6.2. **Process**

5.6.2.1. **Online staff survey**

An online staff survey was used to map the context of delivering the technology (*Paper II, Online Supplement*). The survey was designed to be completed by staff on behalf of the Centre. The questions were designed to provide information on the Centre as a whole, rather than the individual staff member responding to the survey. The questions were adapted from a previous study examining the views of professionals on the use of computerised programmes to support young people's mental health and wellbeing (Clarke et al., 2017). The survey aimed to explore particular areas in relation to: 1) General information on the Centres, 2) Supporting youth mental health in the Centre, and 3) Implementation of computerised mental health programmes in the Centre.

5.6.2.2. **Student discussions**

Student views in relation to computerised mental health interventions were explored through workshops centring on reviewing the two cCBT programmes (MoodGYM and SPARX). The specific questions to guide discussion in the three areas (programme views, programme content and programme implementation) were guided by previous studies examining the effectiveness and implementation of computerised mental health programmes and frameworks on eHealth evaluation. In relation to programme views, the five areas of interest - programme look and feel, ease of use, attention, relevance, and confidence - were adapted from the ARCS-model (Keller, 1987) as used by Kawai and colleagues (2007) in assessing the implementation of an online stress reduction programme. The ARCS model explains four factors that determine how engaging learning materials are for those who use them (Keller, 1987): attention (how engaging the programme is to the learner), relevance (is the programme perceived as useful and worth
doing), confidence (does the programme instil confidence in the participant) and satisfaction (are the participants satisfied with the programme). Furthermore, various studies (Van Voorhees et al., 2009; Fleming, Lucassen et al., 2016) guided the formulation of the questions for the discussion protocol (Appendix 7).

Student demographics and previous use of online mental health resources were examined through a questionnaire completed at the end of the workshops (Appendix 8). Furthermore, two questions in relation to content needs and desired impact of the programme were added after the first workshop, as some students were reluctant to talk about these topics face-to-face.

5.6.2.3. **Staff discussions**

The staff was asked to view the two programmes before the discussion took place. The staff discussion protocol (Appendix 9) was developed based on the student discussion protocol, although the staff discussions focused deliberately on programme implementation. The staff participants were asked for their own views on the two programmes, as well as the expected views and reactions of the students to the programmes. Staff demographics and views were further examined in a staff questionnaire (Appendix 10) completed at the end of each discussion.

5.6.3. **Analysis**

The online staff survey and student and staff questionnaires completed at the end of the workshops/discussions formed the basis of mapping the context of delivery. Quantitative data were analysed using SPSS and responses to open-ended questions were analysed using thematic analysis (Braun and Clarke, 2006).

The student and staff discussions were audio recorded and transcribed. User needs and preferences in relation to the technology were explored
based on the coding matrix and methodological framework described by van Velsen and colleagues (2013). As per the Requirements Development Approach, the data were analysed and coded into requirements, attributes and overarching values. Key themes and categories were identified within each of these three derivatives following the nine-step guide to translating raw data into requirements described by Van Velsen et al. (2013).

Another independent researcher coded segments (approximately 15%) of the transcripts using the provided coding matrix with over 90% of the data being coded into the same themes. Differences were resolved by consensus.

5.7. **Design of Study III (Paper III)**

Study III was conducted as a cluster RCT with each Youthreach Centre randomised to an intervention condition (SPARX-R) or no-intervention control condition. Randomisation was conducted in clusters for practical reasons and to avoid between condition contamination.

**Changes to the study design** Based on the student and staff feedback on the two programmes in Study II, the original design for Study III incorporated one intervention arm (SPARX-R). Two Centres were assigned to start SPARX-R in Autumn 2014 to provide pilot data. However, significant technical issues were encountered with only one of the Centres (n = 4) being able to start the programme. Furthermore, the on-going technical issues – mainly the programme not saving user progress - caused delays in the delivery of SPARX-R in this Centre. Due to these technical issues, it was decided that the main trial would incorporate three trial arms, (MoodGYM, SPARX-R and control) so that the researcher would be better able to provide support to the Centres that delivered SPARX-R. However, due to low literacy levels among Youthreach students, the MoodGYM trial arm had to be stopped. At this time two Centres had started MoodGYM and the remaining Centres
assigned to the MoodGYM condition were given the option to deliver SPARX-R instead. One of the Centres decided to deliver SPARX-R and the remaining eight Centres withdrew from the study.

5.7.1. Participants

Students (n = 146; mean age 17.60 years, 46.6% male) from twenty-one Youthreach Centers were randomised to SPARX-R (n = 92) and no-intervention control (n = 54). All students within the group were included in the study whether or not they were exhibiting heightened levels of depression. Baseline analyses were conducted on all 146 participants. Participants that provided data at post-assessment (n = 66; 45.2%) were included in the outcome analysis.

5.7.2. Process

The intervention was delivered during scheduled class time. At each weekly class, the students completed one module of the programme. The overall programme completion time varied due to gaps in delivery because of mid-term breaks, other inconsistencies in the curriculum or student absenteeism. The researcher was present at the start of the programme after which a staff member moderated the programme. The researcher visited some Centers several times due to technical issues. The staff members were provided with a Programme Manual (Appendix 6) and Study Instructions (Appendix 5) with detailed information on the day-to-day roll out of the study and the completion of the online assessment questionnaires.

5.7.3. Measures

The outcomes of interest were selected to match the aims and content of the programmes. Both positive and negative indicators of mental health were employed. Measures were selected based on their reliability and validity, including their sensitivity to change. Where possible, the intention was to select outcome measures that had been
used in existing studies on the effectiveness of MoodGYM and SPARX and that provided nationally representative data. Furthermore, the findings from the pilot of SPARX-R (n = 4) highlighted the need for outcome measures to be as brief as possible, and appropriate to the reading level of the students. A summary of the outcome measures is provided in Table 5.3.

5.7.3.1. Negative indicators of mental health

**Depressive symptoms** The Moods and Feelings Questionnaire (MFQ; long-version) has been used in previous SPARX effectiveness studies (Merry et al., 2012; Lucassen et al., 2015). However, due to concerns in relation to the length of the scale (33 items) raised in the pilot, it was decided to use the short 13-item version of the scale (Short Moods and Feelings Questionnaire; SMFQ; Angold et al., 1995).

The SMFQ has previously been used in the Growing Up in Ireland\(^5\) national study on children and adolescents. The MFQ has shown moderate to high criterion validity and the ability to identify depression in youth with diverse demographic and clinical characteristics (Daviss et al., 2006). Similarly, the shortened version of the questionnaire has been shown to have sound psychometric properties (Kuo et al., 2005; Angold et al., 1995).

**Generalised anxiety** Symptoms of anxiety were measured using the seven-item General Anxiety Disorder Rating Scale (GAD-7; Spitzer et al., 2006). This scale was originally developed as a brief measure to screen for anxiety in the primary care setting, but has since also been validated for use in community settings with populations aged 14 years and older (Löwe et al., 2008), with GAD-7 showing good internal consistency and construct validity with all age groups.

\(^{\text{5 For further information please see http://www.esri.ie/growing-up-in-ireland/}}\)
### Table 5.3. Summary of the outcome measures used in Paper III

<table>
<thead>
<tr>
<th>Outcome of interest</th>
<th>Scale used</th>
<th>Subscales</th>
<th>Number of items</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressive symptoms</td>
<td>SMFQ</td>
<td>-</td>
<td>13</td>
<td>The long version of the scale (MFQ) has been used in previous SPARX effectiveness studies (Merry et al., 2012, Lucassen et al., 2015)</td>
</tr>
<tr>
<td>Generalised anxiety</td>
<td>GAD-7</td>
<td>-</td>
<td>7</td>
<td>Validated for use in community settings with populations aged 14 years and over (Löwe et al., 2008)</td>
</tr>
<tr>
<td>General wellbeing</td>
<td>WEMWBS</td>
<td>-</td>
<td>14</td>
<td>Validated for UK population (Tennant et al., 2007). Significant improvements in general wellbeing detected in adults who completed MoodGYM (Powel et al., 2012)</td>
</tr>
<tr>
<td>Coping skills</td>
<td>CSI</td>
<td>Avoidant coping</td>
<td>15</td>
<td>Used in an Irish national study on youth mental health and wellbeing (Dooley &amp; Fitzgerald, 2012)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Support seeking</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Problem solving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional regulation</td>
<td>ERQ</td>
<td>Emotional suppression</td>
<td>10</td>
<td>Qualitative feedback from AE students participating in SPARX suggests that the programme may have an impact of controlling emotions (Fleming, Lucassen et al., 2016)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cognitive reappraisal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(SMFQ = Short Moods and Feelings Questionnaire; GAD-7 = Generalised Anxiety Disorder Scale; WEMWBS = Warwick-Edinburgh Mental Wellbeing Scale; CSI = Coping Strategy Indicator; ERQ = Emotion Regulation Questionnaire)*
5.7.3.2. Positive indicators of mental health

Mental wellbeing Considering that the programmes were delivered universally, it was considered important to include a measure of general wellbeing to examine programme effects on those participants who did not have heightened symptoms of depression or anxiety. General mental wellbeing was measured using the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS). WEMWBS has been validated for the UK population (Tennant et al., 2007) and has also shown strong psychometric properties when used with adolescents aged 13-16 years (Clarke et al., 2011). Furthermore, Powell et al. (2012) detected significant improvements in mental wellbeing using this scale within the general UK adult population who completed MoodGYM.

Coping styles A measure of coping skills was included as both of the programmes state developing coping or problem solving skills as one of their key aims. A short form of Amirkham’s (1995) Coping Strategy Indicator (CSI-S) was selected for this study. This scale measures three types of coping: Problem solving, Seeking support and Avoidance behaviours. Previous research has found factor analytic support for these three strategies of coping as well as good reliability and construct validity for the original long version of the CSI (Amirkhan, 1995). Ellis (2004) isolated 15 items of the original 33 items and found them to have good internal reliability. CSI-S has previously been used in an Irish national study of youth mental health and wellbeing (My World Survey, Dooley and Fitzgerald, 2012).

Emotion regulation The decision to measure emotion regulation was based on a previous study suggesting that SPARX may have a positive impact on controlling negative emotion (Fleming, Lucassen et al., 2016). Emotion regulation has been defined as ‘the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goals’ (Thompson, 1994; p. 27-28). Effective
strategies in regulating emotions are critical to healthy social functioning and emotional wellbeing (Zeman et al., 2006). Poor emotion regulation skills have been linked to increased depression and anxiety in adolescents (Silk et al., 2003; Suveg & Zeman, 2004).

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) corresponds well with the two programmes’ theoretical background in cognitive behavioural therapy as it measures both cognitive reappraisal (using cognitive strategies to redefine a situation so that its emotional impact is changed) and expressive suppression (inhibition of emotion expressive behaviour). This scale includes 10 items and asks the respondent to rate on a seven-point Likert-scale how much they agree with each item. Sample items include ‘When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about’ and ‘When I am feeling negative emotions, I make sure not to express them’. The ERQ has presented good psychometric properties (Gross & John, 2003; Sala et al., 2012).

5.7.3.3 Acceptability

Programme acceptability was measured using a structured implementation questionnaire adapted from a range of eHealth evaluation studies and frameworks (Fleming, Lucassen et al. 2016; Kawai et al. 2007; Ritterband et al. 2010). Findings in relation to four elements of acceptability are reported in Paper III: 1) number of levels completed (self-reported), 2) overall satisfaction score (on a scale of 1 to 10), 3) perceived helpfulness and 4) extent of practicing the skills taught in the program. An adapted version of the CBT Helpfulness Scale (Van Voorhees et al., 2009; Zabinski et al., 2001) was used to examine perceived helpfulness of the intervention (Appendix 11). The participant is asked to rate on a scale of 1 (Very unhelpful) to 5 (Very helpful) the usefulness of the programme in recognising and changing behaviors, thoughts and emotions. Three items were added to the scale to reflect the contents of the programme: ‘confront issues or problems
that I struggle with', 'Feel better about myself', and 'Manage my feelings (for example anger, sadness, frustration'). The frequency of practicing the techniques taught in the programme was measured using a five-point scale (1 = never to 5 = almost every day) adapted from Kuyken et al. (2013; Appendix 12). The scale was developed to match programme content and included eight items; four items focusing on specific CBT techniques and one item each on, relaxation, activity scheduling, communication skills and problem solving.

5.7.3.4. Covariates

The participants were asked to state their gender, age and year of study. At post-intervention, the participants were asked whether they had received counselling within the last month.

5.7.4. Statistical methods

5.7.4.1. Power analysis

Original sample size calculations (power = 0.80, $\alpha = 0.05$) were conducted for a three-arm cluster RCT with two intervention conditions (SPARX-R and MoodGYM). The study was powered to detect an absolute difference of 30% (Merry et al., 2012) from the mean SMFQ value in the control arm. Based on a pilot study, we assumed the value in the control arm to be 7.80 (SD 6.36) and the difference in the means 2.34. Assuming an intraclass correlation of 0.02 (Calear et al., 2009), an average group size of nine students and an attrition rate of 30%, the calculations resulted in a desired sample size of 27 Centers (216 participants). The sample size was adjusted after excluding the MoodGYM arm to $n = 144$ or eight Centers with nine participants per condition.
5.7.4.2. **Baseline and outcome analysis**

Baseline differences between males and females were examined using independent samples T-tests (n=146). Participants that provided data at post-assessment (n = 66) were included in the outcome analysis. Missing items were not allowed in the online assessment for items of the outcome measures; however, they were allowed for items of user satisfaction. Intervention effects were analysed using random-effects linear regression models, taking into account the correlation of multiple measurements within one participant and the clustering of the data. Univariate analyses on each outcome variable were adjusted for baseline score, gender and age. Centre ID was included as a random factor in all models to reflect the clustered nature of the data. Estimates of treatment effect are presented as the adjusted difference in outcome between groups, along with 95% CI and $P$ value.

Random-effects linear regression models were fitted to compare the effect at treatment at post-intervention for each response, while adjusting for baseline, the correlation due to cluster membership and within-subject over time. A model was also fitted within the intervention condition to examine whether the participants who showed greatest use of the techniques taught in the programme had better outcomes (Kuyken et al., 2013). Plots of the (standardised) residuals were used to assess underlying model assumptions. All analyses were conducted using R software (version 3.3.1).

5.8. **Design of Study IV (Paper IV)**

In Study IV (as reported in *Paper IV*), student views on SPARX-R were explored via a post-intervention implementation questionnaire and open-ended verbal or written feedback. Furthermore, process evaluation questionnaires completed after each level of SPARX-R examined the views of students throughout the study, including those
who dropped out of the study. Staff views were explored through a post-intervention questionnaire and interviews.

5.8.1. Participants

Of the 92 students who were assigned to the SPARX-R condition and completed pre-intervention assessment, twenty-eight also completed the post-intervention implementation questionnaire (mean age 17.32 years, 32.1% male) and were included in the analysis. Furthermore, process evaluation data (questionnaires completed after each level of SPARX-R) were available from 66 (72%) participants, including also students who had dropped out of the study. Six staff moderators completed the post-intervention questionnaire and open-ended verbal or written feedback was available from twelve students and three staff moderators.

5.8.1.1. Student implementation questionnaire

The majority of the findings from the implementation questionnaire (Paper IV, Online Supplement 1) were reported in Paper IV, with the findings in relation to overall satisfaction, adherence, perceived helpfulness and extent of practicing the skills being reported in Paper III.

The findings from the Requirements Analysis (Paper II) were used to develop the implementation questionnaires. The main part of the implementation questionnaire consisted of five-point (1 = Strongly disagree to 5 = Strongly agree) Likert-style items. For each value identified in the Requirements Analysis, questionnaire items were developed in order to measure how well the programme responded to the specific attributes under that value (Table 5.4.). For some attributes, more than one question was formulated, where as other areas were not easily formulated into questionnaire items, and were further explored in student post-intervention discussions (see chapter 5.8.1.5.).
example, for the attribute ‘Not too wordy’, two questionnaire items were included: ‘The language was easy to understand’ and ‘I understood what I was supposed to do on the programme’. The studies used in developing the student workshop protocols in Paper II (see chapter 5.6.2.2.) also guided the development of questionnaire items under each area of the implementation questionnaire.

**Table 5.4.** Example of the formulation of questions for the implementation questionnaire

<table>
<thead>
<tr>
<th>Underlying value</th>
<th>Attribute</th>
<th>Area on the implementation questionnaire</th>
<th>Corresponding item(s) on the implementation questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to learn from</td>
<td>Not too wordy</td>
<td>Ease of use</td>
<td>The language was easy to understand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engagement</td>
<td>I understood what I was supposed to do</td>
</tr>
<tr>
<td></td>
<td>Not too lengthy</td>
<td>Ease of use</td>
<td>Going through the programme was ‘a lot of work’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engagement</td>
<td>The lessons were too long</td>
</tr>
<tr>
<td>Fun and engaging</td>
<td>Activity-based learning</td>
<td>Engagement</td>
<td>I found the programme fun</td>
</tr>
<tr>
<td></td>
<td>Visually attractive</td>
<td>Engagement</td>
<td>I found the programme boring</td>
</tr>
<tr>
<td></td>
<td>Tailored content</td>
<td>Relevance</td>
<td>I liked the look of the programme</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Usefulness</td>
<td>The lessons related well to my own life</td>
</tr>
<tr>
<td>Tailored to individual needs</td>
<td></td>
<td></td>
<td>I have used the tips and advise in my own life</td>
</tr>
<tr>
<td>Positive and encouraging</td>
<td>Positive framing</td>
<td>Satisfaction</td>
<td>I found the programme upsetting</td>
</tr>
<tr>
<td>Privacy and anonymity</td>
<td>Anonymity and confidentiality</td>
<td>Satisfaction</td>
<td>I was worried about privacy when using SPARX-R</td>
</tr>
</tbody>
</table>
Engagement Programme engagement was explored focusing on four areas identified in the original requirement analysis: how much participants liked the look of the programme, was the programme considered fun, did the participants find the programme interesting and was it considered boring.

Ease of use Seven items were used to examine aspects related to ease of use, including: appropriateness of the language, usability of the programme design, module length, and appropriateness of the programme to the level of computer skills of the user.

Relevance Programme relevance was examined using two items adapted from a study by Van Voorhees and colleagues (2009). The first item (‘The lessons in the programme made sense to me’) explored the overall understandability of the content, whereas the second item (‘The lessons related well to my own life’) explored its personal relevance.

Usefulness Three items of the questionnaire examined programme usefulness. The respondents were asked how much they agreed that the programme was useful overall, and whether they had used the tips and advice provided by the programme or learned something new from the programme.

Satisfaction Programme satisfaction was explored through whether the participants would recommend SPARX-R to a friend or whether they thought SPARX-R was helpful for a young person going through a tough time. The participants were also asked whether they found the programme upsetting or were worried about privacy. Furthermore, participants were asked to give the programmes an overall rating on a scale of 1–10.

Universal/Targeted delivery One multiple-choice question was included to examine user preference for targeted or universal delivery. The respondents were asked if SPARX-R was made available at
Youthreach, who in their opinion should participate. The item had three response categories ‘Everyone attending Youthreach’, ‘Only those who are feeling low or depressed’ and ‘I don’t think SPARX should be made available in Youthreach Centres’.

**Programme likes and dislikes** Open-ended questions were included to examine programme likes and dislikes and suggested changes to the programme. Furthermore, participants were allowed to provide further comments.

**Adherence** The participants were asked to report how many levels of the programme they had completed.

5.8.1.2. **Process evaluation questionnaire**

Process evaluation questionnaires (*Paper IV, Online Supplement 2*) were completed after each level of the programme in order to examine user views on each level, including the views of those participants who did not complete post-intervention assessment. These questionnaires were designed to be as short as possible to avoid disengagement by the participants. The main areas of the implementation questionnaire were examined: engagement, ease of use, relevance, usefulness and possible adverse reactions. Furthermore, the participants were asked to state their favourite and least favourite part of each programme level.

5.8.1.3. **Staff implementation questionnaire**

Staff views were examined on the three areas explored in the original requirements analysis: Programme views, content and programme implementation. All moderating staff, regardless of whether they completed delivering the programme or dropped out of the study, were asked to complete the implementation questionnaire (*Paper IV, Online Supplement 3*).
5.8.1.4. **Staff process evaluation questionnaire**

Similarly to students, staff were asked to complete a process evaluation questionnaire (Appendix 11) after each level of SPARX-R. However, most staff did not complete this questionnaire (two staff moderators completed the questionnaire for level 1 and one staff member completed the questionnaire for level 2).

5.8.1.5. **Student and staff post-intervention discussions**

The aim of the discussions was to further explore student and staff views on the programme, with a specific emphasis on factors influencing engagement and programme delivery. The protocol for the student discussions can be found in Appendix 13. Several means of getting feedback from students were used (interviews, focus groups, written feedback), based on the availability and preferences of the students themselves.

5.8.1.6. **Analysis**

Quantitative data from student and staff questionnaires were analysed using SPSS and open-ended responses were analysed using thematic analysis. Differences in user views by gender, three categories of pre-intervention levels of depression and type of delivery (researcher/staff) were explored in terms of trends, while being aware of the need for a larger sample for examining statistical differences. Baseline depression levels were determined using the Short Moods and Feelings Questionnaire (SMFQ; Angold et al., 1995), with SMFQ < 5 indicating no symptoms, SMFQ ≤ 10 indicating a risk of depression and SMFQ > 10 indicating clinical symptoms of depression (Stallard et al., 2013).

The student and staff discussions were audio recorded and transcribed by the researcher and analysed separately using the six phases of thematic analysis as described by Braun and Clarke (2006). A semantic ‘theoretical’ approach was used to look for patterns in the data and
interpreting these patterns with specific predefined research questions of interest in mind. First, the researcher familiarised herself with the data by reading the transcripts from student and staff discussions several times. Initial codes and patterns were generated, which were then grouped together to identify overarching themes. The themes were then reviewed and the dataset was re-read to ascertain that no important data were missed during the initial coding and to ensure that the identified themes were representative of the data. The data that were not coded (approximately 10%) included segments where the meaning was not clear and general discussion between students that was unrelated to the topic. The themes and subthemes were refined several times and reviewed with a second researcher, and finally, the findings were written up.
6. Results

In this chapter, the results from each study phase will be discussed, as reported in Papers II-IV. Furthermore, un-published findings in relation to the pilot evaluation of MoodGYM, will be reported. To conclude, the main findings from the study will be summarised at the end of the chapter.

6.1. The requirements of students and staff in relation to computerised mental health programmes (Paper II)

*Paper II* explored the needs and preferences of AE students and staff in relation to the delivery of computerised mental health programmes. Particularly, the paper aimed to explore what such programmes should look like, what they should do and how they should be implemented. The findings indicated that AE students and staff are interested in the use of computerised mental health programmes, and that they have quite specific requirements that need to be met in order for such programmes to be delivered successfully.

Nine overall values relating to programme look and feel, programme content and programme implementation were elicited from student transcripts. These values and the related attributes and requirements are presented in Table 6.1.

Reflecting the low levels of literacy and issues with concentration among AE students, the student participants valued programmes that are *easy to use* and are *fun and engaging*. Thus the students required programmes to be visually attractive, activity-based with minimal text-based content, short and comprehensive and allow for customising programme look and connecting with others. In relation to programme content, the students wanted programmes to teach *practical skills on improving mental health and wellbeing* in a way that was *credible and trustworthy* and *positive and encouraging*.
<table>
<thead>
<tr>
<th>Attribute(s)</th>
<th>Requirement(s)</th>
<th>Underlying value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program look and feel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not too lengthy</td>
<td>Each individual module is relatively short</td>
<td>Easy to learn from</td>
</tr>
<tr>
<td></td>
<td>Contents are presented clearly/no irrelevant information</td>
<td>“Not too much writing or words”</td>
</tr>
<tr>
<td>Not too wordy</td>
<td>Limited amount of text based content</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of audio- and video-based files</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simple and jargon free language</td>
<td></td>
</tr>
<tr>
<td>Activity-based learning</td>
<td>The programme is activity-based (e.g. puzzles, games etc.)</td>
<td></td>
</tr>
<tr>
<td>Visually attractive</td>
<td>Use of pictures and animations</td>
<td>Fun and engaging (not boring)</td>
</tr>
<tr>
<td></td>
<td>Easy to see images/text</td>
<td>“Having fun, while learning”</td>
</tr>
<tr>
<td></td>
<td>Graphics are up-to-date</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Happy music</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bright colours</td>
<td></td>
</tr>
<tr>
<td>Connecting with others</td>
<td>The programme can be played as a multiplayer game</td>
<td></td>
</tr>
<tr>
<td>Customizable program look</td>
<td>Personal input on programme look and feel (customizing character, ability to input own voice)</td>
<td></td>
</tr>
<tr>
<td>Content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical skills to improve</td>
<td>Program teaches how to build confidence and self-esteem, manage and talk about feelings, reduce stress and improve coping,</td>
<td>Practical advice on improving mental health and wellbeing</td>
</tr>
<tr>
<td>social and emotional wellbeing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advise on helping others</td>
<td>Programme includes information and advice on helping others</td>
<td>“Practical skills to calm you down”</td>
</tr>
<tr>
<td>Information on substance misuse and</td>
<td>Programme provides information on dealing with substance misuse, depression and anxiety</td>
<td></td>
</tr>
<tr>
<td>mental health problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive framing</td>
<td>Programme contents are positive and encouraging (hope, examples of positive thinking patterns)</td>
<td>Positive and encouraging</td>
</tr>
<tr>
<td></td>
<td>The programme does not focus on negative feelings or thinking patterns</td>
<td>“It shows that there is hope if you try”</td>
</tr>
<tr>
<td>Tailored contents</td>
<td>Information can be tailored to individual needs</td>
<td>Tailored to individual needs</td>
</tr>
<tr>
<td></td>
<td>Provides links to further information</td>
<td>“Everybody’s different, everybody should have a choice”</td>
</tr>
<tr>
<td>Personalized feedback</td>
<td>Asks personal questions and provides personal feedback</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Allows tracking progress</td>
<td></td>
</tr>
<tr>
<td>Realistic goals</td>
<td>Programme goals are incremental and realistic</td>
<td>Credible and trustworthy</td>
</tr>
<tr>
<td>Sincere and convincing</td>
<td>Programme characters appear sincere and believable</td>
<td>“It’s not a magic cure”</td>
</tr>
<tr>
<td>Implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility</td>
<td>The programme can be accessed from home</td>
<td>Accessible support</td>
</tr>
<tr>
<td></td>
<td>The programme can be accessed through mobile phones</td>
<td>“To know there is somewhere to turn to if you need support online”</td>
</tr>
<tr>
<td>Optional attendance</td>
<td>It is up to the student to decide whether or not to take part</td>
<td>Voluntary participation</td>
</tr>
<tr>
<td>Anonymity and confidentiality</td>
<td>The user can remain anonymous</td>
<td>Privacy and anonymity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“It’s not like your secret’s out”</td>
</tr>
</tbody>
</table>
Programme content should also be tailored to individual needs by providing personalised feedback and tailored contents. In order to ensure timely and accessible support, students expressed the need for computerised programmes to also be accessible from home and through mobile phones. Finally, if computerised programmes were delivered in the AE setting, student required optional attendance and privacy and anonymity.

The staff discussed the perceived needs of students in relation to programme look and content and their own requirements in relation to programme implementation (Table 6.2.). The perceived needs of students were in line with the requirements elicited from student transcripts. Four values were elicited from staff transcripts in relation to programme implementation.

In order to deliver computerised programmes successfully, staff considered careful planning and timetabling essential. Staff expressed the need for adequate training for staff, building the programme into the curriculum and careful selection of students. Considering the vulnerability of the students, staff wanted computerised programmes to be complemented by face-to-face support, and thus computerised programmes should be delivered in a structured environment with teacher presence while also having professional support at hand. In order for each student to progress with computerised programmes at his or her own pace, staff required flexibility in delivery. Finally, staff expressed the view that computerised programmes should support the role and functioning of the AE Centre by tying in with other subjects taught in the Centre and providing information on student wellbeing.

The requirements expressed by students and staff informed the programme implementation and process evaluation in the subsequent study. The identified requirements informed programme selection, the selection of outcome measures (appropriateness to levels of literacy and concentration) and the development of process evaluation.
questionnaires (as detailed on p. 67). Furthermore, the findings guided the development of implementation and programme manuals for staff to ensure the availability of adequate support for students and staff during programme implementation.

Table 6.2. Implementation requirements expressed by staff (not in Paper II)

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Requirements</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embedded in the curriculum</td>
<td>A set time and place need to be established for the programme</td>
<td>Planning and timetabling</td>
</tr>
<tr>
<td>Selecting students</td>
<td>Staff can preselect the group of students to take part in the programme</td>
<td></td>
</tr>
<tr>
<td>Staff training and support</td>
<td>Staff training in technical aspects and in the area of youth mental health as needed</td>
<td>Programme manual</td>
</tr>
<tr>
<td></td>
<td>Ongoing support for staff in programme delivery available</td>
<td></td>
</tr>
<tr>
<td>Retrievable user ID and password</td>
<td>Staff has access to user details or they are retrievable from the system</td>
<td></td>
</tr>
<tr>
<td>Delivery in structured class</td>
<td>Program delivered in a structured class environment with teacher presence</td>
<td>Complemented by face-to-face support</td>
</tr>
<tr>
<td>environment</td>
<td>The staff can interact with students when completing the programme (explain words, technical aspects, discuss student reactions to programme content)</td>
<td></td>
</tr>
<tr>
<td>Targeted support available</td>
<td>Support systems (staff mentoring, counselling services) are in place in case of adverse reactions</td>
<td></td>
</tr>
<tr>
<td>Setting targets and rewards</td>
<td>Staff can encourage programme completion by setting targets/rewards</td>
<td></td>
</tr>
<tr>
<td>Flexibility in delivery</td>
<td>Allowing students to progress at their own pace</td>
<td>Flexibility in delivery</td>
</tr>
<tr>
<td></td>
<td>Delivery times are flexible to combat issues with attendance</td>
<td></td>
</tr>
<tr>
<td>Provides information on student</td>
<td>The staff can access individual or summary reports that can be used to plan future supports and report on soft skills development (SOLAS-framework)</td>
<td>Supporting the role and functioning of the Centre</td>
</tr>
<tr>
<td>wellbeing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ties in with other subjects</td>
<td>Programme complements other subject areas taught in the Centre (i.e. SPHE, literacy)</td>
<td></td>
</tr>
<tr>
<td>taught in the centre</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.2. The effectiveness of SPARX-R with youth attending alternative education (Paper III)

The aim of Paper III was to examine the effectiveness of SPARX-R serious game in improving the mental health and wellbeing and reducing symptoms of depression and anxiety in AE students. Of the 146 participants who completed the baseline assessment, 66 (45.2%) completed the post-intervention assessment and were included in the outcome analysis. Baseline analyses (n=146) showed that depression and anxiety were common among the participants, with 60% of the participants exhibiting heightened levels of depression (SMFQ ≥ 5), nearly a quarter (24%) meeting caseness for depression (SMFQ ≥ 11) and a third (34%) exhibiting above moderate levels of anxiety (GAD-7 ≥ 10).

The findings indicated that SPARX-R has a positive impact on emotion regulation strategies, with emotional suppression decreasing significantly in comparison to the control (-2.97, 95% CI -5.48 to -0.46, p = 0.03). SPARX-R also fared better than the no-intervention control condition on most other indicators of mental health and wellbeing (Table 6.3.). Although a non-significant increase in symptoms of depression at post-assessment was detected in both conditions, this increase was greater in the control condition, adjusted difference -1.46 units (95% CI -4.76 to 1.83, p = 0.34). When expressed relative to mean at baseline, this is a difference of approximately 18%. No significant intervention effects were detected for symptoms of anxiety (p = 0.88) or general wellbeing (p = 0.66). The adjusted analysis at post-assessment showed differences in avoidant coping (-3.42, 95% CI -7.05 to 0.22, p = 0.06), support seeking coping (1.88, 95% CI -2.07 to 5.83, p = 0.31) and problem solving coping (0.97, 95% CI -2.70 to 4.64, p = 0.56) in favour of the intervention condition, however, none of these changes reached statistical significance.
Table 6.3. Primary and secondary outcomes by group (SPARX-R and control) at pre- and post-assessment and estimates of effect size

<table>
<thead>
<tr>
<th>Outcome measure</th>
<th>SPARX-R (n=30)</th>
<th>Control (n=36)</th>
<th>Adjusted difference* (95% CI, p-value) at post-assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline mean (SD)</td>
<td>Post-assessment mean (SD)</td>
<td>Baseline mean (SD)</td>
</tr>
<tr>
<td>SMFQ</td>
<td>6.33 (5.01)</td>
<td>6.77 (6.01)</td>
<td>8.81 (6.62)</td>
</tr>
<tr>
<td>GAD-7</td>
<td>7.00 (5.58)</td>
<td>7.20 (6.53)</td>
<td>9.97 (6.12)</td>
</tr>
<tr>
<td>WEMWBS</td>
<td>46.17 (9.00)</td>
<td>45.97 (11.41)</td>
<td>42.75 (10.35)</td>
</tr>
<tr>
<td>CSI AvCo</td>
<td>15.87 (6.19)</td>
<td>14.30 (5.73)</td>
<td>17.58 (6.18)</td>
</tr>
<tr>
<td>SuSe</td>
<td>9.87 (4.88)</td>
<td>11.73 (5.76)</td>
<td>12.17 (5.90)</td>
</tr>
<tr>
<td>ProSo</td>
<td>13.13 (5.07)</td>
<td>13.70 (5.52)</td>
<td>13.61 (5.15)</td>
</tr>
<tr>
<td>ERQ CoRe</td>
<td>23.03 (8.19)</td>
<td>22.27 (8.19)</td>
<td>21.89 (7.00)</td>
</tr>
<tr>
<td>ExpSu</td>
<td>15.57 (6.05)</td>
<td>13.60 (5.79)</td>
<td>16.89 (5.42)</td>
</tr>
</tbody>
</table>

(SMFQ = Short Moods and Feelings Questionnaire; GAD-7 = Generalised Anxiety Disorder Scale; WEMWBS = Warwick-Edinburgh Mental Wellbeing Scale; CSI-AvCo = Coping Strategy Indicator Avoidant Coping Subscale; CSI-SuSe = Support Seeking Subscale; CSI-ProSo = Problem Solving Subscale; ERQ-CoRe = Emotion Regulation Questionnaire Cognitive Reappraisal; ERQ-ExpSu = Expressive Suppression)

*Function score adjusted for baseline, gender and age
Students completed on average 5.3 out of the seven levels of SPARX-R with only 30% (n = 9) completing the entire programme. The frequency of practicing the skills taught in SPARX-R was significantly positively correlated with perceived helpfulness of the programme ($r = 0.43$, $p = 0.04$) and improvements in the use of social support as a coping mechanism ($r = 0.39$, $p = 0.034$), but not with other outcomes.

### 6.3. Factors influencing the implementation of SPARX-R in alternative education (Paper IV)

The aim of Paper IV was to examine the factors, whether student, programme or context related, that may have influenced programme implementation and students engagement with SPARX-R. The findings indicated that SPARX-R was considered easy to use by the majority of participants, with 71.4% agreeing that the language in SPARX-R was easy to understand and 75.0 % agreeing that they understood what they were supposed to do on the programme. However, less than half (46.5%) of the participants indicated that they liked the look of the programme or considered the programme fun (39.2%).

Although the majority of the participants (60.7%) agreed that the lessons in SPARX-R made sense to them, less than half (42.9%) agreed that the lessons related well to their lives or considered the programme useful/worth-doing (39.3%). More than half of participants (53.6%), however, considered the programme helpful for a young person going through a tough time. More females than males, and those categorised as at risk for depression ($5 \leq \text{SMFQ} \leq 10$), rather than with clinical symptoms ($\text{SMFQ} > 10$) or no symptoms ($\text{SMFQ} < 5$), agreed that SPARX-R was personally relevant or useful.

SPARX-R received an mean overall score of 5.78 (SD 2.79) out of 10. Universal delivery of SPARX-R was supported by the majority of
students (51.9%), and all staff supported universal over targeted delivery.

Technical limitations, lengthiness and lack of positive focus were the main reasons for disengagement reported by the students. Staff expressed a need for increased flexibility in programme delivery, in the way of customisable programme length and content, and were keen to complement computerised programmes with face-to-face support to improve student engagement.

6.4. Findings from an evaluation of MoodGYM

The MoodGYM trial arm in Paper III was stopped early because of students’ inability to complete the programme due to low levels of literacy. However, students from two Centres (n = 20) partly completed the programme and completed the post-intervention assessment and implementation questionnaire. Furthermore, students from one Centre (n = 6) provided qualitative feedback in the form of a group discussion. These findings in relation to the effectiveness and implementation of MoodGYM were not included in Paper III and will be discussed here briefly. The study protocols were the same as used in the main SPARX-R study.

6.4.1. Participants

Forty students (mean age 17.78 years, 37.5% male) from two Centres completed the pre-intervention assessment and started MoodGYM. Student and staff post-intervention feedback was available for two of these Centres. Twenty students (mean age 17.10 years, 40.0% male) completed post-intervention assessment and implementation questionnaires. Students from one Centre (n = 6, mean age 18.0 years, 33.3% male) took part in a post-intervention group discussion.
6.4.2. Outcomes

The students completed on average 3.08 modules (61.6%) of the programme. Two participants (16.7%) reported completing the entire programme. No significant improvements on any of the outcome measures were detected in the MoodGYM condition at post-intervention (Table 6.4.). An increase in avoidant coping and decreases in problem solving and support seeking coping were detected in the intervention and control conditions, however, these changes were significantly smaller in the MoodGYM condition for avoidant coping (adjusted difference -0.42, 95% CI -0.83 to -0.01, p = 0.05) and problem solving coping (adjusted difference -0.51, 95% CI -0.86 to -0.14, p = 0.01). However, it is clear that the small sample size affected the ability to detect statistically significant change in this pilot study.
Table 6.4. Primary and secondary outcomes by group (MoodGYM and control) at pre- and post-assessment and estimates of effect size

<table>
<thead>
<tr>
<th>Outcome measure</th>
<th>MoodGYM (n=20)</th>
<th>Control (n=36)</th>
<th>Adjusted difference* (95% CI, p-value) at post-assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline mean (SD)</td>
<td>Post-assessment mean (SD)</td>
<td>Baseline mean (SD)</td>
</tr>
<tr>
<td>SMFQ</td>
<td>8.90 (6.54)</td>
<td>10.10 (6.83)</td>
<td>8.81 (6.62)</td>
</tr>
<tr>
<td>GAD-7</td>
<td>9.25 (5.65)</td>
<td>9.60 (7.39)</td>
<td>9.97 (6.12)</td>
</tr>
<tr>
<td>WEMWBS</td>
<td>44.00 (8.70)</td>
<td>38.80 (11.39)</td>
<td>42.75 (10.35)</td>
</tr>
<tr>
<td>CSI AvCo</td>
<td>17.05 (6.34)</td>
<td>17.40 (5.97)</td>
<td>17.58 (6.18)</td>
</tr>
<tr>
<td></td>
<td>11.00 (5.28)</td>
<td>10.60 (4.35)</td>
<td>12.17 (5.90)</td>
</tr>
<tr>
<td></td>
<td>14.85 (6.14)</td>
<td>13.65 (3.38)</td>
<td>13.61 (5.15)</td>
</tr>
<tr>
<td>CSI SuSe</td>
<td>23.10 (6.53)</td>
<td>21.90 (8.71)</td>
<td>21.89 (7.00)</td>
</tr>
<tr>
<td></td>
<td>16.45 (5.40)</td>
<td>17.25 (5.53)</td>
<td>16.89 (5.42)</td>
</tr>
</tbody>
</table>

(SMFQ = Short Moods and Feelings Questionnaire; GAD-7 = Generalised Anxiety Disorder Scale; WEMWBS = Warwick-Edinburgh Mental Wellbeing Scale; CSI-AvCo = Coping Strategy Indicator Avoidant Coping Subscale; CSI-SuSe = Support Seeking Subscale; CSI-ProSo = Problem Solving Subscale; ERQ-CoRe = Emotion Regulation Questionnaire Cognitive Reappraisal; ERQ-ExpSu = Expressive Suppression)

*Function score adjusted for baseline, gender and age
6.4.3. User views

6.4.3.1. Implementation questionnaire

Overall, MoodGYM was rated less favourably than SPARX-R on all areas of the implementation questionnaire. MoodGYM received a mean user satisfaction score of 3.11 (SD 2.54) out of 10 compared to a score of 5.78 (SD 2.79) received by SPARX-R. The findings of the implementation questionnaires for MoodGYM and SPARX-R, regarding engagement, ease of use, relevance, usefulness, and satisfaction, are summarised in Table 6.5.

A small minority of participants liked the look of MoodGYM and considered it personally relevant and helpful. Four participants (20%) liked the look of MoodGYM (compared to 46.5% with SPARX-R) and one participant considered the programme fun (in comparison to 39.5% of those participating in SPARX-R). Reflecting low levels of literacy, only four participants (20%) agreed that the language in MoodGYM was easy to understand or that they understood what to do on the programme and three participants agreed that the lessons ‘made sense to them’. In comparison, the majority of student who participated in SPARX-R considered the language easy to understand (71.4%), reported that they understood what to do on the programme (75.0%), and agreed that the lessons ‘made sense to them’ (60.7%).

Four participants (20%) considered the lessons in MoodGYM personally relevant, only one participant considered the programme useful/worth-doing and two participants agreed that MoodGYM was helpful for a young person going through a tough time. SPARX-R was considered personally relevant by 42.9%, useful/worth doing by 39.3% and helpful for a young person going through a tough time by 53.6% of the participants.
### Table 6.5. User views on MoodGYM and SPARX-R at post-intervention

<table>
<thead>
<tr>
<th>Item</th>
<th>SPARX-R (n=28)</th>
<th>MoodGYM (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree or</td>
<td>Agree or</td>
</tr>
<tr>
<td></td>
<td>strongly agree</td>
<td>strongly agree</td>
</tr>
<tr>
<td><strong>Engagement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I liked the look of the programme</td>
<td>13 (46.5)</td>
<td>4 (20.0)</td>
</tr>
<tr>
<td>Going through the programme was fun</td>
<td>11 (39.2)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>I found the programme interesting</td>
<td>13 (46.5)</td>
<td>2 (10.0)</td>
</tr>
<tr>
<td>I found the programme boring</td>
<td>13 (46.5)</td>
<td>6 (30.0)</td>
</tr>
<tr>
<td><strong>Ease of use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The language was easy to understand</td>
<td>20 (71.4)</td>
<td>4 (20.0)</td>
</tr>
<tr>
<td>I understood what I was supposed to do</td>
<td>21 (75.0)</td>
<td>4 (20.0)</td>
</tr>
<tr>
<td>It was difficult to find my way around the programme</td>
<td>7 (25.0)</td>
<td>6 (30.0)</td>
</tr>
<tr>
<td>Going through the programme was a lot of work</td>
<td>8 (28.6)</td>
<td>7 (35.0)</td>
</tr>
<tr>
<td>The lessons were too long</td>
<td>10 (35.7)</td>
<td>10 (50.0)</td>
</tr>
<tr>
<td>I felt annoyed/frustrated going through the program</td>
<td>12 (42.9)</td>
<td>6 (30.0)</td>
</tr>
<tr>
<td>My computer skills are good enough for using the program</td>
<td>20 (71.4)</td>
<td>11 (55.0)</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The lessons ‘made sense’ to me</td>
<td>17 (60.7)</td>
<td>3 (15.0)</td>
</tr>
<tr>
<td>The lessons related well to my own life</td>
<td>12 (42.9)</td>
<td>4 (20.0)</td>
</tr>
<tr>
<td><strong>Usefulness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The programme was useful/worth doing</td>
<td>11 (39.3)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>I have used the tips and advice in my own life</td>
<td>8 (28.6)</td>
<td>1 (5.0)</td>
</tr>
<tr>
<td>I learned something new from the programme</td>
<td>12 (42.9)</td>
<td>2 (10.0)</td>
</tr>
<tr>
<td><strong>Overall satisfaction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would recommend the programme to a friend</td>
<td>9 (32.2)</td>
<td>2 (10.0)</td>
</tr>
<tr>
<td>The programme is helpful for a young person going through a tough time</td>
<td>15 (53.6)</td>
<td>3 (15.0)</td>
</tr>
<tr>
<td><strong>Adverse effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I found the programme upsetting</td>
<td>3 (10.7%)</td>
<td>5 (25.0)</td>
</tr>
<tr>
<td>I was worried about privacy</td>
<td>7 (25.0)</td>
<td>6 (30.0)</td>
</tr>
</tbody>
</table>
**Perceived helpfulness** Two participants considered MoodGYM helpful in terms of recognising negative thoughts, not letting negative thoughts get oneself down, having more satisfying relationships, confronting issues, and feeling better about oneself (CBT Helpfulness Scale). Three participants considered MoodGYM helpful in terms of expressing one’s emotions. However, approximately half of the participants considered MoodGYM unhelpful on each of the above items.

**Universal/targeted delivery** Of the participants, 45% (n = 9) did not think MoodGYM should be delivered at Youthreach, 30% (n = 6) supported universal delivery and 25% (n = 5) supported targeted delivery for those who are feeling low or depressed.

**Likes and dislikes** The programme ‘likes’ reported by the participants included the programme being informative, having the opportunity to express one’s feelings and the fact that “they’re trying to help”. Few participants expressed that the programme was easy to use and helpful. Furthermore, participants liked learning about themselves. The most frequently mentioned aspects of MoodGYM that the participants disliked were, that it was too wordy and difficult to understand and the programme was repetitive and too long. Furthermore, some participants reported having technical issues and not liking having to read and/or write. Finally, the programme was said to bring up negative feelings by being too negatively focused and personal. Some did not like learning things about themselves that were not positive and the programme was also said to bring up bad memories.

**6.4.4. Student discussion**

Students’ views on MoodGYM and its implementation were further explored in a student discussion with six students from one Youthreach Centre. The following themes were extracted from the student discussion.
**Hard to understand** Similarly to the open-ended feedback in the implementation questionnaires, the main reasons expressed by the students for disengagement were that the programme was too long, repetitive and difficult to understand. The language was not considered age-appropriate and the contents were too complicated. The students explained that “you’d have to have a degree ... in that type of field” to understand the contents fully. As expressed by one of the students, in order to engage young people “just make it plain and simple and ... get straight to the point.”

**Need for more relatable and practical content** The students were also of the view that the programme contents should be more practical, focusing on how to cope with everyday issues relevant to all young people. Issues mentioned by the students that were considered relevant to most young people living in the local area included the loss of a loved one (including pets) or the consequences of drug use.

**Questions about depression are unreliable and too direct** Students were critical about the self-assessment of depression symptoms completed at the beginning of each module, which they didn’t consider to be useful or reliable: “everybody obviously felt bad in the last two weeks but it doesn’t mean that they are depressed”. Furthermore, such questions were considered too formal and direct, making it less likely for the user to be honest: “You wouldn’t say...‘I’m depressed’ it just doesn’t sound right”.

**Issues with confidentiality** As part of the ethical considerations for the study, the students were informed that in the case of reporting clinical levels of depression and/or anxiety the Centre Coordinator and their parents/guardians would be informed. According to the students, this inhibited them from answering honestly to the questions for fear of causing concern among their parents. The students felt that they should be able to choose if and when they decide to approach a member of staff about their issues.
The potential impact is limited  The potential impact of computerised mental health programmes was considered limited. Although they were considered possibly helpful in terms of raising awareness, computerised programmes alone were not considered sufficient to have significant impact on changing thinking patterns or behaviours.

Computerised programmes cannot replace human contact  Overall, the students’ responses indicated that computerised programmes could not replace face-to-face human contact. Face-to-face interaction was considered superior in terms of giving personal feedback and to “drag more information out of you”. Furthermore, face-to-face contact was thought to provide a greater sense of connection and support: “the only thing they might tell you is how embarrassing it is to speak about the whole topic... and then you can relate to them”. However, the students recognised that for some young people using the computer could be easier than talking face-to-face, and therefore, a combined approach of computerised and face-to-face strategies was suggested.

6.5. Conclusions

The main findings from this study show that young people in alternative education prefer mental health promotion programmes that are strengths-based and delivered universally. The use of a gaming approach is feasible with these young people, many of whom have issues with literacy. However, in order to improve engagement and relevance of such programmes to all young people, there is a need for a more positive approach, improved customisation and complementing such programmes with face-to-face approaches.

The main findings of the four studies were:

• The existing evidence base endorses the supported delivery of computerised mental health programmes that are module-based and have sound theoretical underpinnings. Increased research to
understand high attrition rates and implementation with a more varied group of young people, including those who are socially and economically disadvantaged is needed (Paper I).

- AE students and staff have quite specific requirements in relation to the delivery of computerised mental health programmes (Paper II). Students value programmes that are activity-based, attractive, positive and emphasise user control. Staff want to be able to support students in engaging with such programmes and thus require both, flexibility and structure in programme delivery.

- SPARX-R cCBT may be effective in improving emotion regulation strategies among young people attending AE. Further research is needed to establish the impact of the programme on other outcomes (Paper III).

- SPARX-R is appropriate to the reading level of AE students, who generally have difficulties with literacy. However, high attrition and low engagement rates were an issue, which, according to students were caused by technical issues and lack of positive focus. According to staff, computerised programmes should be delivered within a dedicated mental health curriculum complemented by face-to-face activities in order to improve engagement (Paper IV).
7. Discussion

In this chapter, the main findings from the thesis will be discussed in light of previous research. This will be followed by an interpretation of the findings, methodological considerations, and finally, an overview of the study limitations.

7.1. Comparison with previous research

Mental health needs of AE students

In Paper II staff reported a high prevalence of mental health issues among the AE students ranging from low self-esteem to depression and anxiety. This is in line with staff perceptions of a high prevalence of mental health difficulties among AE students as referred to in previous studies (WRC Social and Economic Consultants, 2007; McHugh, 2014).

In Paper III, the participants reported lower levels of mental health and wellbeing than their peers in mainstream education in Ireland, with 60% of the participants at baseline (n = 146) exhibiting heightened levels of depression (SMFQ ≥ 5), nearly a quarter (24%) meeting caseness for depression (SMFQ ≥ 11) and a third (34%) exhibiting above moderate levels of anxiety (GAD-7 ≥ 10). In an Irish national study of youth mental health and wellbeing (My World Survey, n = 6085, Dooley & Fitzgerald, 2012), 70% of secondary school students (age 12-19 years) reported no symptoms of depression, with 22% indicating mild to moderate symptoms and 8% indicating severe or very severe symptoms of depression. Findings from other Irish studies indicate that between 20-30% of Irish secondary school students have a mental health disorder or are at risk of mental health problems (Lynch et al., 2005; Martin et al., 2006; Sullivan et al., 2004).

Likewise, in comparison to secondary school students internationally, the participants in this study exhibited poor mental health and
wellbeing; mean wellbeing score of 45.99 in comparison to 48.8 in 13-16 year-old secondary school students in UK and Scotland (n = 1650; Clarke et al. 2011); mean depression score 7.09 compared to 3.55-4.10 in secondary school students in the UK (n = 5030; Stallard et al., 2013); and mean anxiety score of 7.67 compared to 4.6 among Australian Year 9/10 students (n = 976; Wong et al.’ 2014).

The level of mental health difficulties among AE students highlights the need for mental health promotion and prevention strategies among this population. Universal interventions that focus on resilience and coping with challenges enhance good mental health and wellbeing and also reduce the risk factors for mental health problems (Clarke et al., 2015; Durlak et al., 2015). Although such approaches are preferable to AE students and staff (as reported in Papers II and IV), it is clear that more targeted support is also necessary for some students exhibiting high levels of mental health problems. The extent of agreement between students and staff on the needs of students in relation to the implementation of cCBT, as reported in Paper 2, is an indication of the nature of the relationship between students and staff within the alternative education setting. The AE setting differs from mainstream education by offering more one-to-one support and flexibility, thereby providing staff with a good platform for supporting student mental health and wellbeing.

*The views of young people and youth service providers on cCBT*

Previous studies have reported that young people attending third level education consider stigma reduction, anonymity and confidentiality and accessibility as the main benefits of computerised mental health programmes (Mitchell & Gordon, 2007; Richards & Timulak, 2013; Sweeney et al., 2016), whereas the limitations of computerised programmes include difficulty of use, privacy concerns, time and access, losing motivation, mismatch between user needs and programme content and lack of personalised feedback and therapist support.
(Richards & Timulak, 2013; Sweeney et al., 2016). Furthermore, Mitchel & Gordon (2007) reported poor credibility of cCBT and low expectancy of improvement among university students, and a preference for cCBT to be accompanied by face-to-face counselling. Similar attitudes were reflected in the views of AE students as reported in Paper II. The participants valued easy to use and engaging programmes that are accessible and anonymous, and provide practical and tailored content that is credible and trustworthy.

Moreover, the views of AE students in this study are similar to those expressed by AE students in New Zealand. Young people attending AE in New Zealand, regardless of age, gender or depressive symptomology, also referred to stigma as a barrier to seeking help for mental health problems, which according to the students could possibly be lowered by computerised delivery (Fleming, Dixon & Merry, 2012; Fleming, Lucassen et al., 2016). Thus, AE students in New Zealand considered universal delivery and using positive terminology that does not focus on depression important to improve engagement and avoid stigmatisation for those experiencing mental health problems (Fleming, Lucassen et al., 2016).

In previous studies, professionals working with young people have reported a general interest in the use of technology to support the mental health and wellbeing of children and adolescents, while expressing concerns about the lack of face-to-face interaction with computerised programmes (Clarke et al., 2017; Fleming & Merry, 2013; Vigerland et al., 2014). This is in keeping with the views of AE staff as reported in Paper II.

**Effectiveness of SPARX/SPARX-R**

To date, the use of the original SPARX has been examined with a general population of depressed adolescents (n = 187, age 12-19 years, 35% male; Merry et al., 2012), youth attending alternative education in New
Zealand (N = 30, age 13–16 years, 56% male; Fleming, Dixon, Frampton & Merry, 2012) and with sexual minority youth (Rainbow SPARX, n = 21, 51% male; Lucassen et al., 2015). Two of these studies employ a randomised controlled design (Merry et al., 2012, Fleming, Dixon, Frampton & Merry, 2012). The studies show SPARX to be non-inferior to treatment as usual (d = 0.3; Merry et al., 2012) and effective in reducing symptoms of depression in AE students, with the effect size ranging from moderate (d = 0.77) for self-rated measures to high (d = 1.61) for observer-rated measures (Fleming, Dixon, Frampton & Merry, 2012). In all of the studies, programme effectiveness was examined with young people with heightened levels of symptoms of depression.

In Paper III, the effectiveness of SPARX-R was examined with a universal population of AE students. SPARX-R was developed as a preventative intervention that is more suitable for universal delivery than the original SPARX for depression. Given that the present study incorporated a universal sample, including participants with minimal symptoms of depression, indicators of positive mental health and wellbeing were consider vital to examine programme effectiveness. Across the existing SPARX studies the focus on positive mental health was limited, with the studies including measures of quality of life and locus of control. Although the programme aims include improving emotion regulation, teaching relaxation techniques, and improving problem solving coping and help-seeking, none of the studies measured the impact of the programme on these dimensions of positive mental health. Merry and colleagues (2012) reported improvements in quality of life, however, it is unclear whether these improvements were statistically significant. Fleming and colleagues (2012) found no significant improvements in quality of life or locus of control.

However, AE students in New Zealand perceived the programme to have helped them in terms of remaining calm and controlling negative emotions, such as anger (Fleming, Lucassen et al., 2016). This is
supported by the findings of the present study, with a significant improvement having been detected at post-intervention on emotion regulation strategies.

The inability to detect a significant impact on symptoms of depression in the current study, comparable to that reported in previous SPARX studies, could be attributed to the small sample size that, due to drop-out, stayed below the original sample calculations. Furthermore, the study sample consisted of a universal sample of AE students, whereas previous studies focused on populations exhibiting moderate-high levels of depression. It is clear that for participants with minimal symptoms of depression at baseline, there is little room for improvement. Of the participants in Paper III, 40% had no detectable symptoms of depression. The findings from Paper IV indicated that those categorised as being at risk of depression found the programme most useful. Merry and colleagues (2012) report further improvements in symptoms of depression at 3-month follow-up. Due to the extent of drop-out, a follow-up analysis was not possible in Paper III.

*User satisfaction and adherence*

In line with previous studies acknowledging high drop-out and low engagement rates as being problematic with online interventions (Christensen et al., 2011; Eysenbach, 2005; Fleming, de Beurs et al., 2016), high attrition was also an issue in the current study with 55% of participants leaving the study before completing post-intervention assessment. Kaltenthaler and colleagues (2008) reviewed trials of cCBT with adults and found an average drop-out rate of 32%. In a school-based trial of MoodGYM, only 32.7% of participants completed the entire programme (Calear et al., 2009). However, those who have not dropped out generally report high user satisfaction with cCBT (Calear et al., 2016; Ellis et al., 2011; Lindvedt et al., 2013; Richards & Timulak, 2013). In the above studies, 60-90% of participants indicated that they would recommend cCBT to other young people, between 80% and 95%
considered cCBT easy to use/understand and 46-83% considered cCBT useful or helpful

Contrary to most cCBT programmes, high completion rates have been reported with SPARX (Merry et al., 2012; Fleming, Dixon, Frampton & Merry, 2012; Lucassen et al., 2015). In the above studies, between 60-80% of participants completed all levels of the SPARX compared to just 30% of participants in the present study (see Paper III) completing all levels of SPARX-R. Furthermore, compared to the views of Irish AE students on SPARX-R, as reported in Paper IV, young people in New Zealand reported higher user satisfaction with SPARX. Over 80% of the AE student and secondary school student participants in New Zealand (Fleming, Lucassen et al., 2016; Merry et al., 2012) indicated that they would recommend SPARX to a friend compared to just a third of the Irish participants of SPARX-R (Paper IV). Fleming, Lucassen et al. (2016) reported that 85% of the AE participants considered SPARX to be useful, compared to just 40% of the participants in Paper IV agreeing that the SPARX-R was useful/worth-doing.

The views of the Irish AE students on SPARX-R, as reported in Paper IV, are more in line with the views of young people (n = 5030; aged 12–16 years) participating in classroom based CBT (face-to-face) in the UK (Stallard et al., 2013). In a school-based trial of the Resourceful Adolescent Programme, only slightly over third of the participants rated the programme positively (a score of 6 or more out of 10) in terms of liking the lessons (36.5%), usefulness in everyday life (35.4%) and half (49.6%) considered the programme relevant to their age. These findings highlight the challenges of transferring evidence-based programmes to real-life settings and other country contexts. Outside the initial randomised controlled trials, keeping participants engaged and showing effect can be difficult. Further research into the transferability of existing evidence-based programmes is needed, including how such programmes can be adapted to better suit the
needs and preferences of the students and how they can be more successfully integrated into the local educational system.

**Predictors of programme engagement**

There is limited research on the relevance of SPARX or other cCBT programmes for specific subgroups of young people. Cheek et al. (2014) explored the views of Australian rural adolescents on SPARX (based on viewing a trailer and presentation of the programme). SPARX was considered to be more appealing for those young people who played computer games. Furthermore, the female participants felt that the programme would be more relevant to boys. In terms of MoodGYM, being female, living in a rural location, younger age, higher education and higher level of symptoms of depression and anxiety have been shown to predict greater adherence (Batterham et al., 2008), with predictors for adherence differing between settings (Neil et al., 2009).

In the current study, no significant differences were detected between participants who dropped out of the study and those who completed post-intervention assessment (Paper III). However, some differences emerged, although non-significant, in user satisfaction by gender and levels of depression (Paper IV). A slightly bigger proportion of the male than female participants reported that they liked the look of SPARX-R and considered it fun. Furthermore, SPARX-R showed particular relevance to those categorised as being at risk of depression.

The use of MoodGYM with a more diverse group of young people, including those who are more disadvantaged, has not been well studied. Sethi (2013) examined the use of MoodGYM with young people recruited from Universities and Community Youth Centres, concluding that MoodGYM may not be appropriate for use with everyone, especially with young people with low literacy levels. This conclusion is endorsed by the findings on the implementation of MoodGYM (Mark III)
in this study. However, it should be mentioned that an updated version of MoodGYM has been brought out since this research was conducted.

7.2. Interpretation

This research was guided by the principles of mental health promotion and the Holistic Framework for improving the Uptake and Impact of eHealth Technologies (Van Gemert-Pijnen et al., 2011). Inspired by the theories of mental health promotion, in this study, the use of cCBT as a universal intervention to improve mental health and wellbeing and reduce the risk for mental health problems was examined. Furthermore, guided by the Holistic Framework, implementation research formed a considerable part of this study, in order to better understand the factors contributing to programme engagement and adherence. In line with the Holistic Framework, the findings show that factors in relation to programme, the user and the context of delivery influence programme engagement. Moreover, the findings highlight the importance of the fit between user expectations and requirements and programme look and content. This study focused particularly on young people attending the AE setting, but the findings may be relevant also for other vulnerable young people.

Programme implementation in real life settings

The uptake of eMental health technologies has generally been low, regardless of many programmes showing effect in RCTs (Fleming, De Beurs et al., 2016). The findings from the current study draw attention to the several factors, that may influence the successful integration of evidence-based programmes into real life settings, and, that need to be taken into account in programme development and implementation to improve engagement and uptake.

There are several factors that determine uptake of and engagement with, computerised mental health programmes. These relate to the
programme, the user and the wider environment (Ritterband et al., 2009; Van Gemert Pijnen et al., 2011). Accessibility and expectations of the relevance and potential benefits of the programme may influence uptake of computerised mental health programmes, whereas factors such as ease of use, monitoring and support, clear instructions, rewards and progress reports may improve engagement and inhibit drop-out (Cavanagh, 2010). Furthermore, using a gaming approach may improve engagement with computerised programmes (Fleming, De Beurs et al., 2016). This was supported in the current study, as the SPARX-R serious game was considerably better received by the AE students than the more text-based MoodGYM.

The Holistic Framework (Van Gemert-Pijnen et al., 2011) highlights particularly the importance of the fit between the programme, the values and requirements of the target audience and the context of delivery in determining programme uptake. The findings from the current study illustrate that the Requirements Development Approach can be a very useful tool to identify how well programmes respond to these requirements. The values and requirements expressed by students and staff in the pre-intervention qualitative discussions (Paper II) helped to better understand the reasons for disengagement with SPARX-R. For example, in Paper II students valued contents that were positively framed and focused on building skills and competencies, and in Paper IV, the lack of this positive focus was identified as one of the main reasons for low engagement and negative reactions towards the programme among students. Furthermore, staff referred to the need for improved flexibility and complementing computerised programmes with face-to-face activities in order for computerised mental health programmes to better fit into the context of the AE setting, accommodating for student absenteeism, literacy issues, irregularities in the curriculum and the need to provide individual support to students.
Need for a positive approach

It is clear that the extent of mental health problems among the AE education students as reported in Paper III indicates a need for an improved focus providing adequate mental health resources within the AE setting. AE students in Ireland (Papers II and IV) and New Zealand (Fleming, Lucassen et al., 2016) consider universal delivery less stigmatising and focusing on positive aspects of mental health rather than mental health problems more acceptable. However, it is evident that some students will require additional more targeted support. Programmes that incorporate universal and targeted approaches are associated with better outcomes for students (Adi et al., 2007; Weare & NInd, 2011), although the right balance between these approaches is yet to be determined.

Universal delivery of strength-based interventions is in line with the theories of mental health promotion (Barry & Jenkins, 2007; Jané-Llopis et al., 2005) and the principles of effective practice in promoting mental health with young people (Barry et al., 2013; Durlak et al., 2011; Kobus-Matthews et al., 2014; Weare & NInd, 2011). Interventions that focus on protective factors for resilience and coping with challenges have relevance to all youth, enhance good mental health and psychological wellbeing, and also reduce risk factors for mental health problems and negative life outcomes (Durlak et al., 2015). Such programmes have been shown effective when delivered face-to-face to young people in school and out-of-school settings (Barry et al., 2017; Clarke et al., 2015).

To date, computerised mental health interventions have largely focused on providing CBT for depression and anxiety. Online strengths-based interventions show potential when used with adults (Baños et al., 2014; Bolier et al., 2013; Schotanus-Dijkstra et al., 2017). However, delivering computerised mental health promotion interventions focusing on positive mental health and building social and emotional skills for young people, needs to be further studied (Paper I; Baños et al., 2017).
The use of information communication technology (ICT) for mental health promotion strategies, that are relevant to all youth, seems particularly relevant, considering the potential to reach wide populations with relative ease and low cost. Further research is warranted to explore whether mental health promotion programmes can be successfully delivered using ICT and the potential benefits of integrating ICT into existing strategies.

Supported delivery and the need for staff training

In Papers II and IV, AE staff suggested that integrating computerised programmes into a dedicated mental health curriculum and complementing them with face-to-face activities could improve adherence. This is in line with the findings from the systematic review (Paper I) and other reviews (Baumeister et al., 2014; Spek et al., 2007), indicating that supported programme delivery is related to improved adherence and lower attrition rates. Although computerised programmes are mostly automated and in theory need limited input from moderators, providing adequate support from motivated and capable moderators may improve student engagement. Professionals working with young people have previously reported a need for guidelines on how to promote youth mental health and wellbeing as well as training in the use of online mental health resources in order to use technology for promoting youth mental health (Clarke et al., 2017).

Programme moderators have a role in providing adequate support and influencing the attitudes of the users (Ritterband et al., 2010). The findings from Paper IV highlight the influence of programme moderators as the participants from those Centers where the program was researcher rather than staff led viewed the program more positively. Whether these findings are a result of response bias due to the researcher being present or because of the increased support and guidance provided by the researcher is unclear. However, it does indicate a need for further staff training in program delivery,
particularly as previous reviews of school-based mental health interventions have highlighted the importance of programme delivery by teachers rather than specialists to ensure programme sustainability and improved impact particularly in terms of academic outcomes (Durlak et al., 2011; Weare & Nind, 2011). It is likely that training in programme delivery will improve the teachers’ skills in promoting student mental health and wellbeing in general, thus bringing additional benefits that reach beyond the impact of the actual programme.

Although all the staff in the current study reported being engaged with mental health promotion at present, the findings indicate that at least some staff members do not feel equipped to do so, and thus would benefit from further training. On the other hand, the level of agreement between students and staff on the needs of students in relation to the implementation of cCBT, as reported in Paper 2, is an indication of the close relationship between students and staff in AE. Staff are aware of, and respect, students’ needs and preferences, and are thus in a good position to further promote student mental health and wellbeing.

Staff training is also vital to ensure that further face-to-face support is available to students when needed, particularly as access to mental health services could be delayed. Many of the students in the present study expressed a wish to improve their ability to talk about their problems to others, indicating that computerised programmes could function as a way to build a bridge to seeking help from other sources. Similarly, AE students in New Zealand thought that cCBT might increase future help-seeking for mental health problems (Fleming, Lucassen et al., 2016). However, research on the impact of computerised mental health programmes on actual help-seeking behaviours is still limited (Christensen et al., 2006; Musiat & Tarrier, 2014).

Furthermore, it is clear from the programme credibility issues raised by students and their desire for anonymity and control that there is a need
to build trust among the students. Previous studies have highlighted that for young people, who have lost connectivity with mainstream education, building caring relationships characterised by trust, respect and inclusion is of particular importance in order for them to build resilience and find a way back to learning (McGrath, 2006; McHugh, 2014). This is particularly important as staff are keen for the programme to provide information on student wellbeing and to be able to support students, yet students may wish to remain anonymous. Further research is required to examine how staff can be better trained and supported in program delivery and how different ways of delivering the program, i.e., by AE staff or by dedicated personnel and with or without discussion, may influence program satisfaction and effectiveness.

7.3. Methodological considerations

This section considers the methodological factors that may have influenced the findings from this study. Factors related to the study design and programme implementation will be considered, and their implications for the findings from this study and for future research will be discussed.

7.3.1. Design issues

In Paper III the effectiveness of SPARX-R was examined in a RCT. Randomisation was conducted in clusters (Centres) to avoid within Centre contamination and for practical reasons. The original study design consisted of two intervention arms, MoodGYM and SPARX-R. However, changes to the study design were made as a result of the inappropriateness of MoodGYM to the literacy levels of the study population. The Centres assigned to MoodGYM that had not yet started the programme were given the option of delivering SPARX-R instead. One of the Centres (n = 4 students) agreed, and the rest dropped out of
the study. The students from one of the Centres participating in SPARX-R also participated in the qualitative student workshops (*Paper II*). This may have influenced their experience of the programme.

As part of the ethical considerations for the study, participants who scored above the predefined cut-off point (score of 11 or above on SMFQ and/or 10 or above on GAD-7) for moderate levels of depression or anxiety were allowed to carry on in the study but were also offered additional support according to the resources available at the Centers and their parents/guardians were informed. The researcher informed the Centre staff, who then contacted the parents/guardians and also informed the students themselves. These students were not excluded from the analysis and therefore, any improvement on the outcome measures may have been the result of receiving outside support rather than participating in SPARX-R. Furthermore, the knowledge of the possibility of their parents being contacted may have inhibited some students responding truthfully to the questionnaires.

These design issues draw attention to the challenges of conducting research in real life settings, where ethical or practical decision may need to be made that weaken the overall quality of the study. Careful planning and conducting a pilot study are important to ensure that these decisions are made in a timely manner, with minimal effect to the study design or the research participants. It is evident that the safety of the study participants is of utmost importance when conducting research, however, it is also important that the implications of ethical decisions on study implementation and the reliability of the findings are considered thoroughly.

### 7.3.2. Selection bias

All Youthreach Centres were invited to participate in this study. The participating Centres were self-selected. Furthermore, the Centre staff selected the students from each individual Centre. Selection bias may
have been present if students/Centres participating in the study differed considerably from the students/Centres who did not participate in the study (York, 1998). This would influence the generalisability of the findings to the Youthreach student population as a whole. Unfortunately, data on the mental health status or the demographic characteristics of Youthreach students as a whole are limited, as they have not been systematically included in existing national youth mental health studies.

In *Paper II*, smaller Centers, typically located in smaller towns or villages, were slightly over represented in the sample (mean number of students 29.38 (SD 15.6) vs. 35.06 (SD 12.6) in the entire population). This was also the case for the sample participating in the RCT (*Paper III*). It is possible that staff members who were more positive towards computerised mental health interventions in general were more likely to participate in the study. Also, staff may have selected students who were more likely to respond positively to a computerised mental health programme, or who had higher levels of mental health problems and need for support. It is clear that selection bias is always present to an extent, in studies were participants are self-selected. Future research should aim to randomly select participating Centres and staff, and to preselect the group of students participating in the study.

### 7.3.3. Implementation issues

There were differences between the Centres in terms of the overall delivery time of SPARX-R and the quality and quantity of support provided by staff. With an attempt to take these differences into consideration, Centre was included as a random factor in all outcome analyses (*Paper III*). Technical issues were reported in all Centres participating in SPARX-R. In some cases this resulted in interruptions in the delivery of the programme, which may have influenced programme satisfaction and impact. Other contextual factors, such as the confidence
of the staff moderators in programme delivery, may have also influenced programme engagement and satisfaction.

In one Centre, the researcher rather than the staff delivered the programme. The students from this Centre rated the programme more positively; however, no significant differences in terms of programme impact between these Centres were detected. Whether these findings are a result of a response bias due to the researcher being present or because of the increased support and guidance provided by the researcher is unclear. In subsequent studies, delivering the programme in a more consistent manner, with minimal differences between Centres would strengthen the findings in relation to programme effectiveness. Providing staff training and a clear instructional manual for programme delivery would increase implementation fidelity.

7.3.4. **Attrition**

The sample size remained below the original sample calculations. Understandably, this may have influenced the lack of significant findings on most outcome measures. The extent of dropout also inhibited the three-month follow-up analysis, as included in the original study proposal.

The extent of dropout reported in *Paper III* may have resulted in attrition bias. Attrition bias refers to the loss of selected participants, resulting in systematic differences between the participants who remain in the study and those who have dropped out (Cuddeback et al., 2004). Previous studies have reported poorer mental health status among those who dropout of cCBT interventions (Christensen et al., 2004; Kenardy et al., 2003). However, no significant differences in terms of demographics or mental health status between those who dropped out and those who completed the study were detected at baseline in the present study.
Increased support for staff delivering the programme could improve attrition rates. Many staff members commented that they felt more comfortable with programme delivery when the researcher was present and technical issues were reported in most Centres. Thus, regular visits to the Centres may have improved attrition rates. However, due to logistics, apart from the initial visit at the start of the programme, regular visits were not possible, as the Centres were located across the country. Instead, support was provided by phone and the Centres were provided with programme manuals. However, informal discussions with the staff revealed that many staff members had not read the programme manuals. To improve adherence, consequent studies should budget for staff training and support, including providing face-to-face support, staff training and instructional manuals or DVDs.

7.3.5. Measurement issues

Information bias relates to the validity of the outcome measures and other possible factors contributing to measurement error (Coggon et al., 1997). Information bias may have been an issue in Paper III.

All the outcomes of interest in Paper III were measured using validated scales. The selection of outcome measures was based on the review of existing SPARX and MoodGYM studies and findings from a pilot study. The pilot study revealed that in selecting outcome measures special consideration should be given to the short attention span and low literacy levels among some of the participants. Common literacy issues among the study participants may have resulted in biased results. Field observations showed that some students had difficulty understanding terms, such as ‘emotions’, used in the scales. Furthermore, difficulties in navigating the Internet browser when completing online questionnaires were observed among some students. Finally, respondent fatigue may have resulted in some students not responding truthfully to the questionnaires.
All outcome measures were completed online. This may have affected the validity of the measures, which were mainly designed to be completed in paper form. Based on previous studies (McKenzie et al., 2011; Stallard et al., 2013), the study participants (Papers III and IV) were divided into three categories based on their SMFQ score to examine programme impact among participants with differing levels of symptoms of depression: no symptoms, at risk and moderate to high levels of depression. It should be noted that the use of these cut-off points has not been validated. The Short Moods and Feelings Questionnaire does not provide cut-off points for diagnosing clinical levels of depression. Therefore, the findings in relation to the differences in programme impact and user views by depression risk should be interpreted with caution.

7.3.6. Qualitative data

Qualitative research has been criticised for lacking scientific rigour, being strongly subject to researcher bias and lacking generalisability (Mays & Pope, 1995). The researcher conducted and analysed student and staff discussions (Papers II and IV) and it is possible that her personal beliefs and attitudes influenced the findings. Several steps, as recommended by Noble and Smith (2015), were taken to improve the validity and reliability of the findings.

Discussion protocols were developed in order to ensure that the data were collected as systematically as possible. All discussions were audio-recorded to inhibit recall bias. The data analysis was conducted using the systematic approaches described by Van Velsen and colleagues (2013) and Braun and Clarke (2006). As suggested by Barbour (2011), the coding and development of themes (Papers II and IV) was reviewed with another researcher. Furthermore, in Paper II, another independent researcher coded segments of the transcripts to check for inter-rater reliability. Further measures could have been taken to ensure that the identified themes accurately represent the views of the students and
staff, by reviewing them with the research participants (Long & Johnson, 2000). Further research conducted by another research team is required to endorse the qualitative findings from this study.

7.3.7. Usefulness of the Holistic Framework and the RCT design

In the context of the current study, the Holistic Framework and the Requirements Development Approach were used to guide the implementation and evaluation of an existing cCBT programme, SPARX-R. In previous studies, the Holistic Framework has been adapted in earlier stages of programme development, to inform the development of prototypes that respond to the needs of the target audience. Further methodological guidelines on how to use the requirements identified in the Requirements Analysis for programme implementation and evaluation would strengthen the usability of the Holistic Framework for evaluation purposes. Although not possible within the scope of the current study, ideally the findings from the Requirements Analysis would have resulted in programme adaptations, before programme implementation in the AE setting. For example, the findings from Paper 2 have contributed to limiting the number of depression assessments used in newer versions SPARX-R, in order to reduce negative reactions by users.

Although the use of the Holistic Framework may be more appropriate in earlier stages of programme development, in the present study, the framework proved useful in several ways. Firstly, it provided structure and methodological approach to examine the needs and preferences of AE students and staff and the organisational factors that may influence programme delivery. This was particularly important considering the limited research to date on the use of computerised mental health programmes with more vulnerable youth. Secondly, guided by the Holistic Framework, the identified requirements were used to evaluate SPARX-R from the view point of the target users and to inform the
implementation process of SPARX-R in the context of the AE setting. In terms of programme implementation, the findings from Paper 2 indicated that students and staff would have benefitted from even further support in implementing SPARX-R, including face-to-face staff training. However, due to practical limitations and lack of resources, this could not be provided.

Considering the high attrition rates reported in Paper 3 and the limited resources available for coordinating the study, a nationwide RCT may not have been the most appropriate choice for a study design. Other designs with less study participants, such as a proof of concept study, may have been more appropriate, particularly considering the lack of previous evaluations of SPARX-R at the time of conducting this research. A proof of concept study with fewer Centres would have been more practicable to implement and could have yielded more in-depth qualitative data that could have been used for programme adaptation and formed the basis for running a larger scale RCT.

7.4. Limitations

In this section, an overview of the study limitations is provided, considering the various factors which may have influenced the validity and the overall generalisability of the findings:

- In the systematic review (Paper I), the data from the included articles were analysed by means of a narrative synthesis. This decision was made based on the poor methodological quality of most of the included studies, particularly those evaluating mental health promotion interventions. Conducting a meta-analysis, if only on the data from the studies evaluating cCBT for depression and anxiety, would have strengthened the findings in relation to the factors related to programme effectiveness.
• The small number of study participants limits the conclusions that can be drawn from the findings concerning student and staff views of cCBT and their generalizability to the Youthreach student and staff populations as a whole.

• The fact that Youthreach staff selected the participants for the RCT study and qualitative workshops may have resulted in the study participants not being representative of the Youthreach student population as a whole. The staff may have selected participants that were considered to be in need of mental health support, thus resulting in an overestimation of the prevalence of mental health problems among Youthreach students. Alternatively, staff may have selected participants that were interested in the programme or likely to react positively to the programme.

• The knowledge that parents/guardians would be informed if students exhibited heightened levels of mental health problems may have resulted in unreporting of symptoms of depression and anxiety.

• Low levels of literacy and concentration among the students, may have resulted in students not understanding all questionnaire items and/or respondent fatigue and thus influenced the validity of the findings.

• The low uptake of SPARX-R in the Centres limits the conclusions that can be made in relation to the effectiveness of SPARX-R.

• Differences in implementation of SPARX-R in the Centres, including the overall time it took to deliver the programme, technical difficulties, and the researcher delivering the programme in one Centre, also limits the conclusions that can be made about the effectiveness of SPARX-R, if delivered as intended.
8. Conclusions

In this final section, the implications of the findings for research, programme development and implementation will be considered. This will be followed by overall conclusions from the study.

8.1. Implications for research

The findings from this study support increased implementation research in examining the use of computerised mental health interventions, as recommended in previous studies (Kaltenthaler et al., 2008; Mohr, Burns et al., 2013). This research should go beyond examining programme acceptability, from exploring how well the programme responds to the specific needs and preferences of the target audience (Van Gemert-Pijnen et al., 2011), to examining what implementation factors, such as adherence and program fidelity, may have moderated programme impact (Durlak et al., 2011). This information is important in terms of understanding how programmes should be developed to maximize engagement and impact and to understand what makes for good quality implementation (Weare, 2015).

Research with specific populations, such as young men, is recommended, in order to understand how computerised interventions can be customised to suit the needs and preferences of specific subgroups. Further research on vulnerable populations, who are unrepresented in previous research and have a high risk of mental health problems, is also important, including, for example, school drop-outs, ethnic minorities and homeless youth. High quality effectiveness trials are needed, with adequate sample size to establish the effectiveness of computerised mental health programmes that are developed to the needs and preferences of these youth.
Finally, although systematic implementation research and high-quality evaluation studies are important, so is the rapid testing and continuous update of new interventions to ensure that programmes keep up with the fast developing technology and changes in user preferences (Fleming, De Beurs et al., 2016; Mohr, Cheung et al., 2013). The process from programme development to initial testing of programme effectiveness, and publishing the results from randomised controlled trials may take years. This means that at the time of possible implementation of the programme at a larger scale, adaptations may already be necessary to correspond to the most recent changes in the technological environment (Fleming, De Beurs et al., 2016). Therefore, new ways of assessing the effectiveness of continuously evolving eHealth technologies, that are less time consuming than full-blown clinical trials, are needed, for example, by assessing the impact of intervention principles rather than a specific version of an intervention (Collins et al., 2007; Mohr et al., 2015). Furthermore, user input and implementation research should be built into each development and evaluation cycle. Considerations in relation to how the programme is going to fit into the given context and who is going to take ownership of the programme and its updating need to be made from the start (Fleming, De Beurs et al., 2016; Van Gemert-Pijnen et al., 2011).

8.2. Implications for programme implementation

In implementing computerised mental health programmes, a thorough assessment of the setting and the needs and preferences of the key stakeholder should be conducted to aid the successful implementation of computerised programmes (Van Gemert-Pijnen et al., 2011). Ensuring the compatibility of the computer system and the programmes in questions and the availability of technical assistance, if necessary, is important to avoid frustration among the users and ensure consistent delivery.
The findings from this study particularly highlight the importance of support when delivering cCBT programmes to vulnerable young people, to improve engagement and avoid adverse reactions. Opportunities for staff training should be provided in relation to youth mental health in general and in the delivery of the specific programme to ensure that adequate support for the user is available. Providing staff training and support is paramount to ensure successful programme delivery in educational settings (Adi et al., 2007).

Another recommendation is to supplement computerised programmes with face-to-face activities and discussion when delivered in AE settings. Again, clear instructions for staff on running these activities and holding discussion are needed. When planning for the implementation of computerised mental health programmes in AE settings, their fit with the existing curriculum and programmes should be considered. Building the programme into the existing curriculum, supported by other subjects in the areas of social, personal and health education, could facilitate delivery and improve programme impact. Incorporating programmes into a multi-modal approach, including features such as teaching skills and linking with academic learning, improving the school ethos, providing training and education for teachers and parents, and linking in with the wider community, has been shown to result in better programme outcomes (Weare & Nind, 2011).

Finally, the findings from this study suggest that a programme that can be delivered in separate sessions rather than in progression would be more appropriate in AE settings, as consistent attendance and changes to week-to-week curriculum can be an issue. Further research is needed to examine whether such an approach is effective, as findings from the systematic review (Paper I) show that the existing evidence-base supports module-based delivery. Providing AE Centres with a suite of modules that could be delivered as a complete programme or as
separate sessions, as appropriate to the curriculum and the needs of the students, would improve the flexibility of delivering such programmes. For this purpose, clarification of the core intervention components would be important in order to ensure high quality implementation and to maximise programme impact (Barry et al., 2017).

The findings also suggest that computerised programmes should be delivered universally in AE settings, but should also be accessible at any time, in order to ensure that support is available when needed. Further research is required to examine how this can be implemented in practice: which components should be included in universal delivery and what areas should be covered in a more targeted way, to what extent universal programmes can be made adaptable to individual needs without affecting programme impact and practical delivery, and how on-going support can be provided in a safe and ethical manner.

8.3. Implications for programme development

Based on the findings from this study, the development of computerised programmes based on the principles of mental health promotion and a strengths-based approach is recommended. Although the evidence-base on the effectiveness of such programmes is still scarce, as reported in Paper I, AE student and staff expressed a preference for more positively framed strengths-based programmes. Such programmes should focus on building practical social and emotional skills around resilience, coping and relationships. Using existing evidence-based universal programmes (Clarke et al., 2015; Barry et al., 2013; Durlak et al. 2011) to guide the development of programme content is recommended. The study supports the use of a gaming approach, as it is understandable to the young people in AE and lowers literacy barriers. However, considering the limited evidence on the effectiveness of computerised mental health programmes, it is clear that further research, including high quality trials and implementation studies, are
required to establish the effectiveness and optimal delivery of computerised mental health promotion programmes before wide roll-out.

It is clear that there is considerable variability in the needs and preferences of each student, and thus improved customisation of programme look and content is needed in order to improve the relevance of such programmes to all students. It is also clear that for some students, a more target approach may be needed. Contemporary technology can be made customisable, allowing one programme to have several pathways based on user needs and preferences. Therefore, computerised programmes could be delivered universally while addressing both, mental health problems (so that those with difficulties are not stigmatised) and the positive mental health of all students. Newer versions of SPARX-R are in development taking into consideration the findings from this study.

8.4. Overall conclusions

The findings from this study bring light to the factors that need to be considered when developing and/or implementing computerised mental health programmes with more vulnerable groups of young people. Few studies to date have examined in such detail the implementation of computerised mental health interventions with more vulnerable youth. The findings indicate a need for increased focus on developing computerised mental health promotion programmes that are based on building social and emotional skills. Young people attending AE, in spite of being at a higher risk for mental health problems, prefer universal programmes that are positive, and strengths-based rather than problem-based. Although further studies with larger samples are needed, the serious gaming approach used in SPARX-R shows potential as an easy to use and effective way of improving student wellbeing with populations with low levels of
literacy. However, the findings also highlight the importance of contextual factors, such as staff training, integrating programmes into a dedicated mental health curriculum and complementing them with face-to-face interaction, in supporting effective delivery of computerised mental health programmes in the AE setting.
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Papers I-IV
Paper 1

A systematic review of online youth mental health promotion and prevention interventions

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A Systematic Review of Online Youth Mental Health Promotion and Prevention Interventions

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Abstract The rapid growth in the use of online technologies among youth provides an opportunity to increase access to evidence-based mental health resources. The aim of this systematic review is to provide a narrative synthesis of the evidence on the effectiveness of online mental health promotion and prevention interventions for youth aged 12–25 years. Searching a range of electronic databases, 28 studies conducted since 2000 were identified. Eight studies evaluating six mental health promotion interventions and 20 studies evaluating 15 prevention interventions were reviewed. The results from the mental health promotion interventions indicate that there is some evidence that skills-based interventions presented in a module-based format can have a significant impact on adolescent mental health, however, an insufficient number of studies limits this finding. The results from the online prevention interventions indicate the significant positive effect of computerized cognitive behavioral therapy on adolescents’ and emerging adults’ anxiety and depression symptoms. The rates of non-completion were moderate to high across a number of studies. Implementation findings provide some evidence that participant face-to-face and/or web-based support was an important feature in terms of program completion and outcomes. Additional research examining factors affecting exposure, adherence and outcomes is required. The quality of evidence across the studies varied significantly, thus highlighting the need for more rigorous, higher quality evaluations conducted with more diverse samples of youth. Although future research is warranted, this study highlights the potential of online mental health promotion and prevention interventions in promoting youth wellbeing and reducing mental health problems.

Keywords Systematic review · Online technology · Intervention · Mental health promotion · Youth

Introduction

Good mental health is a key asset and resource for population health and wellbeing and is critical to positive youth development (WHO 2013). Positive mental health is a requirement for optimal psychological development, the development and maintenance of productive social relationships, effective learning and good physical health. It is estimated that 10–20 % of youth worldwide experience mental health problems (Kieling et al. 2011). The promotion of positive mental health equips youth with the necessary life skills, supports and resources to fulfill their potential and overcome adversity (Barry and Jenkins 2007; Patel et al. 2007). Many opportunities exist to promote positive mental health and wellbeing, not only for those who have mental health problems, but for all youth.

Mental health promotion is based on the underlying principle that mental health is a positive concept, which is important in its own right, is of universal relevance, and is an intrinsic component of the broader health promotion and public health agenda (Herrman and Lopit 2012; WHO 2004). Building on the basic tenets of health promotion (WHO 1986), mental health promotion focuses on enhancing the strengths, capacity and resources of
individuals and communities to enable them to increase control over their mental health and its determinants (Barry and Jenkins 2007). Prevention, on the other hand, aims to reduce the incidences, prevalence or seriousness of targeted mental health problems. Reviews of the international evidence show that comprehensive mental health promotion and prevention face-to-face interventions carried out with youth in collaboration with families, schools and communities, lead to improvements not only in mental health but also improved social functioning, academic and work performance, and general health behaviors (e.g., Barry et al. 2013; Weare and Nind 2011; Tennant et al. 2007).

In recent years, there has been increasing interest in the use of the internet for the delivery of health promotion and mental health interventions. The potential that online mental health interventions hold includes direct, convenient access to resources one might otherwise not have. Online interventions also offer individuals increased privacy and anonymity. In addition, they provide a cost-effective and accessible means of accessing services for disenfranchised and minority populations and those living in isolated geographical areas. (Barak and Grohol 2011). There is accumulating evidence that online interventions can be effective in addressing mental health problems for adults. Several reviews have examined the impact of computerized cognitive behavior therapy (cCBT) interventions targeting depression and anxiety symptoms in adults and reported small to medium effect sizes (e.g. Griffiths et al. 2010; Cuipers et al. 2009; Spek et al. 2007). The effectiveness of online technologies in improving adolescent and emerging adult mental health, however, has been less well documented. The findings from recent studies provide evidence that, for youth, the internet can be seen as both a tool and a setting for action in improving their mental health and wellbeing (Blanchard et al. 2011; Rickwood 2010). Research indicates that adolescents and emerging adults use the internet to seek mental health information (Dooley and Fitzgerald 2012; Gould et al. 2002). Importantly, they report feeling comfortable accessing online information about mental health issues (Oht et al. 2008). To date, however, there has been no systematic attempt to synthesize the evidence on the effectiveness of internet-based interventions for population. This was the goal of this study. The review was carried out as part of a larger study that seeks to develop online resources to support the mental health and wellbeing of youth aged 12–25 years (Clarke et al. 2013; http://www.youngandwellcentre.org.au/research/user-driven-and/bridging-digital-disconnect/).

Current Study

The objective of this systematic review was to examine the effectiveness of online mental health promotion and prevention interventions that are available for youth. The interventions were appraised in terms of their content and delivery, the quality of the evaluation, program outcomes and implementation findings such as drop out and program acceptance. A further objective of this review was to identify gaps in the existing literature. The results from this systematic review may serve as a basis for informing further research in developing and evaluating online mental health promotion and prevention interventions for youth.

Methods

Study Selection

The systematic review conforms with the guidelines outlined by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2009 Checklist. Studies were eligible for inclusion if the intervention was online and designed to promote positive mental health and/or prevent mental health problems of youth aged 12–25. This age range was selected to comply with the focus of the larger research project, of which this study is a part and current literature on the provision of mental health services to adolescents and young adults (McGorry et al. 2007). For the purpose of this review, mental health promotion interventions were defined as any planned intervention or program that was undertaken with the aim of improving mental health or modifying its determinants. Prevention was defined as universal, selective or indicated interventions (Mrazek and Haggerley 1994), with universal interventions targeting the general/whole population, selective interventions targeting individuals or groups whose risk of developing a mental disorder is significantly higher than the rest of the population, and indicated interventions targeting high risk individuals with minimal but detectable signs or symptoms of a mental disorder. Online treatment interventions were not included in this review.

Experimental study designs including randomized controlled trials, quasi-experimental study designs and experimental studies without a comparison group were included in the review. Academic and grey literature published from 2000 onwards in printed or electronic format was deemed eligible for inclusion. The primary outcomes of interest were mental health and wellbeing outcomes. These outcomes included indicators of positive mental health such as self-esteem, self-efficacy, coping skills, resilience, emotional wellbeing. Negative mental health indicators included, for example, depression, anxiety, psychological distress, suicidal behavior. Wellbeing indicators such as social participation, empowerment, communication and social support were also included. Any adverse events or harms associated with the intervention were also
documented. Studies with the following characteristics were excluded from the review: (1) interventions implemented with youth with a diagnosed mental health disorder that were primarily face-to-face with the inclusion of some online technology as an element of the program; (2) interventions that were primarily face-to-face with the inclusion of some online technology as an element of the program; (3) interventions designed and implemented with a general adult population (age 18+); and (4) process evaluation studies.

Search Strategy

Academic databases including Scopus, PubMed, PsychINFO, ISI Web of Science, EBSCO and Cochrane database of systematic reviews were searched. Health Promotion and Public Health Review databases were also searched including Evidence for Policy and Practice Information and Coordinating (EPPI) Centre; University of York National Health Centre for Reviews and Dissemination; National Institute of Clinical Excellence (NICE); Effective Public Health Practice; Health Evidence Canada; WHO programs and projects—http://www.who.int/entity/en/. Additional sources included Google Scholar and reference lists of relevant articles, book chapters and reviews. Key individuals and organizations identified through the search process were contacted to identify further details on publications.

The electronic search strategy used across all databases is provided in Table 1. The search for studies was conducted between 1 November 2011 and 1 March 2012 and included articles published between January 2000 and September 2011. A repeated search was conducted between 4th and 11th June 2013 to update results and included articles published up to June 2013.

Data Abstraction and Assessment of Quality

Using the search strategy described above, all titles and abstracts retrieved were scanned for relevance. Duplicates, articles not relevant and articles that did not meet the inclusion criteria were removed. Full text papers were obtained for studies that were selected for inclusion. Studies that were subsequently selected related to (1) online mental health promotion interventions and (2) online mental health prevention interventions. Two reviewers assessed the studies in order to ensure they met the inclusion criteria set out for this review.

Data Analysis

For this review, a narrative synthesis was undertaken. The interventions and outcomes evaluated in the included studies were too diverse to allow a quantitative synthesis of the study findings. Furthermore, given that the review focused on the effects of the interventions and questions concerned with program implementation, a narrative synthesis was determined to be the most appropriate as it offers more of an insight into potential confounders and moderators that might not necessarily be taken into account during a typical meta-analysis (Rogers et al. 2009). Following the guidelines of the Cochrane Public Health Group, the methodological quality of the intervention evaluations was assessed using the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project (Jackson et al. 2004). Studies were assessed for selection bias, study design, confounders, blinding, data collection and withdrawals and dropouts. Each study was rated independently by two reviewers. The quality assessments were compared and disagreements were resolved through discussion. Based on the ratings of each of the six components, each study received an overall global rating of strong, moderate or weak. Following the quality assessment stage, the inclusion of studies and extraction of key findings was finalized. Extracted data were entered into a table of study characteristics including the quality assessment overall rating for each study and the reasons why the study received a moderate or weak quality assessment rating.

Results

The results of the search and study selection are shown in Fig. 1. The original search process carried out in 2012 produced 8,834 articles, 37 of which were selected for full review. Of these, 14 studies did not meet the inclusion criteria, thus 23 studies were selected for review. During the repeated search performed in June 2013, a further five studies were identified. The combined search resulted in a total of 28 studies undergoing quality assessment. No studies in non-English language were identified in the review process.

The results from the online mental health promotion and prevention interventions are presented in Table 2. The promotion and prevention interventions are ordered according to the strength of the evidence (strong–weak). An overview of the key findings in terms of program origin, type, content and delivery, quality of evidence, outcomes and implementation findings will now be presented.

Online Mental Health Promotion Interventions

Program Origin and Type

Eight studies evaluating six online mental health promotion interventions were identified (Table 2). Three studies evaluating one intervention were carried out in the US; two studies were carried out in Australia and one study was
Table 1: Original search strategy for electronic databases

<table>
<thead>
<tr>
<th>Mental health terms</th>
<th>Type</th>
<th>Web terms</th>
<th>Sample</th>
<th>Intervention terms</th>
<th>Study terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health OR</td>
<td>Literacy</td>
<td>Internet OR</td>
<td>Young people OR</td>
<td>Education OR</td>
<td>Implementation</td>
</tr>
<tr>
<td>Psychoeducation</td>
<td>Positive</td>
<td>Web*</td>
<td>Youth</td>
<td>Therapeutic</td>
<td>Evaluation</td>
</tr>
<tr>
<td>Mental capital</td>
<td>Promot*</td>
<td>e-health</td>
<td>Adolescent*</td>
<td>Program*</td>
<td>Study</td>
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<td>Wellbeing</td>
<td>Prevent*</td>
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<td>Student</td>
<td>Intervention</td>
<td>Random* control trial</td>
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<td>&quot;Positive psychology&quot;</td>
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<td>&quot;Electronic health&quot;</td>
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<td>Mindfulness</td>
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<td>&quot;Virtual community&quot;</td>
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<td>Resilience</td>
<td>Indicated</td>
<td>&quot;Computer game&quot;</td>
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<td>&quot;Information awareness&quot;</td>
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<td>Smartphone</td>
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<td>&quot;Awareness raising&quot;</td>
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</table>

Searches included: * denotes multiple word endings including singular and plural
1. Mental health terms AND Type AND Web terms AND Sample
   e.g. mental health OR psychosocial OR mental capital OR wellbeing OR positive psychology OR resilience OR psychosocial OR social emotional
   AND literacy OR positive OR promot* OR prevent* OR universal OR targeted OR indicated
   AND internet OR web OR e-health OR "electronic health" OR "Virtual community" OR "computer game" OR email OR "cell phone" OR smartphone OR Iphone OR “information communication technology” OR ICT OR online OR computer-based OR "social media" AND
   young people OR youth OR adolescent OR student
2. Mental health terms AND Web Terms AND Sample AND Intervention Terms
3. Mental health terms AND Web Terms AND Sample AND Study Terms
4. Mental health terms AND Web Terms AND Sample AND Intervention Terms
5. Web Terms AND Sample AND Intervention Terms
6. Web Terms AND Sample AND Study Terms

Conducted in Germany, China and Canada. Two interventions were stress management interventions aimed at improving mental wellbeing (van Vliet and Andrews 2009; Fridrici and Lobhaus 2009). One intervention, ePREP was a relationship education program (Braithwaite and Fincham 2007, 2009, 2011). Another intervention, In One Voice was centered around a social media campaign (Livingston et al. 2013). Two interventions were interactive mental health promotion games, Reach Out Central (Shandley et al. 2010) and Ching Ching Story (Li et al. 2013).

Program Content and Delivery

As may be seen in Table 2, program content and delivery varied considerably across these online interventions. The stress management interventions provided online modules which were facilitated by a teacher or psychologist in middle/high school (van Vliet and Andrews 2009; Fridrici and Lobhaus 2009). ePREP utilized email to distribute homework exercises to university students over the course of 7 week which were designed to promoted relationship
skills. In One Voice utilized social media and an educational focused website to improve youth (age 13–25) mental health literacy skills. The online gaming interventions utilized game mechanics and role play to develop skills. Two interventions were implemented with adolescents in secondary schools (Van Vliet and Andrews 2009; Fridrici and Lohaus 2009). Two interventions were adapted from evidence-based face-to-face interventions (Braithwaite and Fincham 2007; Li et al. 2013).

Quality of Evidence

The quality of the evidence from these studies was moderate to weak. One study received a strong quality assessment rating (Van Vliet and Andrews 2009). Three studies received a moderate quality assessment rating as a result of selection bias, weakness in study design or not reporting or not controlling for confounders. Four studies received a weak quality assessment rating as a result of having a combination of the following methodological issues: weakness in study design, high percentage of withdrawals, selection bias, not reporting or not controlling for confounders and not reporting validity and reliability of measures used (Table 2).

Program Outcomes

The school-based stress management course, which received a strong quality assessment rating, reported significant improvements in adolescents’ mental health literacy skills, psychological wellbeing, use of support seeking coping strategies and reduced avoidant coping and psychological distress (Van Vliet and Andrews 2009). Additional outcomes from studies which received a moderate quality assessment rating included improved mental health literacy skills (Fridrici and Lohaus 2009; Livingston et al. 2013), improved communication skills (Braithwaite and Fincham 2007), reduced psychological distress (Fridrici and Lohaus 2009) and a reduction in symptoms of anxiety, depression and physical aggression (Braithwaite and Fincham, 2007).

Implementation findings

Important implementation findings including dropout, efficacy and program acceptance were highlighted in these studies. The dropout rates varied across interventions with school-based interventions having the highest retention rates. Fridrici and Lohaus (2009) reported a
<table>
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<tr>
<th>Intervention name</th>
<th>Target group</th>
<th>Type of intervention and duration</th>
<th>Study design sample</th>
<th>Program outcomes</th>
<th>Quality assessment rating reason for moderate/weak rating</th>
<th>Implementation findings program completion/dropout rates training programs acceptance</th>
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<tbody>
<tr>
<td>Internet-based programme for the management of stress Australia Van Vliet and Andrews (2009)</td>
<td>Adolescents in year 8 or middle school (age 13 years)</td>
<td>School internet-based stress management course for adolescents Aims to develop knowledge about stress and effective coping strategies, to increase use of effective coping strategies and improve mental wellbeing of youth 6 x 30 min lessons Course supplemented with activity books to expand student knowledge</td>
<td>Quasi-experimental Eight high schools (n = 653) students in year 8, 75% of participants female N = 464 intervention group N = 189 control group Measurements: pre, post and 3-month follow-up</td>
<td>Significant increases in knowledge about stress and coping use of support seeking coping life satisfaction psychological wellbeing Significant decreases in: psychological distress avoidance coping total emotional and behavioural difficulties No significant effects for perceived competence, active coping or pro-social coping</td>
<td>Strong 69% completed all six lessons 79% of students completed 5 or more lessons Teachers given instructions on accessing the program, lesson outlines and assessment and reporting information</td>
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<td>Online stress prevention and coping skills training Germany Fridrici and Lohaus (2009)</td>
<td>Adolescents aged 12–18 years</td>
<td>Internet-based stress prevention program for secondary schools, program based on face-face intervention Beyer and Lohaus (2006) which focuses on problem-solving, cognitive reconstruction, seeking for social support, relaxation and time management 8 online lessons, released weekly</td>
<td>Quasi-experimental N = 904 (33 classes of grades 8 and 9 from eight German schools), 48.2% participants female Participants divided into 4 groups: (1) Online-training in schools (n = 195, 7 classes) (2) Online-training via internet at home (n = 214, 8 classes) (3) School-based face-to-face training (n = 200, 8 classes) (4) No intervention control group (n = 286, 10 classes) Pre- and post-intervention measures</td>
<td>Significant increases in knowledge about stress and coping in all intervention groups (highest effects in online school group, lowest in online home group) Significant increase in positive thinking in face-to-face group &amp; online school group Significant reduction of psychological stress symptoms in face-to-face group and online school group No significant reduction in: negative thoughts stress vulnerability No effect on coping strategies</td>
<td>Moderate: Confounders 98% participants completed the program in school. 30.8% completion at home Teachers and psychologists received training in conducting face-to-face and online intervention. Two trainers involved in the supervision of each class Adolescents rated the face-to-face intervention as most accepted form of stress prevention Girls in groups 1 and 3 reported higher training acceptance than boys. Boys in group 2 reported higher training acceptance than girls</td>
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<td>ePREP vs Cognitive Behavioral Analysis System of Psychotherapy (CBASP) USA</td>
<td>University students in dating relationships of over 4-month duration or more</td>
<td>ePREP—internet-based relationship education program, provides skills training for effective communication and problem-solving techniques Initial presentation in the lab (one module), participants then provided with weekly homework by email Weekly emails for 7 weeks ePREP compared with depression and anxiety focused internet-based preventive intervention CBASP ePREP is an electronic version of evidence-based prevention and relationship enhancement program markdown et al. (2011)</td>
<td>Quasi-experimental N = 91 psychology students from one university in US. 59% of participants females (i) ePREP intervention group (ii) CBASP intervention group (iii) Control group presented with information about anxiety, depression and relationships Sample size of groups not reported Pre and post, 8 weeks follow-up measurements</td>
<td>Significant reductions in symptoms of anxiety and depression in ePREP and CBASP groups Significant improvements frequency of psychological and physical aggression and trust in ePREP and CBASP groups Significant increases in constructive communication in CBASP group only No change in global relationship</td>
<td>Moderate Selection bias</td>
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<td>In One Voice Canada Livingston et al. (2013)</td>
<td>Youth aged 13–25 years</td>
<td>Social media campaign to improve awareness and attitudes of youth towards mental health issues Primary aim to increase awareness and use of a mental health website (mindcheck.ca) aimed at youth, secondary aim to improve attitudes towards mental health issues Campaign featured a prominent male sports figure</td>
<td>Successive independent samples design (N = 906 youth) Conducted in British Columbia, Canada T1 (n = 403) completed questionnaires before the campaign and T2 (n = 403) 2 months after the campaign</td>
<td>Significant increases in awareness of mental health website (6% - 15.6%). Awareness of website did not increase significantly among non-white respondents, 13-17 year-olds and those who reported as having a mental health issue No significant effects on personal stigma or social distance Participants exposure to the campaign were significantly more likely to talk about mental health issues with others and seek information relating to mental health issues</td>
<td>Moderate Study design</td>
<td>Campaign reached 30.2% of males and 19.2% of females</td>
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Table 2 continued

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<td>ePREP—Prevention and Relationship Enhancement Programme</td>
<td>University students aged 18–25 years in a romantic relationship of at least 4 months duration</td>
<td>Internet-based relationship education program, provides skills training for effective communication and problem-solving techniques Initial presentation in the lab (one module); participants then provided with weekly homework by email Weekly emails for 7 weeks</td>
<td>RCT N = 77 students from psychology course in US, 71% of participants female Intervention group (n = 38) Control group (n = 39); Control group provided with information about anxiety, depression and relationships Pre-intervention, 8 weeks post-test measurements and 10 month follow-up</td>
<td>Significant improvement in anxiety scores at 10 month follow up Significantly less psychological and physical aggression in intervention groups’ relationships at follow up No significant effect on depression No significant effect on constructive communication and relationship satisfaction</td>
<td>Weak: Selection bias, Confounders</td>
<td>Drop-out rate 19.6%</td>
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<td>USA</td>
<td>Braininawe and Fincham (2009)</td>
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<td>ePREP—Prevention and Relationship Enhancement Programme</td>
<td>University students in a romantic relationship of at least 6-months duration</td>
<td>A computer-based relationship education program, focusing on skills training for effective communication techniques and problem-solving Weekly emails for 6 weeks</td>
<td>RCT N = 77 couples (152 individuals) from one university in US Intervention group (n = 40 couples) Placebo control group (n = 37 couples) Pre- and post-test measurements</td>
<td>Significant decreases in female depression Significant decreases in self- and partner-reported physical assault, self- and partner-reported severe physical aggression Significant increases in dedication and constructive communication and male relationship satisfaction Couples with poorest communication skills benefited the most</td>
<td>Weak: Selection bias, Confounders</td>
<td>Drop-out rate 12%</td>
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<td>Braininawe and Fincham (2011)</td>
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<td>ReachOutCentral (ROC) Australia Shandley et al. (2010)</td>
<td>Youth aged 18-25 years</td>
<td>Internet-based interactive educational game designed to support the mental health of youth aged 16-25 Utilizes CBT principles to assist youth identify and develop practical coping skills for dealing with life stressors ROC features real life stories and used role play to encourage youth to think about solutions to common problems</td>
<td>Single group pre-post design N = 266 self registered to take part in study, 78 % of participants female Measurements pre-, post intervention, 2-month follow-up</td>
<td>Significant increase in females’ support seeking scores at follow up, reduction in females’ stigma increase in females’ resilience score at follow-up increase in problem solving scores for males and females at post-intervention, sustained for females at follow up increase in females’ satisfaction with life post intervention and follow-up Non-significant worsening effect in males on seeking support, avoidance behavior and resilience Significant decrease in females’ self reported alcohol consumption not maintained at follow up Significantly higher alcohol use among males at pre- and post-intervention</td>
<td>Weak: Study design, Selection bias, High percentage withdrawal</td>
<td>Program satisfaction rates high (7.20/10) Drop-out rate 42.4 % Females played ROC on average for 1.6 sessions and 91 cumulative minutes and males for 1.5 sessions and 89 cumulative minutes Program accessed infrequently due to problems in downloading the programme and the storylines not being complex enough to keep the participants engaged</td>
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<td>Ching Ching Story China Li et al. (2013)</td>
<td>University students aged 17-25 years with adequate internet literacy and a Facebook account</td>
<td>Web-based, social network electronic game on enhancing mental health literacy of university students Content based on cognitive-behavioural therapeutic approach. Role playing game in which player assumes role of character and completes missions Programme adopted from a school-based mental health enhancement program (Wong et al. 2012) Duration of intervention 3 weeks</td>
<td>Single group, pre-posttest design Participants recruited from a closed online user group in one major Asian university (N = 127), 59.1 % female</td>
<td>Significant improvements in students’ mental health literacy skills</td>
<td>Weak: Study design, Selection bias, Validity of measures, High percentage withdrawal</td>
<td>Dropout rate 67 %</td>
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<td>MoodGym Australia, Calser et al. (2009, 2013)</td>
<td>Adolescents in secondary school aged 12–17 years</td>
<td>Online: self-directed CBT designed to prevent depression in youth</td>
<td>Cluster RCT N = 1,477 from 30 schools across Australia. 56% of participants female. Intervention group: n = 56. Waiting list control group: n = 914</td>
<td>Significantly lower levels of anxiety at post-intervention and 6-month follow-up. Significantly reduced depression in the male participants post-intervention and 6-months follow-up. Participants with high adherence rates reported significantly stronger intervention effects for anxiety and depression at post-intervention and 6-month follow-up. Significantly more male participants in the control group met criteria for caseness of clinical depression post-intervention and at 6-month follow-up.</td>
<td>Strong</td>
<td>Drop-out rate 12.5%</td>
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<td>Internet-delivered, cognitive-behavioural skills training program USA, Clarke et al. (2009)</td>
<td>Emerging adults aged 18–24 years</td>
<td>Two groups recruited (1) non depressed group that showed elevated health care utilization (2) group with chart diagnosis of depression</td>
<td>Internet, self-help, cognitive-behavioural skills training program for depressive symptoms. Contains information about depression, tools to measure and monitor one’s mood, online journal and interactive tutorials on cognitive and behavioural therapy methods. Participants free to use service at any time during the study period of 32 weeks. Reminders sent by mail at 2, 8 and 13 weeks after enrollment.</td>
<td>Significant improvements in intervention group’s depression scores at week 32 (effect size small, d = .20). Moderate effects size among women (d = .42). Greater symptom reduction associated with fewer minutes of website use. Participants most depressed at baseline more likely to continue using the website throughout study period.</td>
<td>Strong</td>
<td>Drop-out rate 36.9%</td>
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<td>Griep op je Dopt — Master Your Mood Online</td>
<td>Youth aged 16-25 years with depressive symptoms (score 10-45 on CES-D)</td>
<td>An online, professionally facilitated CBT based group course for youth with symptoms of depression 6 x 90 min sessions, Supervised by mental health professionals. Material shared by facilitator in chat room. Participants respond, share experiences and ask questions. Intervention derived from Dutch version of the face-to-face ‘ Coping with Depression’ course (Lewinsohn et al. 1984)</td>
<td>RCT</td>
<td>N = 244 participants recruited from general population Intervention: n = 121 Control: n = 123. Did not receive an intervention Assessments at baseline, post-intervention and 3 month follow up</td>
<td>Significant improvement in depressive symptoms (ES = 0.94) anxiety symptoms (ES = 0.49) sense of control or mastery (ES = 0.44) Improvements maintained at 3 month follow up</td>
<td>Strong Dropout at post-intervention = 21 % Dropouts more likely to be male, have lower education levels, have shown higher anxiety and sense of mastery at baseline</td>
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<tr>
<td>Competent adulthood transition with cognitive behavioral and interpersonal training (CATCH-IT)</td>
<td>Youth aged 14-21 years at risk of depressive disorders as measured by PHQ-A scale</td>
<td>Adolescent internet-based depression prevention program combined with primary care physician interview 14 modules based on behavioral activation, CBT, interpersonal psychotherapy and a community resiliency concept model Both groups received 3 safety assessment calls during the intervention; in addition group 1 received 3 motivational calls and a motivational questionnaire</td>
<td>RCT</td>
<td>Adolescents recruited from 13 primary care sites in four states in US and posted advertisements, N = 83 (55 % of participants female) Group 1 (N = 43); motivational interview with primary care physician + CATCH-IT Group 2 (N = 40); brief advice with primary care physician + CATCH-IT Measurements at pre-intervention, 6 weeks, 12 weeks, 6 months and 1 year post-randomization</td>
<td>Significant reduction in depression mood in both groups at post-intervention. Changes maintained at 12 weeks, 6 months and 1 year follow up Significant increase in social support by peers in both groups at post-intervention No change in automatic negative thoughts or general self efficacy Motivational interview group demonstrated declines in self harm thoughts and hopelessness and significantly less likely to experience a depressive episode at 6 and 12 month follow up</td>
<td>Strong Drop-out rate 7.3 % post-intervention, 23 % 6 month follow up, 30 % 1-year follow-up Physicians trained for interviews using a lecture/video format (1 h. 15 min) Higher ratings of Internet site ease of use associated significantly with lower levels of depressed mood over 6 months Greater level of case of site use predicted lower depression scores at post-intervention</td>
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<td>MyStudentBody-Stress: An online stress management intervention</td>
<td>USA</td>
<td>University students aged 18–24 with high levels of stress (&gt;14 on Perceived Stress Scale)</td>
<td>Online program aims to enhance college students’ stress management and health promoting behaviors Participants receive individual, tailored feedback about stress management. Site also includes peer stories, interactive tools frequently asked questions and answers, and college health news Students instructed to visit the website at least four times over a 2-week period for a minimum of 20 min/visit</td>
<td>RCT Six colleges in US. N = 240 students (aged 18–24) experiencing high levels of stress. 51% of participants female Participants allocated to: MyStudentBody-Stress online intervention (n = 80) Control health information website (n = 80) No intervention control (n = 80) Measurements at baseline, and at 1, 3 and 6 months follow-up</td>
<td>No significant effect on primary outcome—perceived stress Significant improvement in stress management techniques, anxiety, perceived family problems and engagement in light to moderate physical activity at 1 month follow-up No significant differences between online intervention and control website group at 6-month follow-up</td>
<td>Strong</td>
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<tr>
<td>Mobile Tracking of Young People’s Experiences—self monitoring program</td>
<td>Australia</td>
<td>Youth age 14–24 years with mild or more severe emotional or mental health issue (score &gt;16 on Kessler Psychological Distress Scale)</td>
<td>Mobile phone self-monitoring program where youth monitor their mood, stress and daily activities four times a day for 2 weeks. Data reviewed with GP</td>
<td>RCT GPs in Melbourne recruited youth attending GP (N = 118) Intervention group: n = 69 Control group: n = 49 monitored themselves using abbreviated version of mHealth which only assessed current activities g Pre, post-intervention and 6 weeks follow up assessment</td>
<td>Significant increase in intervention group’s awareness of emotions Significant decrease in intervention group’s depressive symptoms No significant effect on rumination</td>
<td>Strong</td>
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<td>Health e-Cards</td>
<td>Australia</td>
<td>Costin et al. (2009)</td>
<td>Emerging adults aged 19-24 Participants divided into high and low distress groups according to depression scores (K10 scale)</td>
<td>A brief depression information intervention employing health e-cards (personalized emails containing depression information) 3 emails with links to depression information-based website Enhanced intervention provided additional facts about depression and help-seeking, and information on what to expect from an initial consultation with a health professional</td>
<td>RCT N = 348/12,000 youth responded to screening questionnaire and fulfilled criteria. 78 % of participants female High and low distress groups assigned to one of three groups: Group 1: Health e-cards Group 2: Enhanced Health e-cards Group 3: General health information unrelated to depression Pre-, post-intervention measures</td>
<td>Intervention groups significantly improved beliefs about efficacy of formal help sources Intervention group higher intentions of seeking help from formal sources Health e-cards not associated with: increase in formal help seeking behaviour; improved beliefs about depression treatments ability to recognize depression knowledge of help-seeking process; or depressive symptoms</td>
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<td>Blogging Intervention</td>
<td>Israel</td>
<td>Botnel-Nissim and Banak (2013)</td>
<td>Adolescents ages 14-17 with social difficulties as measured by IPR scale</td>
<td>Investigating the therapeutic value of blogging Participants instructed to post messages about social difficulties at least twice a week for the period of 10 weeks</td>
<td>RCT N = 161 participants from 14 randomly chosen high schools assigned to: writing about social difficulties in open blog (n = 20) writing about social difficulties in closed blog (n = 27) writing about general subjects in open blog (n = 28) writing about general subjects in closed blog (n = 27) writing a private diary about social difficulties on a personal computer (n = 26) control group (n = 27) 77 % of participants female</td>
<td>Groups 1 and 2 showed significant improvement in self-esteem, social-emotional difficulties and social behaviors Group 1 showed the greatest improvement Level of distress decreased significantly across all four blogging groups Outcomes were sustained at 2 month follow-up</td>
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<td>MoodGYM</td>
<td>Norway</td>
<td>University students with elevated psychological distress (score 20 or above on K10 scale)</td>
<td>Online self-directed CBT designed to prevent depression in youth</td>
<td>RCT N = 163 college students from one university in Norway. 77% of participants female intervention group: n = 81 completed MoodQm access to BluePages depression information website. Waiting list control: n = 82 Pre- and post intervention measurements</td>
<td>Significant reduction in depressive symptoms and negative automatic thoughts reduction in depressive symptoms for subclinical group improvement in depression literacy post-intervention</td>
<td>Moderate High percentage withdrawals</td>
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<td>Cognitive-behavioural analysis system of psychotherapy (CBASP)</td>
<td>USA</td>
<td>University students aged 18–24 years experiencing mild symptoms of depression or anxiety</td>
<td>Computer-based cognitive behavioural program for depression and anxiety symptoms 6 x 20 min sessions on information on depression and anxiety. Based on CBT and Situational Analysis principles</td>
<td>CBASP originally developed for chronic depression, face-to-face treatment (McCallough 1984)</td>
<td>Significant decrease in intervention group's depressive and anxiety symptoms No significant difference in effects between students with high and low mastery of the material</td>
<td>Moderate Selection bias</td>
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<tr>
<td>The Online Anxiety Prevention Program Australia Kenardy et al. (2003, 2006)</td>
<td>University students with elevated anxiety levels as measured by anxiety sensitivity index (cut off score 26)</td>
<td>Online CBT intervention for individuals at risk of developing anxiety disorders</td>
<td>RCT</td>
<td>N = 83 first year psychology students from one university in Australia. 69% of participants female.</td>
<td>Significant reductions in intervention group's depression symptoms and improvements in anxiety related cognitions. Results maintained at follow-up.</td>
<td>Moderate</td>
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<tr>
<td>Kindertelesloot Online Chat Netherlands Fukkink and Hennis (2009)</td>
<td>Children and adolescents aged 8–18 years</td>
<td>One-to-one online chat support service, compared with telephone service Pre and post-chat assessment and 1 month follow up</td>
<td>Quasi-experimental</td>
<td>N = 902 users of the telephone based service invited to take part in online support service. 75% of participants female.</td>
<td>Significant increase in sense of well-being in both groups at post-intervention and one month follow-up. Significant decrease in perceived burden of problem in both groups at post intervention and at follow-up.</td>
<td>Moderate</td>
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<tr>
<td>MoodGYM Australia Christensen et al. (2002)</td>
<td>MoodGYM site users</td>
<td>Online self-directed CBT designed to prevent depression in youth</td>
<td>Single group pre-, post-design</td>
<td>N = 2,009 self-selected participant N = 71 psychology students who visited the site as part of their studies. 60% of participants female.</td>
<td>Significant reductions in depression and anxiety scores among self-selected participants. No significant changes in anxiety and depression among psychology students.</td>
<td>Weak</td>
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<tr>
<td>Intervention</td>
<td>Target group and Country</td>
<td>Type of intervention and duration</td>
<td>Study design sample</td>
<td>Program outcomes</td>
<td>Quality assessment rating reason for moderate/weak rating</td>
<td>Implementation findings: program completion/dropout rates training program acceptance</td>
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<td>MoodGYM Australia</td>
<td>Adolescent school boys aged 15-16</td>
<td>Online self-directed CBT designed to prevent depression in youth Delivered as part of personal development curriculum in secondary school</td>
<td>Quasi-experimental N = 78 boys in Year 9 in one Australian school Intervention group: n = 40 Control group: n = 38 Control group undertook schools standard personal development activities Pre-post and 16 week follow-up</td>
<td>No significant between group differences in change scores pre- to post or pre- to follow-up Boys who completed 3 or more modules, there were small benefits of MoodGYM for depressive symptoms (ES = .4), attribution style (ES = .18), self esteem (ES = .16) at post-intervention. Effects sustained for self-esteem at follow-up Reduction in risk of being depressed in MoodGYM group of 9 % at post-treatment, compared with a slightly increased risk in control group</td>
<td>Weak Selection bias, Confounders</td>
<td>Drop-out rate 15 % 40% completed three or more of the modules</td>
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<tr>
<td>MoodGYM Australia</td>
<td>Adolescent school girls aged 15-16</td>
<td>Online self-directed CBT designed to prevent depression in youth Delivered as part of personal development curriculum in secondary school 5 modules (30-60 min)</td>
<td>Quasi-experimental N = 157 girls in Year 10 in one Australian school Intervention group: n = 67 Control group: n = 90 Control group undertook schools normal personal development activities Pre-post and 20 weeks follow-up</td>
<td>Effect size on depression symptoms not significant at post-intervention but significant (moderate) at 20 weeks follow up (d = .46) No significant effect on attribution style, depression literacy and attitudes towards depression Significant faster rate of decline in intervention group’s depressive symptoms over trial period Benefit most evident for girls with initial level of depression above cut-off for clinically relevant symptoms</td>
<td>Weak Selection bias, Confounders</td>
<td>Drop-out rate 14.6 % at post intervention 29.8 % completed three or more modules. Association between lower completion rates and higher levels of depressive symptoms before interventions</td>
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<tr>
<td>MoodGYM Australia Sathi et al. (2010)</td>
<td>University students (aged 18-25) with low to moderate levels of depression and/or anxiety based on DASS scale</td>
<td>Online self-directed CBT designed to prevent depression in youth Intervention compared with stand alone face-to-face therapy (5 sessions over 3 weeks) and face-to-face therapy in conjunction with MoodGYM</td>
<td>RCT First-year students studying Health Sciences in one university in Australia N = 38 (66 % of participants female) Group 1: MoodGYM: n = 9 Group 2: Face-to-face CBT: n = 10 Group 3: Face-to-face CBT and MoodGYM combined: n = 9 Group 4: Control: n = 10 Pre and post measurements</td>
<td>Significant improvements in depression, anxiety, distress and frequency of automatic negative thoughts in Group 1, 2, 3 Face-to-face was significantly more effective than MoodGYM in reducing symptoms of depression and frequency of automatic negative thoughts Face-to-face in conjunction with MoodGYM was more effective in reducing depression, anxiety, distress, frequency of automatic negative thoughts than therapy received through stand alone MoodGYM</td>
<td>Weak Selection bias, Confounders</td>
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Table 2 continued

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<tr>
<th>Intervention Name</th>
<th>Target group</th>
<th>Type of intervention and duration</th>
<th>Study design sample</th>
<th>Program outcomes</th>
<th>Quality assessment rating reason for mod/weak rating</th>
<th>Implementation findings/program completion/dropout rates training program acceptance</th>
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<tr>
<td>Think, Feel, Do UK Attwood et al. (2012)</td>
<td>Adolescents aged 10–16 years with mild or moderate emotional problems identified by school nurse</td>
<td>cCBT online intervention designed for emotional problems of anxiety and mood 6 x 45 min sessions CD-ROM Think, Feel, Do intervention based on Think Good, Feel Good workbook (Stallard 2002)</td>
<td>Single group pre- post-design N = 12 participants aged 8 schools in UK No control Pre and post measurements</td>
<td>Significant improvement in depression, generalized anxiety and self-esteem UK</td>
<td>Weak Study design, Selection bias</td>
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<tr>
<td>Online support group UK Freerun et al. (2008)</td>
<td>University students feeling “stressed out or low”</td>
<td>Online mutual support group for college students which used electronic bulletin board over a 10 week period</td>
<td>RCT N = 238 students from one university in UK, 70% of participants female Support condition: n = 142, access to information website + support group Information only condition: n = 96 website containing information about student problems</td>
<td>Significant improvement in both groups: subjective well-being, life functioning risk to self or others and satisfaction with life Support group had no additional benefit No improvements in sense of community in other group</td>
<td>Weak High percentage withdrawals, Confounders Support group used by students with more significant problems</td>
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<td>Looseothubetsi, i.e. Ireland Hopan et al. (2013)</td>
<td>University students 18–24 years of age experiencing depressive symptoms (score &gt;16 on CES-D)</td>
<td>Website provided forum to allow participants offer peer support to each other. Also provided information on depression and links to other supports Participants could use the site as often as they liked</td>
<td>Single group pre-, post-design N = 118 participants recruited from one university in Ireland. 36% of participants female Posttest measurements taken after 6 weeks</td>
<td>No significant effects on depression symptoms</td>
<td>Weak Study design, High percentage withdrawals</td>
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<tr>
<td>Internet chat room therapy Israel Bank and Wunder-Schwartz (2000)</td>
<td>University students</td>
<td>Brief group therapy conducted in an internet chat room 7 x 90 min weekly online sessions</td>
<td>Quasi-experimental N = 22 students from universities and community colleges in Israel recruited through newspaper and bulletin board ads. 39% of participants female Group 1: n = 6, internet chat room therapy Group 2: n = 9, face-to-face therapy Group 3: n = 7, control Pre and post measurements</td>
<td>Significant improvement in self-image, social relations and well-being in chat room therapy and face-to-face groups with slightly greater improvement in chat room therapy group</td>
<td>Weak Selection bias, Confounders</td>
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significant difference in dropouts rates when comparing school and home implementation (98% school completion vs. 30% home completion). The online gaming interventions (ROC and Ching Ching Story) had the highest dropout rate at 42%. For the ePREP relationships education program, there was a significant correlation between university students most in need and program effectiveness, in that those with the poorest communication skills benefited the most from the intervention in terms of reduced psychological aggression (Braithwaite and Fincham 2011).

Two studies reported program acceptance findings (Fridrich and Lohaus 2009; Shandley et al. 2010). Fridrich and Lohaus (2009) found that the school face-to-face stress prevention intervention was the most accepted form of stress prevention when compared with the online intervention implemented at school and at home. In terms of gender, female participants reported higher rates of training acceptance than male participants for self-determined online school and face-to-face interventions, however, male participants showed higher acceptance of self-determined online participation via the internet from home.

Online Mental Health Prevention Interventions

Program Origin and Type

A total of 20 studies evaluating 15 prevention interventions were identified (see Table 2). Eight studies were conducted in Australia, three studies in USA and the Netherlands, two studies in the UK and Israel and one study was conducted in Norway and Ireland. Eight of these interventions (12 studies) were computerized cognitive behavioral therapy (cCBT) interventions designed to prevent depression and/or anxiety in adolescents and emerging adults displaying symptoms. One of the cCBT interventions (MoodGYM) has been repeatedly evaluated with different users and in different settings, including, high school universal intervention with male participants, female participants, both genders, website users and college students with elevated distress. Other prevention interventions included an online stress management program for university students (Chiauzzi et al. 2008), a depression information intervention (Costin et al. 2009), a mobile phone self-monitoring mood application (Kauer et al. 2012) and a blogging intervention for adolescents experiencing social-emotional difficulties (Boniel-Nissim and Barak 2013). Three studies examined the effectiveness of online support or therapy with emerging adults at risk of developing mental health problems (Freeman et al. 2008; Horgan et al. 2013; Barak and Wander-Schwartz 2000; Fuhkink and Hermans 2009).

Program content and delivery

The cCBT interventions provided online modules using cognitive behavioral therapy techniques. The majority of these interventions consisted of 5-6 modules implemented weekly. Two of these interventions provided professional assistance along with the self-directed cCBT material (van der Zanden et al. 2013; Van Voorhees et al. 2008). The depression information intervention employed health e-cards which provided personalized emails containing depression and help seeking information (Costin et al. 2009). The mobile phone self-monitoring program provided a tracking device to monitor mood, stress and daily activities and was carried out in consultation with the adolescents’/emerging adults’ general practitioner (Kauer et al. 2012). The online support therapies provided peer-to-peer support (Freeman et al. 2008; Horgan et al. 2013) or therapist support (Barak and Wander-Schwartz 2000) for at-risk college students.

The majority of interventions were implemented with late adolescents and emerging adults aged 18-25. Four interventions were implemented with adolescents as part of a secondary school curriculum, three interventions were delivered through the health system to youth at risk of developing a mental health disorder and eight interventions were delivered to university students aged 19-25 (Table 2). Three interventions were based on face-to-face prevention interventions that had been modified for use as an online intervention (Cukrowicz and Joine 2007; Attwood et al. 2012; van der Zanden et al. 2013).

Quality of Evidence

The quality of the studies varied significantly, eight studies received a strong quality assessment rating. Four studies received a moderate quality assessment rating as a result of either selection bias or a high dropout rate. Eight studies received a weak quality assessment rating as a result of a combination of selection bias, high dropout rate, not reporting or not controlling for confounders, small sample size and no control group (Table 2).

Program Outcomes

Overall, the cCBT intervention outcomes were positive. Findings from the four studies which received a strong quality assessment rating indicate the significant positive effect of cCBT on adolescents’ and emerging adults’ depression and anxiety (Van Voorhees et al. 2008; Calear et al. 2009; Clarke et al. 2009; van der Zanden et al. 2013). Long term effects were reported at 6 months (Calear et al. 2013; Van Voorhees et al. 2009; Hoek et al. 2011) and 12 months follow up (Saunders et al. 2013). Additional
outcomes included increased social support, reduced self harm thoughts, reduced hopelessness and improved sense of control or mastery (Van Voorhees et al. 2009; van der Zanden et al. 2013).

Additional prevention interventions, which received a strong quality assessment rating, included the mobile phone mood tracking device. Result from this randomized controlled trial showed that the monitoring of mood increased emotional self-awareness which in turn decreased depressive symptoms for youth aged 14–24 years with mild or moderate depressive symptoms (Kauer et al. 2012). The study examining the therapeutic effect of blogging about social emotional difficulties reported significant improvements in adolescents’ self-esteem, social emotional difficulties and social behaviors (Boniel-Nissim and Barak 2013). Less structured prevention interventions, including the stress management intervention (Chiauzzi et al. 2008) and Health e-Cards (Costin et al. 2009) produced less positive outcomes. University students that engaged in the stress management intervention evidenced no improvement in primary outcomes including perceived stress and health promoting lifestyle profile. Results from the health e-cards study indicated that the depression information intervention was not associated with changes in emerging adults’ help seeking behavior or mental health literacy.

The three cCBT interventions, which received a moderate quality assessment rating, produced similar positive findings in terms of reduced depression and anxiety symptoms among university students aged 18–24 years (Cukrowicz and Joiner 2007; Lintvedt et al. 2011; Kenardy et al. 2003) with improvements maintained at 6 months follow up (Kenardy et al. 2006). Lintvedt et al. (2011) also reported reduced negative automatic thoughts and improved depression literacy. Regarding interventions that received a weak quality assessment rating, four of the six MoodGYM studies fell within this category. Selection bias, not reporting if confounders were controlled for and high dropouts limit the conclusions that can be drawn from these studies. The remaining studies that received a weak quality assessment rating included three online support interventions (Horgan et al. 2013; Barak and Wunder-Schwartz 2000; Freeman et al. 2008). All three interventions reported non-significant findings.

The results from the MoodGYM cCBT studies that received a strong (Callear et al. 2009) and moderate quality assessment rating (Lintvedt et al. 2009) would suggest that this program is effective when implemented as a universal intervention with adolescents (age 12–17) in high schools and when implemented with university students with elevated psychological distress. Callear et al. (2009) reported that the intervention had a significant lasting effect on anxiety and depression in male adolescents at 6 months follow up (Callear et al. 2013). Another study which compared and contrasted the effect of MoodGYM online with (1) face-to-face therapy and (2) face-to-face therapy and MoodGYM combined found that face-to-face in conjunction with MoodGYM was more effective in reducing university students’ depression, anxiety, distress, frequency of automatic negative thoughts than therapy received through stand alone MoodGYM (Sethi et al. 2010). This study, however, received a weak quality assessment rating and thus further testing of the impact of face-to-face support in combination with the online intervention is required.

Implementation Findings

Program dropout was a significant issue across these prevention interventions. On average participants completed half of the cCBT modules. One study reported that only 29.8% of adolescents completed three or more of the five MoodGYM modules (O’Kearney et al. 2009). Baseline symptoms were found to be significantly related to program dropout across several studies, in that higher levels of depression and anxiety predicted program dropout (O’Kearney et al. 2009; Callear et al. 2013; Kenardy et al. 2003; van der Zanden et al. 2013). Related to this, there was an indication from two studies that program fidelity was important in achieving program outcomes and that benefit was most evident for adolescents most at risk (O’Kearney et al. 2006, 2009). Due to the weak quality assessment ratings of these studies, however, it is difficult to draw strong conclusions from these findings. One study reported a counterintuitive association with greater depression symptom reduction and fewer minutes of website usage and with fewer page hits (Clarke et al. 2009). Post hoc analysis revealed that participants who improved more rapidly found the website less necessary and thus discontinued.

In general, program acceptance was high across studies in which it was assessed. Fуккink and Hermanns (2009) reported that despite no significant difference in program outcomes between the online chat and telephone support service, there was greater acceptance for the online chat over the telephone service in terms of children and adolescents feeling supported, being taken seriously, made to feel at ease, therapist being comprehensible and not disorganized. Regarding the intervention CATCH-IT, Hoek et al. (2011) found that greater levels of ease of site usage predicted significantly lower depression scores at post-intervention. Conversely, another study reported no relationship between intervention satisfaction and program outcomes (Kenardy et al. 2003). This study also failed to detect a relationship between frequency of component usage and program outcomes.
Discussion

The ever increasing role of new technologies in adolescents' and emerging adults' lives provides an unprecedented opportunity to increase access to evidence-based mental health resources. The aim of this systematic review was to provide a narrative synthesis of the evidence on the effectiveness of online mental health promotion and prevention interventions for youth aged 12–25. Searching a range of electronic databases, 28 studies conducted since 2000 were identified. Eight studies evaluating six mental health promotion interventions and 20 studies evaluating 15 prevention interventions were reviewed. Although this review included studies carried out post 2000, over two-thirds of the studies (67.8%) were published since 2009, thus highlighting the growth in studies evaluating online mental health interventions for youth over the past 5 years.

It is difficult to be conclusive regarding the evidence of online mental health promotion interventions due to the small number of studies, the moderate to weak quality of these studies, and the considerable heterogeneity across the interventions in terms of content and delivery. There is, however, evidence that the mental health promotion module-based online interventions, which were implemented with adolescents can have a significant positive impact on their mental health and wellbeing. These interventions were implemented in the school setting and led to significant improvements in adolescent mental health literacy, support seeking behavior and psychological wellbeing (Van Vliet and Andrews 2009; Fridrici and Lohaus 2009). The results from the In One Voice social media campaign points to the potential of social media in combination with an education-based mental health promotion website in enhancing youth awareness of mental health and health seeking behaviors (Livingston et al. 2013). The evidence regarding mental health promotion gaming interventions is weak as a result of the absence of a control group and high dropout rates in the two studies reviewed. Additional research is required to investigate whether gaming is an effective approach for mental health promotion with youth.

Regarding online mental health prevention interventions, 20 studies were identified. In comparison to the mental health promotion interventions, there was more homogeneity across these interventions, with 12 studies evaluating the effectiveness of computerized cognitive behavioral therapy (cCBT) interventions aimed at preventing depression and/or anxiety. Of the seven cCBT studies that received a strong or moderate quality assessment rating, there is evidence that these interventions had significant positive effects in reducing anxiety and depression among adolescents and emerging adults identified at risk of developing a disorder. Similar results have been reported in previous systematic reviews examining the impact of cCBT for symptoms of depression and anxiety among adults. For example, (Spek et al. 2007) found a small effect size for prevention interventions in reducing depression and anxiety in adults. More recently, Griffiths et al. (2010) reported an effect size range from 0.02 to 0.65 for depression interventions involving participants with symptoms of depression. Follow up assessments of cCBT interventions were limited in this review, although, where reported, improvements were maintained. This is important as a previous meta-analysis has highlighted the potential for the effects of cCBT treatment interventions with this age group to be reduced over time (Weisz et al. 2006). One cCBT intervention that reported positive findings across second and third level settings is the Australian MyoGym intervention. It is, however, important to note that, with the exception of one study (Calcar et al. 2009), the sample size of these evaluations was relatively small ranging from 39 to 163 participants. Further testing of this intervention with larger, more representative samples would assist in strengthening the evidence base for this intervention.

Additional prevention interventions that showed promising findings and require further testing include the GP supported mobile phone self-monitoring intervention (Kauer et al. 2012) and the blogging intervention (Boniel-Nissim and Barak 2013).

Information provided by some studies in this review about the provision of support is important for the future development of this field. While it is difficult to draw strong conclusions about the type or intensity of guidance and support necessary due to variation in methodologies and quality of the studies reviewed, there is evidence from the studies reviewed that participant support (either face-to-face and/or web-based support) is an important feature of online interventions in terms of participant completion and program outcomes (Fridrici and Lohaus 2009; Sethi et al. 2010). This is in line with findings from a previous meta-analysis of cCBT interventions for symptoms of depression and anxiety which reported that interventions with therapist support have a large mean effect size, while interventions without therapist support have a small mean effect size (Spek et al. 2007). Future research comparing and contrasting different versions of support to accompany online interventions could help in understanding the minimum level of support required to maximize positive gains. As part of this, further research is required to determine the effective components of online interventions and the optimal program and session length to achieve positive outcomes. Due to the variability across interventions, it was not possible to determine specific strategies and methods that resulted in positive outcomes in this review.

Program completion varied across the interventions with frequently reported high levels of dropout and non-completion across promotion and prevention interventions.
This appears to be a significant issue for online interventions and has been reported in previous reviews (Richardson et al., 2010; Mohr et al., 2013; Griffiths and Christensen, 2006). Further research is warranted in terms of those who engage and those who choose to disengage from online interventions in terms of their expectation, motivation, personality, experiences and preferences. Several studies in this review found that completion of fewer modules was associated with higher depression scores at the baseline. In addition, one study reported that the benefit from the online intervention was most evident among those most at risk (O’Kearney et al., 2009). Continued research aimed at testing and uncovering new methods of improving adherence will be important to optimize the effectiveness of these interventions as there is evidence from this review that greater adherence and engagement was associated with better outcomes (O’Kearney et al., 2006, 2009). At the same time, however, as recommended by Mohr et al. (2013), overgeneralized assumptions that increased engagement is necessarily better under all circumstances should be avoided. Research is thus needed to better understand patterns of use and engagement, as well as the determinants and consequences of engagement.

While studies that received a moderate to strong quality assessment rating provide an indication as to the impact of these interventions on the knowledge, behavior and well-being of youth aged 12–25, a salient finding of this review is the number of studies that received a weak quality assessment rating (N = 12). Six studies did not employ a control group. Sample sizes varied, ranging from 12 to 2,909 participants. In addition, several studies failed to undertake or report sufficient information about randomization. Regarding sampling, with the exception of studies which recruited adolescents through schools, the majority of participants were recruited by self-selection through advertisements in colleges, on websites and in primary care settings. Furthermore, the majority of participants across the reviewed studies were female and were well educated. The significant gender imbalance is notable and, while this provides an indication of the gender profile of users who seek help and access mental health information, it limits the generalizability of the findings to young men. Future research in this field should engage in high quality evaluations with robust research designs in order to better understand the potential of these online interventions. In addition, future studies need to ensure more diverse sample recruitment in terms of gender, race, socioeconomic status, geographic location, access to the internet and computer literacy. Research into program preferences according to gender would also help to (1) clarify and address gender differences such as those identified in this review and (2) identify ways of tailoring interventions to support gender preferences and individual needs.

Five of the online interventions in this review were adapted from evidence-based face-to-face interventions. With the exception of two studies, which had a weak quality assessment rating, results from these studies showed the significant positive effect of these interventions on youth anxiety and depression symptoms. Future research should investigate the feasibility of adapting additional face-to-face interventions that have a strong evidence base and the effectiveness of these interventions when implemented as a standalone online program and/or an additional online intervention to support the face-to-face program.

Finally, it is important to note that all of the studies included in this review were carried out in high income countries and therefore, the findings may not generalize to low and middle income countries. Given the extraordinary increase in the use of cell phone and internet technologies in the latter countries, coupled with the considerable challenges in providing affordable and accessible face-to-face mental health services (Lewis et al., 2012; WHO, 2011), there is a pressing need to examine the implementation and effectiveness of online mental health interventions in these countries. The use of technologies is particularly promising given the critical shortage of health workers and poor distribution of service providers in low and middle income countries (WHO, 2006, 2008).

This systematic review has a number of important limitations, which impact its validity. There are limitations relating to the scope of the systematic search. A systematic search of studies published in grey literature was not included. Furthermore, a search in languages other than English was not undertaken. The possibility of publication bias needs to be considered as there may have been research studies in the area that did not find positive results and consequently were not published. In addition, given that the methodological quality of the studies reviewed varied, conclusions must, therefore, be tentative. Finally, as a narrative synthesis, the review data from the included studies were summarized and not statistically pooled, which limits the strength of the conclusions that can be drawn.

Conclusions

The current study systematically reviewed the effectiveness of online youth mental health promotion and prevention interventions. There is tentative evidence that skills-based interventions mental health promotion interventions, presented in a module-based format, can have a positive impact on adolescent mental health, however, an insufficient number of studies limits this finding. The results from the online prevention interventions indicate
the promising evidence regarding computerized cognitive behavioral therapy interventions and their impact on adolescents’ and emerging adults’ anxiety and depression symptoms. Implementation findings from studies in this review provide some evidence that participant face-to-face or web-based support is an important feature of online interventions in terms of participant adherence and program outcomes. The quality of evidence across the studies varied, thus highlighting the need for more rigorous, higher quality evaluations conducted with more diverse samples of youth. Furthermore, given the high rate of non-completion there is a need for research to investigate factors affecting exposure and adherence. Although future research is warranted, this current study highlights the potential of online mental health promotion and prevention interventions in promoting youth wellbeing and reducing mental health problems.

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Author contributions AC and MB conceived the systematic review and devised the protocol. AC and TK conducted the systematic review searches, data abstraction and independent quality assessment. MB conducted a further quality assessment to ensure consistency. AC and TK populated the table of evidence. AC and MB wrote the results and discussion. All authors read and approved the final manuscript.

References


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Paper 2

Using computerized programs in alternative education:
understanding the requirements of students and staff

pp. 170-182

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Using Computerized Mental Health Programs in Alternative Education: Understanding the Requirements of Students and Staff

Tuuli Kuosmanen, Theresa M. Fleming, and Margaret M. Barry

Abstract
Computerized cognitive behavioral therapy (cCBT) programs have been shown to be both acceptable and effective with youth. However, their use with more vulnerable youth, such as early school leavers, remains relatively unstudied. This study explored student and staff attitudes toward the use of cCBT in an alternative education setting. Methods: Student and staff needs were assessed using the Requirements development approach (Van Velsen, Wenzel, & Van Gemert-Pijnen, 2013). An online staff survey (n = 16) was conducted to provide information on the context of delivery, and stakeholder requirements were further explored in four student workshops (n = 32) and staff group discussions (n = 12). Results: Students' requirements in relation to program look and feel were reflective of issues with literacy and concentration. Activity- rather than text-based programs were considered easier to learn from, whereas attractive design with features such as connecting with others were thought necessary to keep young people engaged. Students wanted to learn practical skills on improving their mental health and well-being, using content that is positive, encouraging, and credible and that can be tailored to individual needs. Anonymity and voluntary participation were considered essential when delivering cCBT in the context of alternative education, as well as additional access from home to ensure timeliness of support. Staff required both flexibility and careful planning and timekeeping in order to deliver cCBT in the alternative education setting and to support student engagement. Conclusion: The findings provide novel insight into the needs and preferences of vulnerable youth, with important implications for the implementation of computerized mental health programs in alternative education settings. A better understanding of user needs and preferences is critical for improving the uptake and impact of e-mental health resources.

Introduction
International evidence suggests that youth who leave mainstream education early have poorer mental health and social outcomes than their peers (Freudenberg & Ruglis, 2007). In the European Union, 11.1% of youth leave mainstream education before completing upper-secondary school (European Commission, 2015). Early school leaving is associated with challenging home environments and parents’ socioeconomic background (Garner, Stein, & Jacobs, 1997; Jimerson, Egeland, Rouffe, & Carlson, 2000) and is likely to result in further disadvantage by limiting the young person’s access to employment or further education and training. Adolescence and early adulthood are the peak period for the first onset of mental health problems (Kessler et al., 2005), with those who are socially and economically disadvantaged being disproportionately affected (Reiss, 2013). For early school leavers, mental health difficulties can be further exacerbated by the experience of dropping out (Kaplan, Dampnousse, & Kaplan, 1994). Therefore, interventions that will enhance the mental health and resilience of early school leavers and equip them with the cognitive, social, and emotional skills needed for life, school, and work are required to reduce the risk for mental health problems and to promote healthy development and positive life outcomes (OECD, 2015).

In Ireland, an alternative education program, Youthreach, provides another route for second-level education for youth aged 15–20 years who have left school. Behavioral and learning difficulties are prevalent among the students, of which nearly a third has been estimated to be in need of psychological support (WBC Social and Economic Consultants, 2007). Although the need for mental health support among the students is elevated, adequate resources in many of the alternative education centers are not in place. Furthermore, stigma and previous negative experiences with adult service providers may inhibit help-seeking (Fleming, Lucassen, Stassi, Shepherd, & Merry, 2016; McHugh, 2014). Delivering computerized mental health programs could improve access to support while ensuring anonymity and thus lowering some of the barriers for help-seeking (Clement et al., 2015).

Computerized cognitive behavioral therapy (cCBT) for preventing depression and anxiety among youth appears promising (Pennant et al., 2015). cCBT programs teach the user to identify the links between thoughts, feelings, and behaviors and may include lessons around interpersonal skills, problem-solving, and regulating strong emotions (Calel, Christensen, Mackinnon, Griffiths, & O’Kearney, 2009; Merry et al., 2012). However, the use of cCBT with more diverse groups of young people, such as...
those attending alternative education, needs to be further studied (Clarke, Kuosmanen, & Barry, 2015). Furthermore, adherence with cCBT can be problematic, thus indicating a need for implementation research to understand how such programs should be delivered to support user engagement and how to better focus these interventions to the needs of the target audience. The significance of implementation is particularly highlighted when targeting hard-to-reach young people, who are by definition difficult to engage and underrepresented in health research (Bonevski et al., 2014).

This article considers the specific requirements for the delivery of cCBT with hard-to-reach vulnerable young people by assessing the needs of students and staff in relation to the use of cCBT in the context of an alternative education setting. Guided by student and staff views on two existing evidence-based programs (MoodGYM and SPARX), the study aims to explore the end-users’ needs and specifications about what such programs should look like, what they should do, and how they should be implemented in the specific context of alternative education.

**Literature Review**

cCBT programs have been shown to significantly reduce symptoms of anxiety and depression in adolescents (Pennarid et al., 2015) and to improve aspects of positive mental health and well-being when delivered in the general population (Powell et al., 2013). The evidence supports the delivery of module-based programs in a supported environment, such as the educational setting (Clarke et al., 2015). The module-based self-administered cCBT program for preventing anxiety and depression, MoodGYM, has been shown to reduce symptoms of depression and anxiety in young people when delivered in educational settings including secondary schools (Calazer et al., 2009) and universities (Sethi, Campbell, & Ellis, 2010). However, its use with youth who are socially, economically, or educationally disadvantaged remains understudied.

SPARX, a self-help intervention for adolescent seeking help for depression, appears to be the only computerized program that to date has been evaluated within an alternative education setting (Fleming, Dixon, Frampton, & Merry, 2011). SPARX uses a serious gaming approach to teach cognitive behavioral techniques, but also includes lessons on stress reduction, problem-solving, and interpersonal skills. Fleming and colleagues (2011) found SPARX to be both effective at reducing symptoms of depression and acceptable to youth in alternative education in New Zealand. However, due to the small number of participants in this study (N = 32), the findings can only be considered indicative and may not be replicable in other country contexts.

Although cCBT shows promising results, high dropout and non-completion rates are common (Christensen, Reynolds, & Griffiths, 2011). This raises particular concerns when delivering such programs in alternative education, where the students can be harder to engage as a result of common learning and behavioral issues and negative life experiences. The Holistic Framework to Improve the Uptake and Impact of eHealth Technologies (Van Gemert-Pijnen et al., 2011) highlights the importance of the technology being responsive to the needs and values of the target audience as well as appropriate in the context where it is being delivered, in order to optimise program uptake and impact.

Embedded in this Holistic Framework is the requirements development approach, which provides a useful methodological framework for identifying and contextualizing what stakeholders want and need from the technology (Van Velsen, Wentezel, & Van Gemert-Pijnen, 2013). Using this approach, each need (attribute) expressed by stakeholders is formulated into specific technical requirements that the program/technology needs to meet to address that need. Furthermore, attributes are used to identify underlying stakeholder values, which are the overall goals that the intervention should adhere to and personal principles that it should not violate (Van Velsen, Benjije, & Wentezel, 2015).

Values, attributes, and requirements can be used as a basis for developing the technology and for assessing how well the technology responds to the main goals of the target audience. Building on the Holistic Framework and the requirements development approach, this study explores the needs and preferences of Youthreach staff and students in relation to the delivery of cCBT. Stakeholder requirements were explored in three particular areas: (1) what the program should look like, (2) what the program should do, and (3) how the program should be implemented in the context of alternative education. As the Holistic Framework, in the next stage of the study, the requirements identified will be used to plan for the implementation and assessment of the acceptability and impact of two cCBT programs, MoodGYM and SPARX.

The objectives of the study were to:

1. To examine the context of Youthreach setting for implementing cCBT, including existing resources and practices, mental health needs of students, and implementation barriers.
2. To identify student requirements and values in relation to program look and feel, program content, and implementation in the context of Youthreach alternative education.
3. To examine staff requirements and values in relation to program look and feel, program content, and program implementation.

**Methods**

The study design follows the requirements development approach (Van Velsen et al., 2013). First, a contextual inquiry was conducted to examine the context of the Youthreach setting for the delivery of cCBT. This was done via an online survey, which was completed by staff on behalf of the Youthreach Centers. Student workshops and staff discussions were then conducted based on viewing two selected cCBT programs, MoodGYM and SPARX, to further explore stakeholder requirements and values in relation to the technology.

**Setting**

Youthreach delivers national primary- and secondary-level curriculum and examinations and vocational training (FETAC) for early school leavers aged 15-20 years in Ireland (Department of Education and Skills, 2010). On average, the students spend 2 years at the Centers on a full-time basis and receive an allowance from
the government for attending the program. The curriculum is more flexible than in mainstream education, the class sizes are smaller, and more one-to-one support is available (CHL Consulting Company, 2006). Personal, educational, and social challenges are common among students. It is estimated that half of the students come from dysfunctional family backgrounds, nearly a third (32%) have difficulties with literacy and numeracy, 28% have issues with substance misuse, and 30% are in need of psychological support (WRC Social and Economic Consultants, 2007).

Programs

MoodGym

MoodGym (www.moodgym.anu.edu.au) is an automated self-directed cCIT program designed to prevent and decrease symptoms of anxiety and depression in youth. The program aims to teach the user to recognize and change negative thinking patterns, build self-esteem, and improve problem-solving, relaxation and relationship skills (Calean et al., 2009). It consists of five interactive modules to be completed in order.

SPARX

SPARX (www.sparx.org.nz) teaches cognitive behavioral techniques, problem-solving and interpersonal skills, and relaxation and emotion regulation techniques for young people seeking help for depression. It is similar to MoodGym in terms of content; however, it adapts a serious gaming approach, thus making it more activity-based and rich in multimedia (Fleming et al., 2011). The program has seven sequential levels, each taking approximately 30 min to complete.

Participants

All Youthreach Centers (n = 110) in Ireland were invited to take part via email and/or telephone. Twenty-one Centers agreed to take part in the online staff survey, 2 Centers actively refused to participate due to time constraints, and the remaining 87 Centers did not respond. The survey was returned by 16 Centers (76%; 12 Centre Coordinators and 4 teachers). Smaller Centers, typically located in smaller towns or villages, were slightly overrepresented in the sample (mean number of students 29.38 (SD 15.6) vs. 35.06 (SD 12.6) in the entire population). Four of the 21 Centers were selected to take part in student workshops and staff group discussions, with the aim of including a variety of Centers from both rural and urban areas and from each of the four provinces in Ireland. In one Center, all students present on the day were invited and agreed to participate, whereas in the other Centers staff was asked to prescreen one class of approximately eight students. Overall, 38 students (52.6% male, mean age 16.73 years) took part in a total of four workshops (Table 1). Two semi-structured group discussions and two interviews were held with Youthreach staff (n = 12, 23% male).

### Process

**Online Survey**

The survey consisted of Likert-type, multiple-choice, and open-ended questions in three areas: (1) General information on the Center (number and age of students, average class size, computer facilities); (2) Supporting student mental health (youth mental health needs, existing resources, and current practices); and (3) Program implementation (perceived usefulness, training needs, implementation barriers, and possible solutions).

**Student Workshops**

The workshops were approximately 45 min in length and facilitated by the researcher (TK) accompanied by one member of the staff. The students were given approximately 10 min to partly view the first module of MoodGym followed by semi-structured discussion. The discussion protocol was guided by previous studies assessing program use and acceptability (Fleming et al., 2016; Kiewit, Yamanashi, & Nakayama, 2007; Van Voorhees et al., 2009). Three specific areas of interest were explored: (i) program views (ease of use, attractiveness, relevance, and usefulness), (ii) content (mental health needs and interests), and (iii) implementation (delivery in the context of Youthreach). The students then viewed a trailer of SPARX, followed by discussion as before. At the end of the workshop, students completed a short questionnaire, which included items on demographics and computer use.

**Staff Discussions**

Staff discussions were 30–45 min in length and were held directly before the student workshops. Discussions followed a protocol similar to student workshops, centering on the same three key areas: program look and feel, program content, and implementation in the context of Youthreach. Staff members were asked to view the two programs before taking part in the group discussions/ interviews. Nine of the 12 staff participants completed a staff questionnaire including items on demographics, computer use.

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1. Available as an online supplement.
2. Available from the corresponding author on request.
youth mental health promotion, and attitudes toward computerized delivery.

Analysis
The online staff survey and student and staff questionnaires completed at the end of the workshops/discussions formed the basis of mapping the context of delivery. Qualitative data were analyzed using SPSS and responses to open-ended questions were analyzed using thematic analysis (Braun & Clarke, 2006). A semi-structured approach was used to explore patterns in the data and to interpret those patterns with specific predefined research questions of interest in mind.

The student and staff discussions were audio recorded and transcribed. User needs and preferences in relation to the cCBT programs were explored based on the coding matrix and methodological framework described by Van Velsen et al. (2013). As per the requirements development approach, the data were analyzed and coded into requirements, attributes, and overarching values. Key themes and categories were identified within each of the three derivations following the nine-step guide to translating raw data into requirements described by Van Velsen et al. (2013). The transcripts were read several times in order to become familiar with the data. Each quote that explained a user need or preference, or a user characteristic, was listed under “User expression.” Following this, attributes (i.e., a summary of the user need or preference) were determined from each quote, and quotes that were coded into similar attributes were grouped together. Specific requirements were then identified for each attribute. During this process, the coding of data into attributes and requirements was reviewed and refined several times with a second analyst (MB) and finally, overall values were determined conjointly.

The data that did not fit into the coding matrix (approximately 25%) consisted mainly of introductions and data that related to the more practical aspects of taking part in the study and general discussion around the ever-increasing use of technology. Last, another independent researcher coded segments (approximately 15%) of the transcripts using the provided coding matrix, with over 90% of the data being coded into the same themes. Differences were resolved by consensus.

Ethics
Written informed consent was obtained from all individual student and staff participants included in the study. Parents/guardians of students under the age of 18 years were asked to consent to the study in the form of passive consent. The study was granted ethical approval from the NUIGalway Research Ethics Committee.

Results

Contextual Inquiry
The contextual inquiry explored three aspects of the Youthreach alternative education setting: (1) general context and structure of Youthreach, (2) mental health needs of students and existing resources, and (3) the delivery of computerized programs in the context of Youthreach.

Computer Use
Only two of the Centers reported previous use of online mental health resources, with reference to educational websites and printable worksheets. All the students reported using the Internet every day or almost every day. The majority of students reported feeling very confident (74%) or confident (26%) using a computer. None of the students reported prior use of online mental health resources. Three-quarters of the students reported playing computer games at least sometimes.

Youth Mental Health and Existing Supports
Staff reported encountering student mental health issues on a daily basis in their work. All staff discussed mental health topics in the class at least once or twice a week, with the majority (77%) also discussing mental health on a one-to-one basis at least weekly. All but one staff participant felt equipped to promote youth mental health and considered it as part of their job. All but one staff member reported feeling confident about delivering an online mental health program. Positive mental health and well-being, improving coping skills, and developing communication skills were considered the most relevant topics in relation to youth mental health, followed by raising awareness around substance misuse and anxiety/depression prevention.

All the Centers delivered Social Personal and Health Education (SPHE), but only two Centers (12.5%) reported delivering specific mental health and well-being programs. All but two Centers provided access to a counselor either onsite (43.8%) or off-site (68.8%).

The Role of Computerized Programs
Computerized programs were considered as a supplement to other supports and services already in place. They were seen as a way to deliver mental health promotion programs universally to the whole class, thus promoting positive mental health and helping among all students and decreasing social isolation for those experiencing mental health difficulties. Furthermore, computerized programs were thought to function as a support and guide to staff in terms of promoting youth mental health.

Program Implementation
The staff identified a number of possible barriers to program implementation, related to student, technology, and structural issues. Student-related barriers included students’ unwillingness to take part and issues with consistent attendance. Structural barriers included lack of adequate computer facilities and timing issues, particularly as each student might need to progress at their

1Social, Personal and Health Education is a mandatory part of the Department of Education and Skills curriculum for primary and lower secondary schools, aiming to support students’ personal development, health and well-being, and communication skills. For more information, please see http://www.education.ie.
### Table 2. Summary of student attributes, requirements, and values.

<table>
<thead>
<tr>
<th>Attribute(s)</th>
<th>Requirement(s)</th>
<th>Underlying value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program look and feel</td>
<td>Each individual module is relatively short</td>
<td>Easy to learn from</td>
</tr>
<tr>
<td>Not too lengthy</td>
<td>Contents are presented clearly/me irrelevant information</td>
<td>“Not too much writing or words”</td>
</tr>
<tr>
<td>Not too wordy</td>
<td>Limited amount of text-based content</td>
<td></td>
</tr>
<tr>
<td>Activity-based learning</td>
<td>Use of audio- and video-based files</td>
<td></td>
</tr>
<tr>
<td>Visually attractive</td>
<td>Simple and jargon-free language</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The program is activity-based (e.g., puzzles, games, etc.)</td>
<td>Fun and engaging (not boring)</td>
</tr>
<tr>
<td>Connecting with others</td>
<td>Use of pictures and animations</td>
<td>“Having fun, while learning”</td>
</tr>
<tr>
<td>Customizable program look</td>
<td>Easy-to-read images/text</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Graphics are up-to-date</td>
<td></td>
</tr>
<tr>
<td>Content</td>
<td>Happy music</td>
<td></td>
</tr>
<tr>
<td>Personal input on program look and feel</td>
<td>Bright colors</td>
<td></td>
</tr>
<tr>
<td>Practical skills to improve social and emotional well-being</td>
<td>The program can be played as a multiplayer game</td>
<td></td>
</tr>
<tr>
<td>Practical advice on improving mental health and well-being</td>
<td>Personal input on program look and feel (customizing character, ability to input own voice)</td>
<td></td>
</tr>
<tr>
<td>Advice on helping others</td>
<td>Program teaches how to build confidence and self-esteem, manage and talk about feelings, reduce stress, and improve coping</td>
<td>Practical advice on improving mental health and well-being</td>
</tr>
<tr>
<td>Information on substance misuse and mental health problems</td>
<td>Program includes information and advice on helping others</td>
<td>“Practical skills to calm you down”</td>
</tr>
<tr>
<td>Positive training</td>
<td>Program provides information on dealing with substance misuse, depression, and anxiety</td>
<td></td>
</tr>
<tr>
<td>Tailored contents</td>
<td>Program contents are positive and encouraging (hope, examples of positive thinking patterns)</td>
<td>Positive and encouraging</td>
</tr>
<tr>
<td>Personal feedback</td>
<td>The program does not focus on negative feelings or thinking patterns</td>
<td>“It shows that there is hope if you try”</td>
</tr>
<tr>
<td></td>
<td>Information can be tailored to individual needs</td>
<td></td>
</tr>
<tr>
<td>Tailored to individual needs</td>
<td>Provides links to further information</td>
<td></td>
</tr>
<tr>
<td>Personalized feedback</td>
<td>“Everybody's different, everybody should have a choice”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Allows tracking progress</td>
<td></td>
</tr>
<tr>
<td>Realistic goals</td>
<td>Program goals are incremental and realistic</td>
<td>Credible and trustworthy</td>
</tr>
<tr>
<td>Serious and convincing</td>
<td>Program characters appear sincere and believable</td>
<td>“It's not a magic cure”</td>
</tr>
<tr>
<td>Implementation</td>
<td>The program can be accessed from home</td>
<td>Accessible support</td>
</tr>
<tr>
<td>Accessibility</td>
<td>The program can be accessed through mobile phones</td>
<td>“To know there is somewhere to turn to if you need support online”</td>
</tr>
<tr>
<td>Optional attendance</td>
<td>It is up to the student to decide whether or not to take part</td>
<td>Voluntary participation</td>
</tr>
<tr>
<td>Anonymity and confidentiality</td>
<td>The user can remain anonymous</td>
<td>Privacy and anonymity</td>
</tr>
<tr>
<td>“It’s not like your secret’s out”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

own pace. Technology-related barriers included computer literacy difficulties for some students, the lack of face-to-face interaction posing challenges for staff in terms of monitoring adverse reactions, and the view that students appear to work better when hands-on support and opportunities for discussion are provided.

**Student Values and Requirements**

In this section, the needs of young people attending alternative education were explored in relation to three key areas of computerized delivery: program look and feel, program content, and program implementation in the context of the Youreach setting. Nine overall values were elicited from student transcripts (Table 2):

- The program is easy to learn from, taking into account the literacy levels of the students
- Easily accessible outside the Youreach setting
- Voluntary participation with optional attendance in class
- Ensures Privacy/Anonymity
- Teaches practical skills to improve mental health and well-being
- Positive and encouraging program content that does not cause negative feelings or distress
- Tailored to individual needs by allowing personalization of content
- Credible and trustworthy, highlighting students’ need to be able to trust the program
- “It’s not like your secret’s out”
- Voluntary participation
- Privacy and anonymity

These overall values and how they are reflected in program look, content, and implementation requirements are discussed below.

**Program Look and Feel**

The overall value related to the program look and feel was that of being easy to learn from and engaging for young people. The underlying assumptions were that young people do not like reading and that they get bored easily. Therefore, the program should not be too lengthy or wordy, only presenting the most crucial information, using simple and jargon-free language, and avoiding text-based content. The use of audio- and video-based files was preferable "just to get you off reading and give you a break" (M, Group 4). Furthermore, games were considered more colorful and fun, and "tailored towards the way the world is going" (M, Group 3).

Although students wanted the program to be visually attractive, at the same time, some students also indicated

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that they were not expecting a learning program to be up to the standard of commercial games in terms of look and design. This was related to the time spent on a learning program compared to playing for entertainment.

"...it's not going to be as bad as you thought you would be doing it for long. Like you would be at home nearly daily."

Finally, the students appreciated having a personal input to the look and feel of the program, for example, by customizing your avatar (feature of SPARKS). This, along with the possibility of connecting with others in the form of a multiplayer game, was seen as a way to help the young people engaged.

Content Requirements
Students wanted to gain practical advice on improving their mental health and well-being, centering on learning social and emotional life skills. The potential of the programs was seen as teaching the user to manage and talk about their issues and to be able to seek help from other sources. Furthermore, the programs could help in understanding and helping others with mental health difficulties.

In terms of program topics, males especially reported that they wanted to learn how to manage and talk about their emotions:

"I would like to get confident at dealing with feelings and sorting them out." (M, Group 3)

Students also wanted to build self-esteem and confidence, to improve coping, and to learn how to manage anger and stress. A few participants expressed an interest in receiving specific information on depression and anxiety or drugs and alcohol. However, ultimately students expressed that content should be tailored to the needs of each individual user.

Overall, students expressed the need for positively framed content that does not bring about negative feelings. Reading about depression and negative thinking patterns were considered "boring" or "depressing", while positively framed content around hope, positive thinking patterns, and building personal strengths were viewed more favorably among the participants.

The value of credible and trustworthy content was reflected in some students being doubtful about the possible impact of computerized programs in terms of reducing symptoms of depression:

"I didn't like the way it says that it will make your life better... It's kind of putting it out a bit too much." (M, Group 4)

This highlights the need for realistic and incremental goal setting to ensure that students find the content credible. Furthermore, students expressed the need for program characters to appear sincere and believable.

Implementation Requirements
Overall, students expressed that one of the benefits of using computerized programs was increasing the options for mental health support, particularly for those who may not be confident enough to seek support from traditional sources. While students recognized the benefit of delivering such programs within the Youthreach setting as a way to engage all youth, allowing additional access from home and mobile phones would ensure that support is available in a timely manner.

As expressed by a student:

"If you are having a bad day to get on the game and just chill out and relax." (M, group 4)

Furthermore, students wanted optional attendance and the ability to remain anonymous if the program was delivered in the Youthreach Centre. Anonymity was considered particularly important if the program was played as a multiplayer game.

Staff Values and Requirements
Staff talked about the values and requirements of students in relation to program look and content, as well as their own requirements in relation to program implementation. Staff demonstrated a deep understanding of the needs of the students, referring to the same needs expressed by students while also providing more context to these needs. Staff perceptions of student requirements in relation to program look and content are discussed, followed by the requirements of staff in relation to program implementation.

Program Look and Content
Echoing the views of students, staff expressed the need for the program not to be too wordy or theoretical, reflecting on the particularly low levels of literacy among the students:

"The typical child here... has a reading age of maybe 7, 8, 9, 10, 11... So you really have to always be conscious of the fact that they don't understand an awful lot of words." (Staff, Group 2)

Furthermore, low levels of concentration and the need for instant gratification among the students highlighted the need for the program to be able to grab the attention of the young person from the start by being visually attractive, easy to follow, and activity based. Furthermore, staff added that the program should not include homework assignments, as students were unlikely to complete them. Staff also acknowledged the need for anonymity and confidentiality in order to ensure that students engage fully with the program.

A variety of mental health issues among the students were mentioned by staff, with some common themes including negative self-view and lack of confidence, coping with adverse life experiences (bullying, dysfunctional family backgrounds), depression, and anger management. Staff highlighted the need to build self-belief and social and emotional skills among the students in order for them to move on successfully in their lives after the Youthreach Centre.

"...they are very closeted in here... that's what they need right now. But it's to have the skills to move on after here." (Staff, Interview 2)

Computerized programs were also seen as a way to help young people acknowledge their mental health issues in a nonthreatening way, particularly for the more reserved and less confident students. However, mirroring the views of students, staff considered the role of computerized programs as not to treat mental health issues such as depression, but
rather, to work alongside face-to-face support, improving mental health awareness and help-seeking.

Implementation Requirements

Four overall values were elicited from staff discussions relating to program implementation: planning and timetabling, complemented by face-to-face support, flexibility in delivery, and supporting the role and functioning of the Centre.

Due to the unpredictable nature of the week-to-week curriculum in the Centers, staff expressed the need for careful planning and timetabling to ensure continued delivery. This included the need for establishing a set time and place in the curriculum for the program, selecting a group of students that were interested in the topic and not pre-occupied by other Youthspeak Centre tasks/responsibilities, ensuring that staff are supported in program delivery and having access to user details in case they got lost. Staff referred to the need for training in relation to the technological aspects of the program and its day-to-day delivery, as well as in relation to mental health in general. Although face-to-face training was considered beneficial, most staff members did not think this was completely necessary, as long as they were provided with a program manual and instructions and support was available throughout the program as required.

Although staff acknowledged the benefits of computerized mental health programs in increasing options for support for young people, nevertheless, face-to-face support was considered superior to computerized programs.

"...it's more human, but I think with them having a smartphone in their hand at all times, it would be a shame not to do it that way." (Staff, Interview 1)

Thus, providing face-to-face support alongside cCBT to improve engagement and address possible adverse effects was considered vital. Staff expressed that the program should be delivered in a structured class environment, where staff can monitor and encourage student engagement, along with providing more targeted support for more vulnerable students in the form of professional counseling or staff mentoring. Staff also wanted to encourage student engagement by setting targets or rewards for completing the program.

However, the need for flexibility and a student-centered approach to program delivery was also recognized, to allow each student to progress at his or her own individual pace and because absences were an issue in many of the Centers.

Finally, staff valued programs that support the role and functioning of the Centre, by providing usable information on student mental health and well-being and complementing other subject areas, such as literacy. Information on student well-being could be used for generating reports on soft skills development as required by the Soft Skills Framework (Gordon, 2011), as well as for planning for future supports.

Discussion

From this qualitative analysis, it is apparent that alternative education staff and students have clear needs and preferences, which may shape the successful implementation of computerized mental health programs for vulnerable youth. This is important, as computerized mental health programs have promising results and yet adherence is often problematic. The findings are consistent with the views of youth work service providers and youth attending alternative education in New Zealand on cCBT and the SPARX program (Fleming et al., 2016; Fleming & Merry, 2012), and highlight the importance of a student-centered approach and the need for programs that are positive and engaging to youth and emphasize user control and autonomy.

In line with the theories of mental health promotion (Barry & Jenkins, 2007; Jané-Llopis, Barry, Hosman, & Patel, 2005) and the principles of effective practice in promoting mental health in the youth setting (Kobus-Matthews, Jackson, Eastick, & Loconte, 2014), the students clearly appreciated a more positive focus on mental health and well-being. The students' views that reading about depression and negative thinking patterns is "horrible" or even "depressing" present a challenge to the use of current evidence-based programs in terms of how to address mental health issues and engage young people in a meaningful manner without focusing unduly on the negative aspects of mental health. The staff account of the challenges faced by students indicates that the underlying nature of emotional problems among students varies from specific mental health problems such as depression and anxiety, to poor self-esteem linked to negative experiences in mainstream education, to coping with social and economic issues. Thus, an approach that focuses on building cognitive, social, and emotional skills which have universal relevance to all youth (Barry & Jenkins, 2007) may not only be more acceptable to the students but also more appropriate when targeting all students in an educational setting. Interventions that focus on protective factors for resilience and coping with challenges enhance good mental health and psychological well-being, but also reduce risk factors for mental health problems and negative life outcomes (Clarke, Morreale, Field, Hussein, & Barry, 2015). To date, computerized mental health interventions have largely focused on providing CBT for depression and anxiety. However, the findings from this study suggest that focusing on enhancing protective factors for mental health and well-being through the development of positive social and emotional skills may be more appropriate when delivering universal interventions within an alternative education setting.

Recognizing that some students will require additional more targeted support, the role of computerized programs was considered to supplement rather than replace other existing supports. Many of the students expressed a wish to improve their ability to talk about their problems to others, indicating that computerized programs could function as a way to build a bridge to seeking help from other sources. This highlights the importance of providing face-to-face support along with computerized programs (Seth et al., 2010). To ensure that support is available, there may be a need for further training for staff around youth mental health, particularly as access to mental health services could be delayed. Although all staff reported being engaged with mental health promotion at present, the findings indicate that at least some staff members do not feel equipped to do so. Furthermore, it
is clear from the program credibility issues raised by students and their desire for privacy that there is a need to build trust among the students. This is particularly important, as staff is keen for the program to provide information on student well-being to be able to support students, yet students may wish to remain anonymous.

A student-led approach, valuing diversity and emphasizing tailoring and flexibility, is integral to the philosophy of alternative education (CHL Consulting Company, 2006). The staff expressed a need for flexibility around program delivery due to inconsistencies in the curriculum and student attendance and the need for students to be able to progress at their own pace. Computerized programs can provide this flexibility, as each student progresses with the program at their own pace rather than as a group, therefore allowing the student to carry on where they left off and making it possible for students to catch up outside of class time. However, the staff also required structure, not only to increase student engagement, but also to support staff in delivering the program consistently. Building the program within a face-to-face mental healthpromotion program may support consistent delivery and facilitate staff involvement while also allowing students anonymity and control while using the computer.

Finally, ensuring that programs are easy to learn from and fun and engaging seems particularly important considering students’ low concentration levels, as described by staff, and below-average levels of literacy among many youth attending alternative education. The students’ requirement for activity-based programs is very much in line with guidelines on creating youth-friendly websites (Largo, Beloshiti, & Rahman, 2002; Lønanger & Nielsen, 2013) and supports the assumption that gamification may improve user engagement (Fleming et al., 2016). The findings suggest that challenges and rewards, and the possibility to connect with others, while remaining anonymous, may improve engagement. The use of persuasive technologies (Oinass-Kukkonen & Harjumaa, 2009), including features such as tracking progress, personalized feedback, and tailored contents, may result in a more meaningful user experience.

In the next phase of the study, the requirements identified in this study will be used to tailor the implementation of the programs to the specific requirements of the Youthreach setting. For example, considering issues with literacy, it will be important to ensure that support from staff is available when needed. To encourage student engagement, staff can be advised to offer rewards, such as a certificate for completing the program. Furthermore, as per the Holistic Framework (Van Gemert-Pijnen et al., 2011), the current findings will be used as a basis for process evaluation, assessing the acceptability and implementation of the cCIT programs in a randomized controlled trial.

Limitations

The small sample size and limited number of workshops conducted may have affected the generalizability of the findings to the alternative education setting. Furthermore, as the Centers were self-selected, the participating staff may have held more favorable attitudes toward computerized mental health promotion than the Youthreach staff population as a whole. Including additional programs, which use a variety of different approaches, such as social and emotional learning, would have been beneficial.

Conclusions

Employing the Holistic Framework to Improve the Uptake and Impact of eHealth Technologies and the requirements development approach, this study explores the views of both student and staff in alternative education in relation to the implementation of two computerized mental health programs. This study adds to the existing literature on using computerized mental health programs with youth by offering important insight into the factors that need to be considered when developing and/or implementing computerized mental health programs with more vulnerable groups of youth in alternative educational settings. These young people have a higher risk of experiencing mental health problems; yet most research to date has been conducted with mainstream students and limited resources exist targeting this group specifically. The findings highlight the need for youth-friendly, personalized programs with a positive focus on mental health and well-being, to keep these young people engaged and to prevent potential adverse reactions.

Acknowledgments

The authors wish to acknowledge the collaboration of all the Youthreach Center staff and students who took part in the study.

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Online Supplement: Online Survey completed by Youthreach Centres as part of the contextual inquiry

Youthreach Survey

Information on the Centre

This set of questions is concerned with specific information on your Centre.

1. **Name of Youthreach Centre**

______________________________________________________________________

2. **What is your current role?**

   □ Youthreach Coordinator
   □ SPHE teacher
   □ Guidance counsellor
   □ Counsellor
   □ Other (please specify)

3. **How many trainees do you have in your Youthreach Centre at present?**

______________________________________________________________________

4. **What is the average class size at your Youthreach Centre?**

______________________________________________________________________

5. **What is the age range you work with?**

______________________________________________________________________

6. **How many computers do you have available for the use of the young people at your Centre?**

______________________________________________________________________

7. **Has your Centre previously used online health/mental health resources?**

   □ Yes (please specify)

   □ No
Supporting Youth Mental Health

This set of questions is concerned with the mental health and well-being needs of young people attending Youthreach.

8. In relation to the young people attending your Youthreach Centre, how relevant are the following topics?

<table>
<thead>
<tr>
<th>Topic</th>
<th>Not at all relevant</th>
<th>Not really relevant</th>
<th>Somewhat relevant</th>
<th>Relevant</th>
<th>Very relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive mental health and wellbeing</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Developing coping skills</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Depression prevention</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Anxiety prevention</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Developing communication skills</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Suicide prevention</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Dealing with loss</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Addressing school problems</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Promoting positive family relationships</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Promoting positive peer relationships</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Bullying</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Cyberbullying</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sexuality</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Drug awareness</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Alcohol awareness</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Smoking awareness</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>Eating disorders</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Other topics you think are relevant to youth mental health

9. Please indicate, which of the following forms of support are available for young people at your Centre?

☐ SPHE (Social and personal health education)
☐ PIPS (Personal and interpersonal skills)
☐ Onsite counsellor
Referral to offsite counsellor
Guidance counselling
MindOut - social and emotional skills programme
Visits from outside organisations

Other mental health supports (please specify)

10. Please briefly describe the procedure that is being followed if a young person attending your Youthreach Centre is experiencing a mental health problem.

Programme implementation

This set of questions is concerned with the delivery of online interventions at YOUR Youthreach Centre.

11. How useful do you think it would be to deliver an online mental health promotion programme at your Youthreach Centre?

☐ Not useful at all
☐ Not very useful
☐ Somewhat useful
☐ Useful
☐ Very useful

12. In your opinion, how could your Centre benefit from the use of an online mental health promotion programme?

13. Please indicate, how important would the following forms of training and support be if you were to offer online mental health programmes at your Centre?

<table>
<thead>
<tr>
<th>Training/Support</th>
<th>Not that important</th>
<th>Somewhat important</th>
<th>Important</th>
<th>Could not do without</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face-to-face training for staff on how to use the programme</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>User manual for staff</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Information for staff on the evidence</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
behind the programme

<table>
<thead>
<tr>
<th>Support/Information</th>
<th>☐</th>
<th>☐</th>
<th>☐</th>
<th>☐</th>
<th>☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing support for staff while implementing the programme</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information on the programme for students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information on the programme for parents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other types of training/support that you think would be important (please specify)

14. Can you think of any barriers to delivering an online mental health promotion programme at your Centre?

15. How could these barriers be overcome?

16. Do you have any additional comments to make?
Paper 3

A pilot evaluation of the SPARX-R gaming intervention for preventing depression and improving wellbeing among adolescents in alternative education

*pp. 184-191*

Kuosmanen, T.
Fleming, T. M.
Newell, J.
Barry, M. M.

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A pilot evaluation of the SPARX-R gaming intervention for preventing depression and improving wellbeing among adolescents in alternative education

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Emotion regulation
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Stigmatized youth

ABSTRACT

Aim: The use of computerized mental health programs with vulnerable youth, such as early school leavers, remains relatively unstudied. This pilot study examined the feasibility of delivering a computerized cognitive behavioral therapy (CBT) gaming intervention (SPARX-R) for young people (age 15–20 years) who have left school early and are attending Youtheach, an alternative education (AE) program in Ireland.

Method: Students (n = 148) from twenty-one Youtheach Centers were randomized to SPARX-R and no-intervention control. All students within the group were included in the study whether or not they were exhibiting heightened levels of depression. Program impact was examined on both negative and positive indicators of mental health, including depression (primary outcome), generalized anxiety, general mental wellbeing, coping and emotion regulation. Assessments were conducted at baseline and post-intervention (7 weeks).

Results: Students who completed data at post-assessment (n = 66) were included in the analysis. The participants completed on average 5.3 modules of SPARX-R with 30% (n = 9) completing the entire program. A significant improvement in emotion regulation strategies was detected, with depressive suppression decreasing significantly in the SPARX-R group in comparison to the control group (t = 2.97, 95% CI = 5.48 to –0.46, p = 0.03).

Conclusion: Findings suggest that SPARX-R has a positive impact on emotion regulation. The lack of significant findings on other outcome measures may be attributed to inadequate sample size, and therefore, further research with larger samples is required to establish the effectiveness of the program in reducing depression and anxiety and improving psychological wellbeing among young people attending AE.

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1. Introduction

There is increasing evidence supporting the delivery of computerized mental health programs to promote youth mental health and wellbeing (Clarke et al., 2015; Fennant et al., 2015). Computerized cognitive behavioral therapy (CBT) programs particularly, have been shown to significantly reduce symptoms of anxiety and depression in youth (Oakley et al., 2009; Fleming et al., 2011; Merry et al., 2012) as well as improve some aspects of positive mental health, such as self-esteem (O’Keary et al., 2000), and mental health literacy (Lintvelt et al., 2013). However, adherence can be problematic with high dropout rates, with supported delivery, e.g., within education settings, being linked to increased adherence and better outcomes (Baumeister et al., 2014; Clarke et al., 2015). However, to improve the uptake and impact of computerized programs more also needs to be known about how young people use and engage with these programs and how adherence is linked to outcomes (Clarke et al., 2015; Fleming et al., 2016; Van Gernert-Pijnen et al., 2011). Furthermore, the transferability of these findings to young people who are socially and economically disadvantaged, such as those who have left school early, remains relatively unstudied.

Approximately 11% of young people in the EU leave school before earning a school leaving qualification (European Commission, 2015). There is no one reason for early school leaving, but rather, it is a complex interplay of factors such as low socio-economic status, negative school experience, dysfunctional family backgrounds and personal problems (Farmer et al., 2003; Garnier et al., 1997; Harrington, 2008; Jimerson

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et al., 2000; Lamb et al., 2015; Stokes, 2003). Young people who are socially and economically disadvantaged are disproportionately affected by mental health problems (Reiss, 2013) and living school can further adversely affect the social and health outcomes of these already disadvantaged young people by bringing about feelings of inadequacy and worthlessness and limiting access to further education and the labor market (Fredensborg and Bugis, 2007; Kaplan et al., 1994; McHugh, 2014).

In Ireland, the National Second-Chance Education Program, Youthreach, provides an alternative route for early school-leavers (age 15–20 years) to receive second level qualifications and vocational training. These students experience social, economic and educational disadvantage (WRC Social and Economic Consultants, 2007). Therefore, interventions that will enhance the mental health and resilience of these young people and equip them with the cognitive, social and emotional skills for life, school and work are needed to ensure healthy development and positive outcomes (OECD, 2015). Although early school leavers are at high risk of experiencing mental health difficulties, previous studies suggest that an approach that focuses on promoting protective factors for positive mental health and wellbeing rather than treating mental health problems may be more acceptable to youth in AE (Fleming et al., 2010b; Fleming and Merry, 2012; Kussmanen et al., in press).

Teaching cognitive behavioral techniques to encourage healthier patterns of thinking and behavior decreases symptoms of anxiety and depression (James et al., 2015; Veitz et al., 2006). However, there is inconclusive evidence as to whether CBT delivered universally is effective in preventing depression in adolescents (Calker and Christensen, 2010). Nevertheless, computerized CBT delivered universally irrespective of risk has been shown to improve psychological wellbeing in healthy individuals (Powell et al., 2013). The delivery of computerized CBT within the AE setting has a number of advantages considering that resources are often limited and students may be reluctant to talk about mental health topics face-to-face due to perceived stigma (Fleming et al., 2010b). Because of stigma and social isolation, both students and staff also prefer universal delivery to a more targeted approach. Furthermore, many CBT programs include lessons around building self-esteem, stress reduction and coping, which have relevance for all youth.

One program that appears promising is SPARK-R CBT gaming program for promoting wellbeing and preventing low mood, stress and anxiety in youth. The program has a focus on managing strong emotions and teaching positive coping mechanisms, such as problem solving and help-seeking. SPARK-R is rich in multimedia and most text-based content is accompanied by audio, which is important considering common literacy difficulties among these students (WRC Social and Economic Consultants, 2007). Furthermore, elements of gaming utilized in SPARK-R, such as following a narrative, completing challenges and interacting with program characters, may improve engagement and facilitate learning (Wouters et al., 2012). Although the evidence on the effectiveness of serious games (“computerized interventions which utilize gaming for serious purposes” [Fleming et al., 2014, p. 1]) for improving mental health and wellbeing is still limited (Lau et al., 2017; Johnson et al., 2016), gaming interventions have shown promising results in the area of depression prevention and treatment (Fleming et al., 2014; Li et al., 2014).

SPARK-R is a revised version of the original SPARK CBT for depression in youth, which has been shown to reduce symptoms of depression in educationally alienated teenagers in comparison to a wait-list control condition (Child Depression Rating Scale Revised (CDRS-R) baseline to 5-week mean change =−1.47 versus −1.1, p = 0.001; Fleming et al., 2011). SPARK-R also has been found non-inferior to treatment-as-usual (face-to-face counselling) with adolescents (n = 187) at risk of developing depressive disorder (between group difference in CDRS-R improvement score 2.73 in favor of SPARK; 95% confidence interval −0.33 to 5.77, p = 0.079; Merry et al., 2012). Furthermore, qualitative feedback from young people who participated in SPARK (Fleming et al., 2016b) indicates that the program may promote the use of positive emotion regulation strategies, which are critical to healthy social functioning and emotional wellbeing (Zeman et al., 2006), where as poor emotion regulation skills have been linked to increased depression and anxiety in adolescents (Silk et al., 2003; Suveg and Zeman, 2004).

This pilot study examines the feasibility and potential impact of SPARK-R cCBT program when delivered as a universal intervention in an AE setting in Ireland. We hypothesized that participating in SPARK-R would lead to decreases in the mean level of symptoms of depression and anxiety, increases in mental wellbeing, and improvements in coping and emotion regulation skills among the students, with increased participation being linked to better outcomes.

The specific objectives of this pilot study were:

1. To examine the impact of SPARK-R on symptoms of depression and anxiety among a universal AE student population.
2. To examine the impact of SPARK-R on psychological wellbeing, coping and emotion regulation among a universal AE student population.
3. To explore user satisfaction and acceptability.
4. To explore the relationship between program engagement and outcomes.

As the effectiveness of SPARK-R has not yet been assessed in a RCT, the study provides important preliminary information on the potential impact of the program when delivered universally in AE settings, which can be used to aid in the planning of future larger scale trials. The study builds on a qualitative analysis of the requirements of Youthreach students and staff in relation to computerized mental health promotion (Kussmanen et al., in press), which was undertaken to inform program selection, implementation and evaluation.

2. Method

2.1. Study design

This study was conducted as a cluster RCT with each Youthreach Center randomized to an intervention condition (SPARK-R) or no-intervention control condition. The study design initially incorporated two intervention conditions, SPARK-R and MoodGYM (www.moodgym.anu.edu.au). However, the MoodGYM trial arm was stopped and excluded from the study because of students’ inability to complete the program due to literacy difficulties.

2.2. Intervention

2.2.1. SPARK-R

SPARK-R is a revised version of the original SPARK CBT-based self-help intervention, designed to treat symptoms of mild to moderate depression in adolescents seeking help for depression using a serious gaming approach (Merry et al., 2012). The content is in essence the same, however, SPARK-R is framed as a preventative program; instead of focusing exclusively on depression, SPARK-R is aimed for young people who ‘feel down, stressed or angry’ (Merry et al., 2014). The skills taught in SPARK-R include psychoeducation, relaxation skills, activity scheduling, problem solving, cognitive restructuring, interpersonal skills, help seeking, and dealing with strong emotions (Merry et al., 2012). SPARK-R incorporates elements of gaming, such as completing goals and challenges, presentation of a narrative and interaction with program characters, to facilitate learning. The program has seven sequential levels, each taking approximately 20–30 min to complete.

2.3. Participants

All Youthreach Centers (n = 110) were invited to take part in the study via email and/or phone. The coordinator was asked to select one class of students (aged 15–20 years) to take part in the study. In some
of the smaller Centers, all students were asked to take part in the study. As a universal exploratory study, strict inclusion/exclusion criteria were not used. All participants who provided consent were allowed to participate in the study. Informed consent was obtained from all individual participants via an online consent form. Parent/guardian assent was a requirement for students under the age of 18 years. Participants who scored above the predefined cut-off point (score of 11 or above on SMFQ and/or 10 or above on GAD-7) for moderate levels of depression or anxiety were allowed to carry on in the study but were also offered additional support according to the resources available at the Centers. Their parents were also informed. These students were not excluded from the analysis.

2.4 Ethics

The study was granted ethical approval by the National University of Ireland, Galway Research Ethics Committee (ref: 14/MAY/11).

2.5 Measures

Pre-assessment and post-assessment questionnaires were completed online through Survey Monkey.

2.5.1 Demographic variables

The participants were asked to state their gender, age and year of study.

2.5.2 Depression and anxiety

2.5.2.1 Depressive symptoms. Depressive symptoms were measured using the 13-item Short Mood and Feelings Questionnaire (SMFQ; Angold et al., 1995). The SMFQ asks how the respondent has been feeling or acting in the past two weeks (0 = not true, 1 = sometimes, 2 = true). Based on previous studies (McGinn et al., 2011; Stallard et al., 2013), participants with an overall score of five were categorized as being at risk and those scoring eleven or above were identified as having high levels of depression. The internal consistency of the measure in the current study was very high (Cronbach α = 0.91).

2.5.2.2 Generalized anxiety disorder. Generalized anxiety was measured using the seven-item General Anxiety Disorder Rating Scale (GAD-7; Spitzer et al., 2006). The respondents are asked to rate on a four-point scale (0 = not at all to 5 = nearly every day) how often they have been bothered by particular problems in the last two weeks. Overall scores range from 0 to 21 with higher scores indicating greater levels of anxiety symptoms. Very high levels of internal consistency (Cronbach α = 0.90) were associated with GAD-7 in the current study.

2.5.3 Wellbeing measures

2.5.3.1 General mental wellbeing. The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS; Tennant et al., 2007) consists of 14 positively phrased items asking the respondents to indicate how often they have felt or thought in a certain way in the last two weeks on a scale of 1 (never) to 5 (all of the time). The total score ranges from 14 to 70, with higher scores indicating higher levels of emotional wellbeing. The WEMWBS exhibited very high internal consistency (Cronbach α = 0.91) in this study.

2.5.3.2 Coping styles. A 15-item short form of Amirkhan’s (1995) Coping Strategy Indicator (CSI-5; Ellis, 2004) measures three types of coping: problem solving, seeking support and avoidance behaviors. The respondents are asked, on a scale of 1 (Never) to 6 (Always), how often they use specific ways to handle a stressful situation. Scores are calculated for each type of coping separately, with higher scores reflecting more frequent use of the corresponding coping strategy. The measure exhibited high internal consistency (Cronbach α = 0.84) in the current sample.

2.5.3.3 Emotion regulation. Emotion Regulation Questionnaire (ERQ: Gross and John, 2003) is a 10-item scale measuring cognitive reappraisal and expressive suppression. Cognitive reappraisal is an antecedent-focused strategy, which involves using cognitive strategies to redefine a situation so that its emotional impact is changed before the emotional response takes place. Expressive suppression is a maladaptive response-focused strategy, referring to consciously inhibiting behavioral responses to emotions. The ERQ asks the respondent to rate on a seven-point Likert-scale how much they agree with items such as ‘When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about’. The internal consistency of the measure was high (Cronbach α = 0.85) in the current study.

2.5.4 Acceptability

Program acceptability was measured using a structured implementation questionnaire adapted from a range of health evaluation studies and frameworks (Tennant et al., 2016b; Kawcz et al., 2007; Ritterband et al., 2011). Findings in relation to four elements of acceptability are reported in this study: 1) number of levels completed (self-reported), 2) overall satisfaction score (on a scale of 1 to 10), 3) perceived helpfulness and 4) extent of practicing the skills taught in the program. An adapted version of the CB1 Helpfulness Scale (Van Voorhees et al., 2009; Zabinski et al., 2001) was used to examine perceived helpfulness of the intervention. The participant is asked to rate on a scale of 1 (Very unhelpful) to 5 (Very helpful) the usefulness of the program in recognizing and changing behaviors, thoughts and emotions. Three items were added to the scale to reflect the contents of the program: confront issues or problems that I struggle with, ‘Feel better about myself’, and ‘Manage my feelings (for example anger, sadness, frustration)’. The frequency of practicing the techniques taught in the program was measured using a five-point scale (1 = never to 5 = almost every day) adapted from Kuyken et al. (2013). The scale was developed to match program content and included eight items; four items focusing on specific CBT techniques and one item each on: relaxation, activity scheduling, communication skills and problem solving.

2.6 Process

The intervention was delivered to groups of Youthreach students during scheduled class time. At each weekly class, the students completed one module of the program. The overall program completion time varied due to gaps in delivery because of mid-term breaks, other inconsistencies in the curriculum or student absenteeism. Although the program was delivered in class, each student progressed with the program at their own pace. If a student missed a class, he/she was able to complete the module another time in the Youthreach Center or just carry on where they left off at the next class. Assessment was taken at the beginning and when the students had completed the program. Students who did not complete the entire program, either because of running out of time or not wanting to continue taking part, were also asked to complete the post-assessment questionnaire. The majority, 80% of participants, completed the post-assessment questionnaire seven to eight weeks after completing the pre-assessment questionnaire. The control Centers were asked to complete the post-assessment questionnaire seven weeks after the pre-assessment. The researcher was present at the start of the program after which a staff member moderated the program. The researcher visited some Centers several times during technical issues. The staff members were provided with a Program Manual and Study Instructions with detailed information on the day-to-day roll out of the study and the completion of the online assessment questionnaires. Each participant was assigned with a program login and password. The staff delivering the program was provided with a list of each
student’s login details in case the students would forget them. The login also served as the participant ID. Participants were asked for their login when they completed the pre-intervention and post-intervention assessments.

2.7. Sample size

Original sample size calculations (power = 0.80, α = 0.05) were conducted for a three-arm cluster RCT with two intervention conditions (SPARX-R and MoodGYM). The study was powered to detect an absolute difference of 30% (Mery et al., 2012) from the mean SMQF value in the control arm. Based on a pilot study, we assumed the value in the control arm to be 7.80 (SD 6.30) and the difference in the means 2.34. Assuming an intraclass correlation of 0.02 (Calear et al., 2009), an average group size of nine students and an attrition rate of 30%, the calculations resulted in a desired sample size of 27 Centres (216 participants). The sample size was adjusted after excluding the MoodGYM arm to n = 144 or eight Centers with nine participants per condition.

2.8. Randomization

Randomization was conducted in clusters to avoid between-condition contamination and for practical reasons. Each Centre was randomly assigned a unique identification number after which they were randomized to intervention or control using the random number sequence function in Excel. The researcher was not blind to the randomization process.

2.9. Statistical analysis

Participants that provided data at post-assessment (n = 66) were included in the analysis. Missing items were not allowed in the online assessment for items of the outcome measures, however, they were allowed for items of user satisfaction. Intervention effects were analyzed using random-effects linear regression models, taking into account the correlation of multiple measurements within one participant and the clustering of the data. Univariate analyses on each outcome variable were adjusted for baseline score, gender and age. Center ID was included as a random factor in all models to reflect the clustered nature of the data. Estimates of treatment effect are presented as the adjusted difference in outcome between groups, along with 95% CI and p value.

Baseline differences between males and females were examined using independent samples t-tests. Random-effects linear regression models were fitted to compare the effect at treatment at post-intervention for each response, while adjusting for baseline, the correlation due to cluster membership and within-subject over time. A model was also fitted within the intervention condition to examine whether the participants who showed greatest use of the techniques taught in the program had better outcomes (Kuyken et al., 2013). Plots of the (standardized) residuals were used to assess underlying model assumptions. All analyses were conducted using R software (version 3.3.1).

3. Results

3.1. Participants

Centres were recruited to the study between June 2015 and October 2015. However, due to issues with scheduling, the last Centre did not start the program until May 2016. One Centre that participated in a qualitative stage of the study (Kassamareen et al., in press) was automatically included in the SPARX-R condition and the remaining twenty Centres were randomized into control (n = 9) or SPARX-R (n = 12). An additional eleven Centres were randomly assigned to deliver MoodGYM, however, this trial arm was stopped and thereafter received no intervention. In total, 146 participants from 16 Centres completed the pre-intervention assessment (SPARX-R: n = 92, Control: n = 54). The flow of participants is presented in Fig. 1. Attrition rates were high, with 45.2% of the participants assessed at post-intervention. Of the Centres that stayed in the study, 59% of students completed post-assessment. One Centre did not complete the user satisfaction questionnaire (n = 5).

3.2. Baseline analysis

Nearly half of the participants who provided baseline data were male (Table 1). The participants were between the ages of 15 and 20 years old (mean age 17.60 years). Most of the participants were first year students (50.7%) or second year students (38.3%). There were no significant demographic differences between participants who dropped out and those who completed the post-intervention assessment.

Of the sample at baseline, 36% were identified as being at risk for depression (SMQF > 5 and 24%) had high levels of depression (SMQF ≥ 11). Furthermore, 34% scored above the cut-off for generalized anxiety disorder (GAD-7 ≥ 10). There were statistically significant differences between males and females at baseline, with males scoring lower than females, on average, on symptoms of anxiety (mean difference = −2.74, p = 0.006) and depression (mean difference = −1.94, p = 0.05) and higher on general mental wellbeing (mean difference = 1.70, p = 0.04). Males were also significantly less likely than females to report using support seeking coping strategies (mean difference = −2.53, p = 0.003) and avoidant coping strategies (mean difference = −2.86, p = 0.01).

3.3. Outcome analysis

3.3.1. Depression and anxiety

Mean outcome scores at pre- and post-assessment and adjusted mean differences in outcomes are shown in Table 2. Both the intervention and control groups had a higher SMQF score at post-intervention than at baseline. The adjusted analysis at post-intervention showed a non-significant treatment effect (p = 0.34) of the magnitude of −1.46 units (95% CI = 4.76 to 1.83). No intervention effects were detected for symptoms of anxiety (p = 0.88). No significant correlation between baseline levels and intervention effects was detected on any of the outcome measures.

3.3.2. General mental wellbeing, coping and emotional regulation

There was no significant intervention effect on general mental wellbeing as measured by the WEMWBS (adjusted difference 0.78, 95% CI = 3.07 to 4.64, p = 0.66). The adjusted analysis at post-assessment showed differences in avoidant coping (−3.42, 95% CI = −7.05 to −0.22, p = 0.06), support seeking coping (1.88, 95% CI = 2.07 to 3.83, p = 0.31) and problem solving coping (0.97, 95% CI = −2.70 to 4.64, p = 0.56) in favor of the intervention condition, however, none of these changes reached statistical significance. The adjusted differences in expressive suppression scores between groups showed a significant difference in favor of the intervention condition (−2.07, 95% CI = −3.88 to −0.46, p = 0.03). A non-significant decrease in cognitive reappraisal in the intervention condition (adjusted difference = −0.93, 95% CI = −4.78 to 2.92, p = 0.60) was also detected.

3.4. Acceptability

3.4.1. Adherence and practice of skills

Participants completed on average 5.3 levels (70%) of SPARX-R with the majority (n = 26; 87%) completing four or more levels and 38% (n = 9) completing the entire program. Of the skills and strategies taught in SPARX-R, the most frequently practiced techniques were cognitive behavioral techniques; 65.2% reported having practiced recognizing personal negative thinking patterns, 65.2% tried stopping negative
practiced listening and negotiating skills (60.9%) or used the problem-solving strategies (56.5%) taught in SPARX-R. The least utilized techniques were activity scheduling and relaxation techniques. Of the participants, 16.7% stated that they had not practiced any of the techniques taught in SPARX-R and 25% had not practiced more than two of the techniques, and those only once or twice. Independent-samples t-tests suggested that at baseline students who had not practiced the techniques scored higher on depression (mean difference 1.1; p = 0.05) and anxiety (mean difference 2.7; p = 0.30) and had lower levels of psychological wellbeing (mean difference 0.08) than the rest of the students in the SPARX-R condition. However, these between-group differences in baseline scores were statistically non-significant.

3.4.2. Overall satisfaction and perceived helpfulness
SPARX-R received an overall satisfaction score of 6.0 (SD 2.76) out of 10. The program was rated most helpful in terms of confirming problems and recognizing negative thoughts followed by having more satisfying relationships and feeling better about oneself, with nearly half of the participants endorsing the helpfulness of SPARX-R on each of these items (Table 4). Approximately 40% reported SPARX-R being helpful in relation to managing and expressing emotions. A third (34.7%) of students thought SPARX-R was helpful in preventing negative thoughts affecting one’s mood. The program was rated least helpful in terms of changing behavior.

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
</table>

Table 1: Baseline characteristics by group.

<table>
<thead>
<tr>
<th></th>
<th>SPARX-R (n = 12)</th>
<th>Control (n = 54)</th>
<th>Total (n = 66)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>10/12</td>
<td>53/54</td>
<td>63/66</td>
</tr>
<tr>
<td>Male</td>
<td>2/12</td>
<td>2/54</td>
<td>4/66</td>
</tr>
<tr>
<td>Mean (SD) age</td>
<td>17.31 (1.24)</td>
<td>17.34 (1.24)</td>
<td>17.33 (1.24)</td>
</tr>
<tr>
<td>Year of study</td>
<td>53/35</td>
<td>53/35</td>
<td>53/35</td>
</tr>
<tr>
<td>1st</td>
<td>38/21</td>
<td>38/21</td>
<td>38/21</td>
</tr>
<tr>
<td>2nd</td>
<td>2/54</td>
<td>2/54</td>
<td>2/54</td>
</tr>
<tr>
<td>3rd</td>
<td>9/12</td>
<td>9/12</td>
<td>9/12</td>
</tr>
<tr>
<td>WAIWARS</td>
<td>40.96 (10.14)</td>
<td>40.96 (10.14)</td>
<td>40.96 (10.14)</td>
</tr>
<tr>
<td>SMQ</td>
<td>6.10 (5.66)</td>
<td>6.10 (5.66)</td>
<td>6.10 (5.66)</td>
</tr>
<tr>
<td>GAD-7</td>
<td>6.78 (5.66)</td>
<td>6.78 (5.66)</td>
<td>6.78 (5.66)</td>
</tr>
<tr>
<td>CS</td>
<td>13.24 (6.34)</td>
<td>13.24 (6.34)</td>
<td>13.24 (6.34)</td>
</tr>
<tr>
<td>SD</td>
<td>13.12 (5.03)</td>
<td>13.12 (5.03)</td>
<td>13.12 (5.03)</td>
</tr>
<tr>
<td>EQ</td>
<td>24.04 (9.37)</td>
<td>24.04 (9.37)</td>
<td>24.04 (9.37)</td>
</tr>
<tr>
<td>ES</td>
<td>15.60 (6.06)</td>
<td>15.60 (6.06)</td>
<td>15.60 (6.06)</td>
</tr>
</tbody>
</table>

(WAIWARS = Warwick-Edinburgh Mental Wellbeing Scale; SMQ = Self-Meets and Feelings Questionnaire; GAD-7 = Generalised Anxiety Disorder Scale; CS = Coping Strategies Indicator Aversion; CS-Table = Support Seeking Table; CS-Tids = Problem Solving Table; EQ = Emotion Regulation Questionnaire; Cognitive Reappraisal; EQ-ES = Emotional Suppression.)
Table 2

Primary and secondary outcomes by group at pre- and post-assessment and estimates of effect size.

<table>
<thead>
<tr>
<th>Outcome measure</th>
<th>Baseline (mean [SD])</th>
<th>Post-assessment (mean [SD])</th>
<th>Baseline (mean [SD])</th>
<th>Post-assessment (mean [SD])</th>
<th>Adjusted difference (95% CI, p-value) at post-assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMQF</td>
<td>6.33 (3.01)</td>
<td>6.77 (6.01)</td>
<td>8.01 (6.62)</td>
<td>8.09 (6.13)</td>
<td>-1.46 (4.76 to 6.83, p = 0.34)</td>
</tr>
<tr>
<td>GAD-7</td>
<td>7.09 (3.56)</td>
<td>7.20 (5.23)</td>
<td>8.07 (6.12)</td>
<td>8.11 (5.64)</td>
<td>-0.14 (3.53 to 2.32, p = 0.58)</td>
</tr>
<tr>
<td>WMIDS</td>
<td>46.17 (10.46)</td>
<td>45.97 (14.45)</td>
<td>42.75 (10.39)</td>
<td>42.17 (10.25)</td>
<td>0.78 (0.30 to 1.16, p = 0.66)</td>
</tr>
<tr>
<td>CS</td>
<td>18.02 (6.58)</td>
<td>14.36 (5.79)</td>
<td>17.17 (6.96)</td>
<td>18.41 (7.02)</td>
<td>-1.41 (2.70 to 0.86, p = 0.03)</td>
</tr>
<tr>
<td>ASa</td>
<td>9.87 (4.88)</td>
<td>11.73 (5.76)</td>
<td>12.17 (5.50)</td>
<td>13.08 (5.11)</td>
<td>1.88 (1.07 to 2.68, p = 0.11)</td>
</tr>
<tr>
<td>Perse</td>
<td>13.31 (5.07)</td>
<td>11.70 (5.32)</td>
<td>11.61 (5.35)</td>
<td>12.31 (5.22)</td>
<td>0.97 (0.44 to 2.45, p = 0.06)</td>
</tr>
<tr>
<td>ERQ</td>
<td>21.03 (8.19)</td>
<td>22.17 (8.19)</td>
<td>22.83 (7.92)</td>
<td>22.81 (7.72)</td>
<td>-0.95 (2.38 to 0.43, p = 0.00)</td>
</tr>
</tbody>
</table>

3.5. Relationship between practice and outcomes

Linear regression models were used to determine the frequency of utilizing the techniques taught in the program was linked to better outcomes. The interaction between frequency of practice and treatment effect was non-significant for all outcome measures except for support seeking coping (r = 0.39, p = 0.034), with those reporting more frequent use of the techniques also showing greater improvement in support seeking. Furthermore, more frequent practice of the techniques was significantly correlated with increased perceived helpfulness of the program (r = 0.43, p = 0.04).

4. Discussion

This pilot study examined the use of SPARK-RCBT at a universal intervention to promote mental health and wellbeing among adolescents attending AE in Ireland. Although effect sizes were non-significant for most outcome measures, the findings indicate that the program has an impact on decreasing maladaptive emotion regulation strategies. Additionally, the study highlights the benefits of using a gaming approach and not relying on text-based content, particularly when delivering computerized mental health programs for socially and educationally alienated adolescents. MostOMA, which has been successfully delivered with adolescents attending mainstream secondary schools (Calarci et al., 2009), could not be completed by adolescents of the same age group attending AE due to difficulties with literacy.

Reinforcing staff perceptions of a high prevalence of mental health difficulties among AE students (WRC Social and Economic Consultants, 2007), 66% of the participants at baseline (n = 146) were exhibiting heightened levels of depression (SMQF ≥5), nearly a quarter (24%) met caseness for depression (SMQF ≥11) and a third (34%) exhibited moderate levels of anxiety (GAD-7 ≥10). Furthermore, the participants in this study reported lower levels of mental health and wellbeing than their peers in mainstream education as reported in large scale international studies; mean WMIDS score of 45.99 in comparison to 48.8 in 13–16 year old secondary school students in UK and Scotland (n = 1650; Clarke et al., 2011); mean SMQF score 7.09 compared to 3.55–4.10 in secondary school students in the UK (n = 5030; Stallard et al., 2013); and mean GAD-7 score of 7.67 compared to 4.6 among Australian Year 9–10 students (n = 976; Wong et al., 2014). As in the above studies, female participants reported poorer mental health and wellbeing at baseline than males, which also is in line with a previous Irish national study on youth mental health and wellbeing (n = 4085; Deoley and Fitzgerald, 2012).

It is clear that there is a need for mental health promotion and prevention strategies among the AE students. However, the considerable variation in the level mental health difficulties among the sample population presents a challenge as to how to deliver programs that are relevant and helpful to all students, particularly, as AE students consider universal delivery less stigmatizing (Fennig et al., 2016b). Interventions that focus on protective factors for resilience and coping with challenges have relevance to all youth, enhance good mental health and psychological wellbeing, and also reduce risk factors for mental health problems and negative life outcomes (Clarke et al., 2015; Durlak et al., 2015). However, additional more targeted support is also needed for students exhibiting high levels of mental health problems, in which case, computerized programs could act as a bridge to seeking help from these sources.

The lack of significant findings (p = 0.05) in the current study can be attributed at least to the small sample size (n = 66) that, due to significant dropout, remained much below the original sample calculations. Comparing the adjusted differences at post-assessment, the intervention condition fared better on all but one of the outcome measures, with the reduction in expressive suppression being significant (adjusted difference = 2.97, 95% CI = 1.84 to 4.10, p = 0.003). Although a non-significant increase in symptoms of depression at post-assessment was detected in both conditions, this increase was greater in the control condition, adjusted difference = -2.19, 95% CI = -4.16 to 0.65, p = 0.17.

Table 3

Participants self-reported frequency of practicing techniques taught in SPARK-RC at post-intervention.

<table>
<thead>
<tr>
<th>Participants endorsing each response category (%)</th>
<th>n</th>
<th>Never</th>
<th>Once or twice</th>
<th>About once a week</th>
<th>Several times a week</th>
<th>Almost every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice relaxation techniques</td>
<td>24</td>
<td>58.0</td>
<td>25.0</td>
<td>16.7</td>
<td>8.3</td>
<td>-</td>
</tr>
<tr>
<td>Identified and made time for activities that make you feel better</td>
<td>23</td>
<td>52.2</td>
<td>29.2</td>
<td>17.4</td>
<td>8.3</td>
<td>-</td>
</tr>
<tr>
<td>Tried to stop negative thoughts</td>
<td>23</td>
<td>34.8</td>
<td>-</td>
<td>39.1</td>
<td>26.1</td>
<td>-</td>
</tr>
<tr>
<td>Practice kindness and regulation skills</td>
<td>23</td>
<td>39.1</td>
<td>23.9</td>
<td>27.3</td>
<td>13.0</td>
<td>-</td>
</tr>
<tr>
<td>Used STOPS to solve problems</td>
<td>23</td>
<td>43.5</td>
<td>26.1</td>
<td>13.0</td>
<td>17.4</td>
<td>-</td>
</tr>
<tr>
<td>Identified positive things about yourself and your future</td>
<td>23</td>
<td>36.4</td>
<td>26.1</td>
<td>27.3</td>
<td>13.0</td>
<td>-</td>
</tr>
<tr>
<td>Recognized your own negative automatic thoughts</td>
<td>23</td>
<td>34.8</td>
<td>26.1</td>
<td>13.0</td>
<td>26.1</td>
<td>-</td>
</tr>
<tr>
<td>Tried to stop negative thoughts for more positive ones</td>
<td>22</td>
<td>45.0</td>
<td>4.5</td>
<td>27.3</td>
<td>18.2</td>
<td>5.1</td>
</tr>
</tbody>
</table>
period in this study might have been too short to show significant impact. Merry et al. (2012) reported further improvement in symptoms of depression and anxiety between post-intervention to 3-month follow-up in adolescents taking part in SPARX.

It is also possible, that the changes detected on emotion regulation will have long-term positive effects on psychological wellbeing and symptoms of depression and anxiety that reach beyond the end of this trial. Expressive suppression has been linked to negative outcomes in youth, such as low social support and connectedness (Gross and John, 2003; Strizhavka et al., 2009), poorer self-esteem and life-satisfaction (Gross and John, 2003), depression (Betts et al., 2009; Larsen et al., 2013) and increased suicidality in the face of adversity (Kaplow et al., 2014). Although decreases in maladaptive expressive suppression were detected, equivalent increases in the more adaptive emotion regulation strategy, cognitive reappraisal, were not detected in this study. Further research is warranted to examine program impact on other adaptive strategies, such as increased self-awareness (Chambers et al., 2013), as well as the possible links between changes in emotion regulation and mental health and wellbeing in the long term.

However, it is clear that the effects of the intervention should be further explored in a sufficiently powered study including a follow-up assessment. Sample calculations should be conducted to allow for examining the impact of age, gender and baseline scores on outcomes, to better understand which young people most benefit from the program. The small sample size in this study did not allow analysis of differences in outcomes by gender or age. Previous studies have examined the effectiveness of SPARX delivered as a targeted program for adolescents with heightened symptoms of depression. In this study, SPARX-R was delivered universally, regardless of baseline levels of depression, which may have also contributed to the lack of significant findings, even though no significant interaction between baseline scores and intervention effect was detected.

Finally, low engagement rates reported in this study may have influenced program impact. Of the students who completed post-intervention assessment, 70% did not complete the entire program and over 40% reported practicing little to none of the techniques taught in the program. A better understanding of the factors contributing to disengagement, whether related to the user or the context of delivery, is needed to improve program uptake and impact. The findings from this study also suggest that those who are not utilizing the techniques may have poorer mental health and wellbeing at baseline, are less likely to improve on support seeking coping and are less likely to perceive the program as helpful. Further research is warranted to establish the link between degree of practice and outcomes, and to explore ways to promote practice of skills, for example by supplementing the program with face-to-face sessions or by providing opportunities for peer support online (No et al., 2016).

4.1 Limitations

Some of the limitations in this study include the small number of participants due to significant dropout, the lack of follow-up, the participating class of students having been selected by the Center staff and the use of self-report measures, particularly as literacy issues were prevalent amongst the study population.

5. Conclusions

Findings from this pilot study indicate that the delivery of computerized CBT in AE may be feasible, however, further trials with adequate sample sizes are warranted. Considering the extent of dropout in this study and lack of full completion, implementation research is also needed to evaluate how to support more effective delivery of computerized programs in the AE setting.

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References


Paper 4

The implementation of SPARX-R computerized mental health program in alternative education: Exploring the factors contributing to engagement and dropout

pp. 194-209

Kuosmanen, T.
Fleming, T. M.
Barry, M. M.

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Kuosmanen T., Fleming T.M., Barry M.M.

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ABSTRACT

Background: Computerized cognitive behavioral therapy (cCBT) has been shown to improve mental health and wellbeing in youth; however, high drop out and low engagement rates are reported in many studies. This study examined the factors that contribute to engagement and dropout with SPARX-R, a CBT program for preventing depression and improving wellbeing with a group of vulnerable 15-20 year olds attending alternative education (AE).

Methods: Students who took part in a randomized controlled trial (RCT) of SPARX-R completed a post-intervention implementation questionnaire (n = 28) and provided verbal or written feedback (n = 12) on their experience of the program. Furthermore, process evaluation questionnaires completed after each level of SPARX-R examined the views of participating students, including those who dropped out of the study. Staff views were also explored through a post-intervention questionnaire and interviews.

Results: The majority of the students considered SPARX-R easy to use and agreed that the program made sense to them. However, less than half of the participants reported that they liked the look of the program or considered it fun, and only a third reported that they would recommend SPARX-R to a friend. Those categorized as being at risk for depression, as assessed on the Short Moods and Feelings Questionnaire, rated the program higher in terms of its relevance and usefulness in comparison to those with no symptoms or clinical symptoms of depression. Technical issues, lengthiness and the lack of positive focus were the main reasons reported for negative reactions and disengagement with SPARX-R. Staff expressed a need for increased flexibility in delivery and complementing computerized programs with face-to-face activities to improve student engagement.

Conclusions: Computerized delivery can offer multiple benefits to mental health promotion and prevention in educational settings. Further research is needed to examine how such programs can be incorporated into existing approaches and made more positive and adaptable to support universal delivery for more vulnerable young people.

1. Introduction

The delivery of computerized cognitive behavioral therapy (cCBT) programs as a means of improving youth mental health and wellbeing and preventing depression and anxiety is receiving increasing attention. cCBT can be delivered offline (e.g. via a computer software or CD-ROM) online (e.g. website), or using a combination of online and offline approaches (e.g. an app). Computerized programs offer improved access to resources using a medium that is attractive and familiar to young people. These programs can also be delivered by non-mental health professionals with minimal training required for program moderators.

(Artwood, Meadows, Stallard, & Richardson, 2012; Richards & Hughes, 2016). There is increasing evidence showing that CBT programs are effective in reducing symptoms of depression and anxiety in youth (Coles, Chilman, Mackinnon, Griffiths, & O’Kearney, 2009; Poisson et al., 2013). However, the uptake of CBT programs has generally been disappointing, with high drop out and low engagement rates attributed to CBT (Chilman, Reynolds, & Griffiths, 2011). This indicates a need for implementation research to better understand the needs and preferences of young people and the factors determining engagement. The factors determining adherence are multifaceted, relating to the user (e.g. demographics, treatment expectations, motivation), the...
environment (e.g. access to computer, social support) and the program itself (e.g. mode of delivery, appearance, burden of use) (Strieterbund, Themidke, Cox, Kuznetzov, & Gonder-Frederick, 2009). Previous studies have suggested that better adherence to CBT is predicted by being female, higher education and higher depression and anxiety severity (Basterhaan, Neil, Bennett, Griffiths, & Christensen, 2008). In terms of program characteristics, the use of persuasive design (Otto-Robinson & Hjerpum, 2009) and features of gaming (Fleming et al., 2014; Fleming, De Bours et al., 2016), such as following a narrative, using visual imaginary and virtual characters, have been suggested to facilitate learning and improve engagement. Overall, providing support in program completion has been linked to greater adherence and better outcomes (Richardson & Richardson, 2012). When incorporating eHealth technologies to routine practice e.g. in health or educational settings, the Heliastic Framework to Improve the Uptake and Impact of eHealth Technologies (Van Gemert-Pijnen et al., 2011) highlights the importance of the fit between the technology, the requirements of the key stakeholders, and the context of delivery in determining program uptake and impact. Similarly, theories from implementation science, such as the Normalization Process Theory (Mair et al., 2012; May & Finch, 2009), emphasize that for new programs to be embedded and sustained in routine practice, they need to be considered worthwhile and to make sense in relation to current practices, and work needs to be carried out to facilitate their implementation including getting buy-in and organisational support and providing staff training.

Considering the complexity of the factors determining program engagement, implementation research needs to go beyond examining program acceptability, exploring how well the program responds to the specific needs and preferences of the target audience (Van Gemert-Pijnen et al., 2011), in also examine what implementation factors, such as adherence, program fidelity and moderator support, may moderate program impact (Durlak, Weissberg, Dymnicki, Taylor, & Schinke, 2011). This information is important in terms of understanding how programs should be developed to maximize engagement and impact and to understand what makes for good quality implementation (Weare, 2015). However, there is limited research to date examining young people’s views of computerized mental health programs and cCBT, which could be used to improve the relevance of such programs to young people.

This study reports on the implementation findings from a RCT study (n = 146; Kusumam, Fleming, Newell, & Barry, 2017) examining the effectiveness of a cCBT program, SPARX-R (version 1.0; Merry, Fleming, Stukas, Shepherd, & Lucassen, 2013), delivered universally to AE students (age 15-20 years) in Ireland. Research on the delivery of cCBT universally to promote positive mental health and prevent mental health difficulties in all students is limited (Clarke, Kusumam, & Barry, 2015). However, universal delivery improves reach and can be less stigmatizing for the students (Fleming, Lucassen, Stukas, Shepherd, & Merry, 2016; Weare, 2015). Furthermore, few studies have examined the implementation of cCBT for more vulnerable youth, such as those who have left mainstream education and are attending AE. Early school leaving3 is linked to a variety of factors, such as dysfunctional family backgrounds and socioeconomic disadvantage (Gumkär, Stain, & Jacobs, 1997; Jimmerson, Egeland, Stinff, & Carlson, 2000), which can result in a heightened risk for mental health difficulties and poor social and health outcomes in adulthood (Fuchsmberg & Ruggles, 2007; Kaplan, Dumphson, & Kaplan, 1994).

SPARX-R aims to prevent symptoms of depression and improve emotion regulation, problem solving and interpersonal skills in young people. The program incorporates elements of gaming, such as completing goals and challenges, and the presentation of a narrative and interaction with program characters. SPARX-R is a revised version of the original SPARX cCBT for depression, which has been shown to be non-inferior to treatment as usual (mainly face-to-face CBT; Merry et al., 2012) and effective in reducing symptoms of depression and acceptable to youth attending AE in New Zealand (Fleming, Dism, Frampton, & Merry, 2011; Fleming, Lucassen, et al., 2015). In previous studies, SPARX has received positive feedback for having a youth friendly and interactive design, emphasizing user control and increasing accessibility to support (Fleming, Lucassen, et al., 2016; Lucassen, Merry, Hatcher, & Frampton, 2015; Merry et al., 2012). However, AE students in New Zealand expressed a preference for universal delivery of cCBT and for a program that does not solely focus on depression (Fleming, Lucassen et al., 2016), thus leading to the development of the prevention focused SPARX-R. Australian youth who viewed a trailer of SPARX considered the program more appealing for boys and those who play computer games (Chedi, et al., 2014).

In our RCT, SPARX-R was found to have positive impact on students’ emotion regulation strategies, with expressive suppression decreasing significantly in comparison to co-intervention control (z = 2.97, 95% CI = −5.48 to −1.46, p = 0.03; Kusumam, Fleming, et al., 2017). However, no significant improvements were detected on general mental wellbeing, depression, anxiety or coping strategies. Similar to other effectiveness studies, high dropout and low engagement rates were reported, with 56% of students dropping out of the study and only 30% of students completing the entire program. Few studies to date have explored the reasons for such high levels of attrition or have explored participating students’ views regarding their experience of program implementation. The current study aims to examine the factors, whether program, context or student related, that contributed to student engagement and dropout in this trial.

Drawing from the Heliastic Framework (Van Gemert-Pijnen et al., 2011), this study builds on an exploratory Requirements Analysis of the needs and preferences of AE students and staff in relation to program look, content and implementation (Kusumam, Fleming, & Barry, 2017). In the Requirement Analysis, we found that AE students and staff have quite specific requirements that need to be met in delivering computerized mental health programs, arising from issues with low levels of literacy and concentration, and the vulnerability of the students. Thus, programs need to be customizable, fun and interactive and not text-heavy, use a positive strengths-based approach and ensure confidentiality and optional attendance. Staff need to be able to monitor and support students and require structure and timetabling to ensure sustained delivery, while also allowing for flexibility in delivery taking into consideration the needs of individual students. In the current study, program acceptability was assessed through examining how well the program met these values and requirements expressed by AE students and staff.

The aim of this study was, therefore, to examine factors affecting the implementation of SPARX-R cCBT in the context of AE. The objectives of the study were:

1. To examine user satisfaction and acceptability of SPARX-R.
2. To explore staff perceptions on SPARX-R and its delivery in the context of AE.
3. To examine factors related to the program and/or the context of delivery that may have contributed towards disenagement and discontinuation of the program and AE students.
4. To identify the optimal way of delivering cCBT in the context of AE in order to improve student engagement.

2 Methods

There were three components to this implementation study: 1) Process evaluation questionnaires were completed by students after each level of the program. The aim of these questionnaires was to explore the views and reactions of the students, including those who dropped out and did not complete the entire program, to the initial
levels of the program; 2) The study participants’ views on SPARK-R were examined via post-intervention implementation questionnaires, complemented by qualitative feedback; 3) Staff views on SPARK-R and its implementation were explored via a moderator questionnaire completed at the end of the program. These data were augmented with qualitative staff interviews.

2.1. Setting
Youthreach delivers national primary and second level curriculum and examinations and vocational training for early school-leavers age 15–20 years in Ireland (Department of Education and Skills, 2010). On average, the students spend two years at the Centers on a full-time basis and receive an allowance from the government for attending the program. The curriculum is more flexible than in mainstream education, the class sizes are smaller and more one-to-one support is available (CHL Consulting Company, 2006). Personal, educational and social challenges are common among students, with an estimated half of the students coming from dysfunctional family backgrounds, nearly a third (32%) having difficulties with literacy and numeracy and 30% being in need of psychological support (WRC Social and Economic Consultants, 2007).

2.2. Intervention
SPARK-R (version 1.0) is a revised version of the original SPARK CBT-based self-help intervention, designed to treat symptoms of mild to moderate depression in adolescents seeking help for depression using a serious gaming approach (Merry et al., 2012). SPARK was developed and has been adapted for a variety of minority youth populations using a co-design approach with young people, mental health professionals, cultural advisors, learning and behavior change experts and a computer game development company (Fleming, Dixon, & Merry, 2012; Lucassen et al., 2013; Shepherd et al., 2015). The content of SPARK and SPARK-R is in essence the same; however, SPARK-R is framed as a prevention program by targeting feelings of anger, stress and feeling low rather than depression, thus making it more suitable for universal delivery. The skills taught in SPARK-R include psycheducation, relaxation skills, activity scheduling, problem solving, cognitive restructuring, interpersonal skills, help seeking, and dealing with strong emotions. The program has seven sequential levels, each lasting approximately 20–30 min to complete. In the current study, SPARK-R was accessed offline via a computer software installed on the Youthreach Center computers. SPARK-R was delivered as part of the curriculum, participants accessing the program as a group in a computer lab, each participant working on their individual computer.

2.3. Participants
The study participants consisted of all students (age 15–20 years) who took part in a pilot trial of SPARK-R (Kooiman, Fleming, et al., 2017). All Youthreach Centers nationally (n = 116) were originally invited to take part in the pilot trial. In each individual Center, the program coordinator was advised to select one class of approximately eight students to participate in the study. Nine Youthreach Centers (n = 92 students, 48.5% male, mean age 17.75 years) were set to start SPARK-R and completed the pre-intervention assessment. Of these, 30 students from five Centers completed the post-intervention outcome assessment, but not necessarily all levels of the program, and were asked to complete the post-intervention implementation questionnaire. Six of the nine Centers who completed pre-intervention assessment were invited to take part in post-intervention discussions. The three remaining Centers were excluded because of not having started the program due to technical issues (n = 1 Center) or the Center closing for the summer period (n = 2 Centers). Staff from all Centers that started SPARK-R was asked to complete the moderator questionnaire at post-intervention. In one Center, the program was led by the researcher, as requested by staff.

2.4. Procedure
All questionnaires were completed online using Survey Monkey. The program moderator provided students with a separate link for the online assessments.

2.4.1. Student post-intervention implementation questionnaire
Post-intervention implementation questionnaires (Online supplement 1) were completed at the end of program delivery. The questionnaire was adapted from a range of eHealth evaluation studies (Fleming, Lucassen et al., 2016; Kavoli, Yamanaka, & Nakayama, 2007; Van Voorthuysen et al., 2009) and the original requirements analysts (Kooiman, Fleming, & Barry, 2017). Student views were explored using five-point likert-style questions on five areas: 1) Engagement; 2) Ease of use; 3) Relevance; 4) Usability and 5) Overall satisfaction. In terms of overall satisfaction, participants were also asked to rate the program on a scale of 1 to 10. Additionally, participants were asked whether they supported universal or targeted delivery of SPARK-R. Program likes and dislikes were examined in open-ended questions.

2.4.2. Process evaluation questionnaires
Process evaluation questionnaires (Online supplement 2) were completed directly after each level of the program. The aim was to explore the views and reactions of students who participated in the program, including those who dropped out and did not complete the entire program. The questionnaire consisted of five-point likert-type questions on ease of use, enjoyment, usefulness, acquisition of knowledge and intention to use the knowledge, and adverse effects. Furthermore, open-ended questions were included to examine program likes and dislikes.

2.4.3. Student discussion
Student views were further explored through different forms of discussion (group discussion, interviews) or written feedback. These mixed methods were chosen to best fit the wishes and availability of the students in each Center. The protocol for open-ended feedback was similar to the post-intervention questionnaire, exploring participant views on the SPARK-R specifically (program look, content and implementation), and the role of computerized mental health resources in general. The discussions were between 15 and 35 min in length and held during class time.

2.4.4. Staff questionnaire and interviews
The moderating staff completed a questionnaire after completing program delivery (Online supplement 3). Open-ended and likert-type questions were used to explore five aspects: 1) Student engagement; 2) Usability; 3) Program implementation; 4) Overall satisfaction and 5) Views on computerized delivery in general. Furthermore, the moderating staff member from three Centers were interviewed either face-to-face or via telephone to further explore these aspects of program implementation.

2.5. Analysis
Quantitative data from student and staff questionnaires were analyzed using SPSS and open-ended responses were analyzed using thematic analysis. Differences in user views by gender, three categories of pre-intervention levels of depression and type of delivery (researcher/staff) were explored in terms of trends, while being aware of the need for a larger sample for examining statistical differences. Baseline depression levels were determined using the Short Mood and Feelings Questionnaire (SMFQ; Angold et al., 1995), with SMFQ < 5 indicating no symptoms, SMFQ between 5 and 10 indicating a risk of depression
and SMQ > 10 indicating clinical symptoms of depression (Hallbø et al., 2012). The student and staff discussions were audio recorded and transcribed by the researcher (TK) and analyzed separately using the six phases of thematic analysis as described by Braun and Clarke (2006). A semantic ‘theoretical’ approach was used to look in patterns in the data and interpreting these patterns with specific predefined research questions of interest in mind. First, the researcher (TK) familiarized herself with the data by reading the transcripts from student and staff discussions several times. Initial codes and patterns were generated, which were then grouped together to identify overarching themes. The themes were then reviewed and the dataset was reread to ascertain that no important data was missed during the initial coding and to ensure that the identified themes were representative of the data. Although only a small number of student discussions were held, the identified themes were similar across the three Centers and between the staff and student discussions, and also reflected the findings from the post intervention questionnaires, thus indicating data saturation. The data that were not coded (approximately 10%) included segments where the meaning was not clear and general discussion between students that was unrelated to the topic. The themes and subthemes were refined several times and reviewed with a second researcher (MB), and finally, the findings were written up.

2.6. Ethics

Informed consent was obtained from all individual participants. Parents/guardian consent was a requirement for students under the age of 18 years. The study was granted ethical approval by the National University of Ireland, Galway Research Ethics Committee (ref: 14/ MAX/113).

3. Results

3.1. Student post-intervention implementation questionnaire

Implementation data at post-intervention was available for 28 (mean age 17.32 years, 32.1% male) of the 30 students who completed SPARK-R. Of the students at baseline, 41.4% indicated having no symptoms of depression, 25.2% were categorized as being at risk, and 29.2% indicated having clinical levels of depression. The researcher delivered the program to eight of the participants (28.6%). The findings from the post intervention questionnaire are summarized in Table 1.

3.1.1. Look and feel

Less than half of the participants agreed that they liked the look of SPARK-R (46.5%) or that they thought that the program was fun (36.2%). Although more than half (55.6%) of the participants considered the program interesting, nearly a half (46.5%) also indicated that they found the program boring.

3.1.2. Ease of use

Most of the participants considered SPARK-R easy to use, with 71.4% agreeing that the language was easy to understand, 75.9% agreeing that they understood what they were supposed to do on the program, and 71.4% agreeing that their computer skills were adequate for using the program. However, a quarter (20.8%) of the participants also agreed that it was difficult for them to find their way around the program, with another 28.6% of participants agreeing that the program was a ‘lot of work’ and over a third (35.7%) agreeing that the modules were too long. Almost a half (42.8%) of the participants had felt annoyed or frustrated going through the program.

3.1.3. Relevance and usefulness

The majority of participants (60.7%) agreed that the program lessons ‘made sense’ to them, however, less than half (42.9%) considered the program personally relevant by agreeing that lessons related well to their own lives. Even a smaller minority considered the program useful/worth doing (35.3%). Additionally, 28.6% indicated that they had used the advice provided by the program in their own life and 42.9% agreed that they had learned something new from the program.

3.1.4. Satisfactions

On a scale of 0 to 10, SPARK-R received a mean overall satisfaction score of 5.78 (SD 2.79). Although more than half of the participants (53.6%) considered the program helpful for a young person who is going through a tough time, only a third (32.2%) indicated that they would recommend the program to a friend. A minority (10.7%) indicated that the program was upsetting and a quarter (25%) stated that they were worried about privacy.

3.1.5. Program likes and dislikes

The participants mentioned three aspects of SPARK-R that they liked: 1) the gamifying elements, such as customizing your avatar and completing challenges, 2) ease of use, and 3) helpfulness, particularly around managing emotions. In terms of dislikes, the participants referred to the program being boring and too easy to play, having too much talk/writing, being too slow, the need for more customization, and the advice being too ‘hard going’ (i.e., difficult to deal with) by focusing mainly on negative aspects of mental health.

3.1.6. Universal vs. targeted delivery

Over half of the participants (51.4%) indicated that if SPARK-R was
delivered in AQ it should be delivered universally to all students. A third of the participants supported targeted delivery for those who are feeling down or depressed, and the rest (71.3%) did not think SPARX-R should be delivered at AQ.

3.1.7 Differences in user views by group characteristics

More males (55.6%) than females (42.1%) agreed that they liked the look of SPARX-R, whereas a bigger proportion of females than males considered SPARX-R personally relevant (47.4% vs. 33.6%) and useful (47.4% vs. 22.6%).

Those being categorized as being at risk of depression (SNMP score between 5 and 10) rated the program more positively on almost all the items of the implementation questionnaire compared to those with no symptoms and those with clinical levels of symptoms of depression.

Furthermore, more participants in the ‘at risk’ — category reported the program useful/worth doing (57.0% vs. 30.0%) of those with no symptoms and 28.0% of those with clinical symptoms.

In the one Center, where SPARX-R was researcher led, participants gave SPARX-R a significantly higher mean score compared to those Centers where SPARX-R was led by staff (8.22 vs. 4.56, p < 0.000).

The majority of participants from this one Center agreed that they liked the look of the program (70.0%) and that the program was fun (60.0%), with only 28.0% indicating that they considered the program boring. Of the participants from the Centers where the program was delivered by staff, only 33.3% liked the look of the program, 27.8% considered the program fun, and more than half indicated that the program was boring (61.1%).

3.2 Process evaluation questionnaires

Of the students who completed pre-intervention assessment (n = 923), 30 students completed post-intervention assessment and 28 students also completed the post-intervention implementation questionnaire. Of the students who completed pre-intervention assessment, 72% (n = 66 students from five Centers) evaluated the best level of SPARX-R with only three students completing the last level evaluation questionnaire. Two of these Centers completed the entire program (Centers 1 and 2, n = 36 students). Two centers (Centers 3 and 4, n = 24 students) completed three levels before dropping out because of negative reactions towards the program from students and inconsistencies in delivery because of student absenteeism and gaps in the curriculum. Center 5 (n = 6 students) completed only one level of SPARX-R, after which they dropped out because of students’ unwillingness to take part.

In regards to user views on the first level of SPARX-R, there were no clear differences between the individual students who did or did not complete the post-intervention assessment. However, some differences between Centers were detected (Table 2). Students from two of the Centers who dropped out (Centers 3 and Center 5) were more likely to find the level long and significantly less likely to agree that the level was useful (p = 0.033) or that they had learnt something new (p = 0.003) or were insisting to see what they had learnt (p = 0.04), than students from the Centers that completed the program. However, students from Center 4, who also dropped out of the study, rated the first level as positively as those who had completed the program, with all students agreeing that the level was easy to use, nearly all (88.9%) agreeing it was enjoyable and two thirds (66.7%) considering it useful.

The biggest loss of participants was between levels 1 and 2, with 49.3% of participants who completed the first process evaluation questionnaire not completing the second evaluation questionnaire. It is unclear whether the students also discontinued with the program. No clear patterns emerged when comparing user satisfaction ratings between levels, with most levels rated as easy to use, enjoyable and useful by the majority of participants. The final levels were rated somewhat more positively than other levels, which could be due to those students who were less satisfied with the program having already dropped out.

3.3. Student discussions

Student discussions (n = 12, 67% male) were held in two Centers. One of these discussions was undertaken as a group discussion and in the other Center four students were interviewed individually as the students considered this more comfortable than group discussion. Furthermore, students (n = 5) from one additional Center gave written feedback, as the staff was unable to organise oral discussion. Students participating in the discussions were divided in their views of SPARX-R, with students from two of the Centers being very positive about the program and considering it helpful (SPARX-R was led by the researcher in Center A, and in Center B, the researcher led four of the seven levels). Students from the third Center (Center C) did not like the program or did not find it personally helpful. The following themes were elicited from the student transcripts and are also presented in Table 3.

3.3.1. The game is fun and easy to learn from

The students who were more positive about SPARX-R expressed that playing a serious game like SPARX-R was easy to learn from and fun. The game being activity-based and interactive and wanting to progress from one level to the next kept the students engaged. The gaming approach was considered to assist learning and concentration.

“... where I remembered most of the information is the actual game” (F, Center B).

One male student considered the gaming approach childish.

3.3.2. Technical limitations and lengthiness caused disengagement

According to the students, technical and design limitations caused annoyance and frustration while going through the program. These included actual technical issues (the game freezing or not saving progress) and limitations in terms of design or gaming (graphics not being up-to-date, the character moving or reacting slowly and lack of interaction). Students were also critical of the excessive amount of text or talking on the program, the program being repetitive in places and not allowing the user to skip sections. The students stated that “long parts” (M, Center A) and having to read information that you “just want to know” (M, Center B), particularly while not being in the right mood, caused disengagement.

3.3.3. SPARX-R can be helpful for young people

Those students who expressed that SPARX-R was helpful referred to
<table>
<thead>
<tr>
<th>Overall theme</th>
<th>Subtheme(s)</th>
<th>Illustrative quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>The game is fun and easy to learn from</td>
<td>Playing the game was enjoyable</td>
<td>“It is different and a bit of a crack (tact)?”</td>
</tr>
<tr>
<td></td>
<td>Interactivity improved learning and concentration</td>
<td>“That’s where I remembered most of the information in the actual game”</td>
</tr>
<tr>
<td>Technical limitations and length hampered enjoyment</td>
<td>Technical issues caused frustration</td>
<td>“I’d have to keep at it”</td>
</tr>
<tr>
<td></td>
<td>Limited in terms of design pacing</td>
<td>“My team’s too slow to react”</td>
</tr>
<tr>
<td>SPARK-R can be helpful for young people</td>
<td>SPARK-R was personally helpful</td>
<td>“It helped me anyway to think about things before I do it”</td>
</tr>
<tr>
<td></td>
<td>SPARK-R wasn’t personally helpful because of not being depressed</td>
<td>“It doesn’t allow you to be happy. There is no positive emotion”</td>
</tr>
<tr>
<td>Focusing on depression encourages negative feelings</td>
<td>Universal delivery of eCBT can reduce stigma and mental isolation</td>
<td>“...if everybody else is doing it as well it won’t feel like they are the only one person who is depressed”</td>
</tr>
<tr>
<td>Compressed mental health programs should be delivered universally</td>
<td>Mental health is relevant to all young people</td>
<td>“... if it was just people that felt depressed, they’d feel embarrassed if people saw them going into a room doing it...”</td>
</tr>
<tr>
<td>eCBT makes mental health support more accessible</td>
<td>Talking about feelings can be difficult to some young people</td>
<td>“That’s where I remembered most of the information in the actual game”</td>
</tr>
</tbody>
</table>

Students expressed that they should have the freedom to discontinue with the program if they no wished:

“Everybody should give it a try and if they don’t like it, they should stop away from it.”

(M, Center A)

The possible disadvantage of universal delivery, however, as expressed by one male student, was that including students who may not be interested in the program might cause discomforts for others.

3.3.6. eCBT makes mental health support more accessible

Computerized mental health programs were considered to potentially improve access to mental health support by using a medium that is accessible and familiar to young people. Computerized delivery was considered particularly beneficial for more reserved young people, who might be ‘embarrassed’ or ‘afraid to talk’ (M, Center A) about their feelings. To improve access, students reported that universal delivery within the AE setting should be complemented with access from home and through mobile phones.

One of the participants reflected that SPARK-R “taught exactly the same thing as a psychologist would” (F, Center B), thus making the program relevant for those who are on a waiting list to see a counselor. However, the computer was considered to be more informal and thus more relatable than going to a counselor:

“It was like he was your friend.”

(F, Center B)

3.4. Staff views

Six staff moderators from six of the nine Centers completed the moderator questionnaires at post-intervention. Two of these Centers completed the entire program and rated it overall more positively. Four Centers did not complete the entire program with two of these Centers reporting very low student engagement and user satisfaction. The moderating staff members (n = 3) from these Centers were also interviewed. The findings from staff interviews will be presented alongside the findings from the questionnaires.

3.4.1. Overall satisfaction

SPARK-R received an overall mean rating of 5 out of 10 (SD 3.60) from staff. There was considerable variability in the scores, ranging from 3 to 10, with half of the staff giving the program a score of four or below and the other half rating the program at seven or above. These
who gave SPARKS-R a higher rating, also reported that they would probably or definitely deliver SPARKS-R again in their Center and agreed that they would recommend the program to a young person. Those who gave SPARKS-R a score below four, did not consider delivering SPARKS-R in its current form again in their Center, and disagreed that they would recommend the program to a young person.

3.4.2. Student engagement

Half of the staff agreed that the language was appropriate to students’ reading level and four of the six staff agreed that students found the program easy to use. None of the staff indicated that there were issues with confidentiality or privacy.

Staff from two of the six Centers indicated high student engagement with SPARKS-R and the gaming approach:

"...if they disliked it or weren't comfortable with it, they would have walked away. So, the fact that they see through and completed it really is a big testament to it."

Staff moderators from two Centers that dropped out, disagreed that students became engaged with SPARKS-R.

The reasons for disengagement as reported by staff included the program not being age appropriate (“Some of our students are over 18 and must feel that the game was too childish for them”), the lack of fit between content and style of delivery (“The game seemed to be inflexible whereas the content was serious”) and the content being too negatively focused. Staff expressed that “students were sensitive to the repeated questioning of how they feel” and that due to the vulnerability of the students, there was a need for a more positive approach focusing on enhancing student well-being:

"...our students have been exposed to many adults and I feel they need a program to be more positive."

Finally, the staff expressed that the presence of students with negative views on the program may have influenced the engagement of others:

"The people who I felt benefited the most from it were the girls who had mental issues and I was concerned that the girls that didn't see themselves at times or sort of giving the occasional negative comment..."

3.4.3. Confidence

Staff from four Centers considered SPARKS-R relevant to the lives of the students with these staff members also considering it useful. The program was considered helpful for students in terms of identifying negative thinking patterns, improving coping with stressful situations, increasing mental health awareness and improving students' skills in regulating and talking about their feelings. Half of the staff indicated that they would recommend the program to a young person going through a tough time.

The two staff members that reported low student engagement did not consider the program relevant and helpful and strongly agreed that the program brought up negative feelings among the students. However, one staff member expressed that regardless of students' negative reactions to the program, critiquing and conversing about the program with other students had indirect benefits:

"This appears to have added to their ability in having now to a new program of work experience, they appear to have a more positive attitude."

3.4.4. Implementation of SPARKS-R

None of the staff members indicated that they did not feel confident in delivering the program. Nevertheless, some staff stated that they felt more comfortable when the research was present and that they should have prepared more prior to program delivery, for example, by completing the program themselves. Only the staff from the two Centers who had completed the program agreed that the program fitted well with the class timetable.

All staff indicated that they had faced technical issues going through the program. This caused frustration and anxiety among the students and influenced the timing of program delivery. Some staff expressed that the program lost momentum due to inconsistent or delayed delivery due to student absences, inconsistencies in the curriculum or staff members being sick.

3.4.5. Role of computerized mental health programs in AE

The use of technology and the gaming approach was considered a medium that the young people can relate to and bring variety to existing teaching methods. Computerized programs were seen as being particularly relevant for more shy or reserved students, particularly males, who were less confident about talking openly about their feelings.

"They [male students] switched on to it really quickly...girls and is still...and support each other..."

All staff supported universal delivery. Nonetheless, staff brought attention to the importance of careful selection of participants to ensure positive student engagement. Selecting those students, who are interested in taking part, taking into consideration possible stressful life events, and giving a choice to the students whether or not to take part, were considered vital.

Due to the issues with student attendance and inconsistencies in the week-to-week timetable of the Centers, the staff expressed a particular need for structure in delivering computerized mental health programs by establishing the program as a regular part of the curriculum, with a specific time and class of students. To improve student engagement and program impact staff suggested that computerized programs should be complemented with other teaching methodologies and discussion:

"There was no format for students to discuss the issues raised...I would plan a whole session around a topic that had a mix of teaching methodologies with the game as one aspect."

One staff member particularly expressed that some students, who were not interested in computers in general, found the program difficult to engage with and would have preferred face-to-face discussion. To facilitate this, staff required a program manual with a format for discussion. Integrating the program to face-to-face sessions would also make monitoring student reactions and providing support easier. Furthermore, the staff established a need to have professional mental health support available in case of adverse reactions.

On the other hand, one staff member expressed that the program would work better in a mainstream secondary school setting, which by nature is more structured than AE and does not have similar issues with student attendance. For an AE setting, delivering shorter programs over a few consecutive days focusing on a specific theme was considered more feasible and effective.

4. Discussion

The findings suggest that AE students and staff are interested in a computerized approach for promoting mental health and well-being and consider that such an approach should be delivered universally. Few studies to date have examined, in detail, student views on the implementation of computerized mental health programs. The user views reported in this study are in line with the requirements previously expressed by AE students and staff in Ireland (Koestenbaum, Fleming & Barry, 2017). The findings indicate that increased tailoring of program look and content, together with a focus on positive mental health and building social and emotional skills, could improve the relevance of such programs when delivered universally to all students. Furthermore, the study highlights the importance of contextual factors in determining user views and the successful delivery of computerized mental health programs. The universal delivery of computerized programs in the educational setting can supplement existing supports and teaching approaches, however, guidelines on optimizing the implementation of such programs in the educational setting requires further inquiry.

Our finding that very few participants considered SPARKS-R difficult to understand is encouraging considering the low levels of literacy among these students, due to which other programs have proven
inappropriate (Koszumska, Fleming, et al., 2017). However, considering that less than half of the participants agreed that they liked the look of the program and that it was personally relevant or useful, it is clear that the program design and content could be further adapted to make it more suitable for universal delivery in AE settings. At the same time, it is important to consider that the technical issues reported by all participating Centers may have influenced student views on SPARX-R overall. From a developmental perspective, this highlights the need for significant funding and greater collaboration to enable continuous updates as technology changes and the expectations of technology grow.

Some students considered the focus on negative thinking patterns unhelpful and counter-productive. This highlights the need for computerized programs not to be overly ‘negative’ and to focus on building strengths and social and emotional skills. Although the terminology used in SPARX-R has been changed to be more suitable for universal delivery (i.e., instead of depression, SPARX-R targets anger and feeling low), the content is still in essence the same as in the original SPARX eCIT for depression, and further changes may be necessary if the program is delivered universally. Universal delivery of strength-based interventions is in line with the principles of best practice in school based mental health promotion and prevention (Vissu & Nind, 2011). Programs aiming to build social and emotional skills have been shown to be effective in improving positive mental health and wellbeing and reducing risk factors for mental health disorders when delivered face-to-face to young people in school and out-of-school settings (Barry, Clarke, Moreelle, & Field, 2017; Clarke, Moreelle, Field, Humein, & Barry, 2015; Durkształt et al., 2011). However, although online strengths-based interventions show potential when used with adults (ition et al., 2014; Bolier et al., 2013), delivering such programs to young people needs to be studied further.

The finding that SPARX-R had particular relevance for these students, who were at risk of depression, is not surprising considering that the program aims to prevent symptoms of depression. However, it also suggests that although students preferred universal delivery, there is a need for both targeted and universal approaches within the AE setting. One of the challenges of universal delivery is engaging people with differing needs and expectations. This has implications for future program development, as contemporary technology can be made customisable, allowing one program to have several pathways based on user needs and preferences. Therefore, computerised programs could be delivered universally while addressing both mental health problems (so that those with difficulties are not stigmatised) and the positive mental health of all students. Newer versions of SPARX-R in development are taking into consideration the findings from this study.

The participants from these Centers where the program was researched rather than staff led viewed the program more positively. Whether these findings are a result of response bias due to the researcher being present or because of the increased support and guidance provided by the researcher is unclear. However, combined with some staff reporting that they felt more comfortable when the researcher was present, these findings indicate a need for further staff training to increase confidence in intervention delivery and to raise awareness of the purpose and role of the interventions in relation to existing practices. Professionals working with young people have previously reported a need for guidelines on how to promote youth mental health and wellbeing as well as training in the use of online mental health resources in order to use technology for promoting youth mental health (Clarke, Chambers, & Barry, 2017). Although computerised programs are mostly automated, and, in theory, need limited input from moderators, providing adequate support from motivated and capable moderators may improve student engagement, particularly as staff in the current study was interested in complementing computerized programs with group discussion. Further research is required to examine how staff can be better trained and supported in program delivery and how different ways of delivering the program, i.e., by AE staff or by dedicated personnel with and without discussion, may influence program satisfaction and effectiveness.

The lack of significant differences between the views of those students who did and did not drop out of the study indicates that the decision to leave the study may have been made by the Center rather than the individual students. There were two main reasons for the Center deciding to stop program delivery: students’ unwillingness to engage with the program and difficulties in fitting the program in the Center curriculum. The AE setting is by nature less structured than mainstream education and therefore, improved flexibility in program delivery is needed (Koszumska, Fleming & Barry, 2017) to ensure that programs are responsive to the needs of the students and fit into the timetable of each individual Center. This could be done, for example, by building the program as a collection of short modules that could be delivered as separate entities or as a combined course. At the same time, providing a more structured and supported environment for program delivery by building such programs into a dedicated mental health curriculum could increase sustainable delivery. Staff recognized that complementing the program with face-to-face activities and discussion is a way of improving student engagement. Combined with the findings in relation to the need for further staff training, this has important implications for developing teacher training and program manuals that would provide guidelines for program delivery and a format for discussion, when delivering computerized programs in educational settings.

Students required privacy and improved accessibility for computerized mental health programs, both from home and through mobile phones. For the purpose of this study, access to SPARX-R was provided through a CD-ROM. In New Zealand, SPARX is freely accessible to the public online. Providing programs online would allow for home access, however, online access also brings challenges in terms of providing adequate support in a timely manner in the case of possible crisis situations. On the other hand, students considered the delivery in the context of the AE setting also important, to ensure that those unlikely to access the program at home are provided with support. Further research is required to develop programs that are designed for delivery in the AE setting while having components that are accessible from home.

4.2. Limitations

Due to the small sample size in this study, the findings should be interpreted cautiously. It should also be noted that the researcher’s involvement with program delivery might have caused bias in user views. One of the authors (TF) was involved in the development of SPARX-R; however, she was not involved in data collection or analysis. The variability in the format of student qualitative feedback (written and oral) limits the interpretability of the findings. Furthermore, the low completion rate of process evaluation questionnaires limits the conclusions that can be drawn from these data.

5. Conclusions

The findings from this study indicate that a gaming approach such as SPARX-R is both easy to use and understandable for young people with low levels of literacy, such as those attending AE. However, in order to improve engagement and reduce the risk for negative reactions among this vulnerable group of young people, program content needs to be more positive, focusing on building social and emotional skills and competencies. The findings also highlight the importance of implementation factors in terms of sustained program delivery. In the context of AE, there is a need for increased flexibility in program delivery as well as combining computerized programs with more ‘hands-on’ face-to-face approaches. Furthermore, there is a need for increased training and support, and the provision of teaching manuals along with computerized programs, to improve communication and awareness among the moderating staff. A greater focus on implementation research to examine the many factors that may influence program delivery and
impact in real life conditions is required in evaluation studies. Furthermore, rapid testing and subsequent development are necessary as users prefer technology and change.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.childyouth.2017.11.002.

Acknowledgements

The authors wish to acknowledge the collaboration of the Youthreach Centre staff and students who took part in the study. This work was supported by the Humanities PhD Research Scholarship, National University of Ireland, Galway.

Declaration of interest

The authors have no conflicts of interest to declare.

References


## Student Post-intervention Implementation Questionnaire

Please tick to show how much you agree/disagree with each statement.

### Engagement

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I liked the look of the programme</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Going through the programme was fun</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I found the programme interesting</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I found the programme boring</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### Ease of use

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The language was easy to understand</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I understood what I was supposed to do</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>It was difficult to find my way around the programme</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Going through the programme was 'a lot of work'</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The lessons were too long</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I felt annoyed/frustrated going through the programme</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My computer skills are good enough for using the programme</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### Relevance

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The lessons in the programme 'made sense' to me</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The lessons related well to my own life</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### Usefulness

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think the programme was useful/worth doing</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I have used the tips and advice in my own life</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I learned something new from the programme</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Satisfaction

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would recommend SPARX to a friend</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPARX is helpful for a young person who is going through a tough time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I found the programme upsetting</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I was worried about privacy when using SPARX</td>
<td></td>
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</tr>
</tbody>
</table>

Overall, on a scale of 1-10 (1 = poor, 10 = excellent) how would you rate the programme?

<table>
<thead>
<tr>
<th>Poor</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If SPARX was made available in Youthreach Centre, who do you think should take part in it?

- Everyone attending Youthreach
- Only those who are feeling low or depressed
- I don’t think SPARX should be made available in Youthreach Centres

What did you like MOST about SPARX?

What did you NOT like about SPARX?

Is there anything you would change about the programme?

Is there anything else you would like to say about the programme?
Process Evaluation Questionnaire

1. What is your user name?

2. Which level of SPARX did you complete today?
   - Level 1 (Cave Province)
   - Level 2 (Ice Province)
   - Level 3 (Volcano Province)
   - Level 4 (Mountain Province)
   - Level 5 (Swamp Province)
   - Level 6 (Bridgeland Province)
   - Level 7 (Canyon Province)

3. How did you find the length of the module?
   - It was too long
   - It was just the right length
   - It was too short

4. How user friendly did you find this level? Please tick one box after each statement.

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I found this level easy to use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I found this level easy to understand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I found this level easy to read</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. How much do you agree with the following statements? (Please tick one box after each statement)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoyed this level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I found this level useful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I learnt something new going through this level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I intend to use what I have learnt in my own life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This level brought up sad/angry feelings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. What was your favourite thing about this level?


7. What was your LEAST favourite thing about this level?


8. Do you have any other comments?


Online Supplement 3.

Staff Questionnaire

1. Engagement

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students became engaged with the programme</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The language was appropriate to the reading level of the students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students found the programme easy to use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The programme brought up negative feelings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students were concerned about confidentiality/privacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please comment

2. Usefulness

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The topics were relevant to the lives of the students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The programme was useful/worth doing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would recommend the programme to a young person going through a tough time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. In your opinion, what was the most useful part of the programme content?


4. Please describe any changes you may have noticed in students since taking part in the programme (e.g. changes in behaviour, concentration, academic achievement).


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5. Implementation

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The levels fitted in well with the class timetable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We did not face many technical issues going through the programme</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I felt confident in delivering the programme</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please comment

6. Please briefly describe any issues you may have faced that had an impact on the delivery of the programme.

Please comment

7. If the programme was delivered in Youthreach Centres in the future, who should take part in it?
   - All students
   - Only students with depression or anxiety problems
   - Neither

Please comment

8. Would you consider delivering the programme at your Centre in the future?
   - Definitely
   - Probably
   - Probably not
   - Definitely not
   - Not sure

Please comment

9. What was your favourite aspect of the programme?

10. What was your LEAST favourite aspect of the programme?
11. How could the programme be improved?

12. In your opinion, what are the advantages of delivering a computerised mental health programme at Youthreach Centres?

13. Can you think of disadvantages/limitations of computerised mental health programmes?

14. Overall, on a scale of 1-10, how would you rate the programme?

<table>
<thead>
<tr>
<th>Poor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Excellent</th>
</tr>
</thead>
</table>

15. Do you have any additional comments in relation to the programme?
Appendices
List of appendices

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>Summary of eHealth evaluation frameworks</td>
<td>213</td>
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<td>2</td>
<td>Recruitment email for Youthreach Coordinators (<em>Paper II</em>)</td>
<td>216</td>
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<tr>
<td>3</td>
<td>Study information package for staff (<em>Paper II</em>)</td>
<td>217</td>
</tr>
<tr>
<td>4A</td>
<td>Information sheets and consent forms (<em>Paper II</em>)</td>
<td>227</td>
</tr>
<tr>
<td>4B</td>
<td>Information sheets and consent forms (<em>Papers III and IV</em>)</td>
<td>234</td>
</tr>
<tr>
<td>5</td>
<td>Study information for SPARX-R Centres (<em>Papers III and IV</em>)</td>
<td>240</td>
</tr>
<tr>
<td>6</td>
<td>SPARX-R Manual</td>
<td>243</td>
</tr>
<tr>
<td>7</td>
<td>Student discussion protocol (<em>Paper II</em>)</td>
<td>249</td>
</tr>
<tr>
<td>8</td>
<td>Student Information Questionnaire (<em>Paper II</em>)</td>
<td>252</td>
</tr>
<tr>
<td>9</td>
<td>Staff discussion protocol (<em>Paper II</em>)</td>
<td>254</td>
</tr>
<tr>
<td>10</td>
<td>Staff Information Questionnaire (<em>Paper II</em>)</td>
<td>256</td>
</tr>
<tr>
<td>11</td>
<td>CBT Helpfulness Scale (<em>Paper III</em>)</td>
<td>259</td>
</tr>
<tr>
<td>12</td>
<td>Frequency of practice measure (<em>Paper III</em>)</td>
<td>260</td>
</tr>
<tr>
<td>13</td>
<td>Student post-intervention discussion protocol (<em>Paper IV</em>)</td>
<td>261</td>
</tr>
</tbody>
</table>
### Appendix 1. Summary of eHealth evaluation frameworks

<table>
<thead>
<tr>
<th>Title, author, year</th>
<th>Description</th>
<th>Strategies and principles</th>
<th>Foundations</th>
</tr>
</thead>
</table>
| **Dynamic Framework for Evaluating Collaborative Adaptive Interactive Technologies**<br>O’Grady et al., 2009 | Framework of parameters to consider when evaluating collaborative, adaptive, and interactive online applications focusing especially on the social and dynamic qualities of Web 2.0 applications | Evaluation framework divided into three evaluation phases (formative, summative and outcome) and five categories:  
- People (user parameters)  
- Content (text, images, multimedia)  
- Technology (technology used to create and run the programme)  
- Computer-Mediated Interaction (user interactions with and via the interface)  
- Health Systems Integration (incorporation in to the larger system) | Based on a comprehensive review of literature on evaluation frameworks for consumer health sites and descriptions of adaptive, Web-based technologies |
| **Continuous Evaluation of Evolving Behavioural Intervention Technologies (CEEBIT)**<br>Mohr et al., 2013 | Methodological approach for rapid evaluation of multiple computerised behavioural interventions or evolving versions at the same time, in order to keep up with rapid changes in technology and consumer expectations | Addresses how to evaluate online behavioural interventions effectively and efficiently  
A method of evaluating multiple interventions provided by one deployment system at the same time. The system would:  
1) Acquire outcome and usage data  
2) Identify inferior interventions  
3) Allocate consumers to interventions  
4) Remove inferior interventions from the system | Not mentioned |
| **Spiral Technology Action Research (STAR) Model**<br>Skinner et al., 2006 | An integrated model for the development, implementation and evaluation of eHealth promotion programmes | Continuous evaluation and development, user-centred design and participatory action research, community development and empowerment, capacity building, community ownership of the resource  
Groups technological and community development processes into five development cycles:  
1) Listen  
2) Plan  
3) Do  
4) Study  
5) Act  
Pays particular attention to making the resource accessible and relevant to the target audience’s literacy levels and patterns of technology use | Uses action research to integrate ICT development, health promotion principles, behaviour change theories, quality improvement and community mobilisation practices  
The model evolved and was refined through experiences of the TeenNet youth health promotion initiative |
| **Design and evaluation guidelines for**<br> | Presents guidelines and recommendations | A set of guidelines in relation to:  
1) Design process  
2) Addresses limitations in | Builds on the literature in the area and a series |
| **mental health technologies** | ns in relation to the design and evaluation of mental health technologies in a mental healthcare setting | accessing clients in a mental healthcare setting and strategies for collaborative design with therapists  
2) Design factors  
Therapeutic models, client factors, privacy  
3) Evaluation guidelines | of mental health technology development projects (Personal Investigator, Playwrite, Mobile Mood Diary, My Mobile Story) |
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<tr>
<td><strong>Behaviour Change Model for Internet Interventions</strong></td>
<td>A model to help guide Internet intervention development and predict and explain behaviour changes and symptom improvement produced by Internet interventions</td>
<td>Nine nonlinear interconnected steps that produce behaviour change and symptom improvement: user characteristics, environmental factors, website characteristics, user support, website use, mechanisms of change, behaviour change, symptom improvement and treatment maintenance. All these components contain areas that can be observed, evaluated and manipulated.</td>
<td>Informed by theories from various disciplines including theories of motivation, social marketing/advertising, web-based design/development, information architecture and design, and models of knowledge transfer and behaviour change. Also draws from empirical findings and clinical experience.</td>
</tr>
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</table>
| **Khoja-Durrani-Scott Framework for e-Health Evaluation** | Presents a conceptual framework for developing an eHealth evaluation tool to examine and measure factors that play a role in the success of eHealth technologies | Maps different evaluation themes and associated factors at different stages of the eHealth development life cycle (development, implementation, integration, sustained operation).  
Themes of evaluation:  
• Health service outcomes  
• Technology outcomes  
• Economic outcomes  
• Behavioural and sociotechnical outcomes  
• Ethical outcomes  
• Readiness and change outcomes  
• Policy outcomes | Based on literature review of existing eHealth evaluation theories and concepts and consolidation with an expert panel of e-Health researchers from 12 Asian countries who were part of the PAN Asian Collaborative for Evidence-based eHealth Adoption and Application (PANACEA) |
| **A framework for the participatory design of evidence-based online youth mental** | A framework and a practical guide to include young people as co-designers in the design process of | Key principles:  
• Young people included as active participants (co-designers) throughout the design process  
• Interventions evaluated from young people’s point of | Based on participatory design literature and Inspire Foundation projects |

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<table>
<thead>
<tr>
<th><strong>Holistic Framework to Improve the Uptake and Impact of eHealth Technologies</strong></th>
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<tr>
<td><strong>Van Gemert-Pijnen et al., 2011</strong></td>
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</table>
| A holistic approach to the development of eHealth technologies aiming to boost their uptake and impact  
Practical guide to help plan, coordinate, and execute the participatory development process of eHealth technologies |
| Six working principles:  
1) Stakeholder participation  
2) Continuous evaluation cycles  
3) Implementation research  
4) eHealth technology results in organisational changes  
5) Persuasive design technologies  
6) Advanced methods to assess impact |
| Development a cyclic process of ideation, designing, building, and evaluating that should be led by a multidisciplinary research and development team |
| Research and development activities:  
• Contextual inquiry  
• Value specification  
• Design  
• Operationalisation  
• Summative evaluation |
| This framework builds on a critical review of existing eHealth frameworks, on empirical research and multidisciplinary theories from psychology, communication, and human-computer interaction design (persuasive technology, human-centred design, business modelling)  
Framework based on holistic principles, i.e. human, environmental and technology factors closely interconnected. |

<table>
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<tr>
<th><strong>Health Interventions</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Hagen et al., 2012</strong></td>
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</table>
| online mental health interventions  
Intervention developers and researchers |
| view, whether they are meaningful relevant and engaging and their potential benefit/harm to their mental health  
Use of participatory methods and generative and evaluative cycles. |
| Six phases of design process:  
1) Identify  
2) Define  
3) Position  
4) Concept  
5) Create  
6) Use |
| Six working principles:  
1) Stakeholder participation  
2) Continuous evaluation cycles  
3) Implementation research  
4) eHealth technology results in organisational changes  
5) Persuasive design technologies  
6) Advanced methods to assess impact |
| Development a cyclic process of ideation, designing, building, and evaluating that should be led by a multidisciplinary research and development team |
| Research and development activities:  
• Contextual inquiry  
• Value specification  
• Design  
• Operationalisation  
• Summative evaluation |
Appendix 2. Recruitment email for Youthreach Coordinators
(Paper II)

Dear [name of Youthreach Coordinator],

I am a doctoral student examining the use of online technologies for supporting young people’s mental health and wellbeing. I am conducting my research in the Health Promotion Research Centre (HPRC), NUI Galway under the supervision of Professor Margaret Barry. My study explores the use of an online mental health promotion programme, MoodGYM, in the context of Youthreach Centres. MoodGYM is an Australian online depression prevention programme that has been proven to be effective in improving wellbeing and reducing symptoms of depression and anxiety in young people. Please see the Information sheet attached for further information on the study.

I have been in contact with the National Co-ordinator for Youthreach, Mr. Gerard Griffin, who gives his support for the study. I am now contacting each Youthreach Centre to enquire about your willingness to take part in the study. I would also be grateful if you could provide me with some more information about your Centre to better plan for the implementation the study. At first, I would like to know what mental health promotion programmes or supports are already in place at your centre. Secondly, could you tell me about the computer facilities in your centre in order to determine how many trainees could take part in the intervention at any one time? I am hoping to implement Phase 1 of the study in autumn 2014 and Phase 2 in spring 2015.

I will follow up with a phone call in the coming week, where we can discuss participating in the study more thoroughly. In the meantime, you can contact me by email t.kuosmanen1@nuigalway.ie or by phone xxxx.

Yours sincerely,

Tuuli Kuosmanen

Tuuli Kuosmanen
Doctorate Student
WHO Collaborating Centre for Health Promotion Research
School of Health Sciences
National University of Ireland, Galway
Galway, Ireland

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Appendix 3. Staff Information package (Paper II)

Study Information Sheet

“Using technology to promote young people’s mental health and wellbeing”

This doctorate study examines the use of online technologies for supporting young people’s mental health and wellbeing in the context of Youthreach, Ireland’s Second-Chance Education Programme. It is being conducted at the Health Promotion Research Centre (HPRC), National University of Ireland, Galway under the supervision of Professor Margaret Barry.

Background to the study
There is increasing evidence that technologies can be used effectively in improving mental health and wellbeing. The advantages of online delivery include anonymity and privacy, improved access to services and cost-effectiveness. Using online technologies with young people is especially promising due to the high levels of technology use among this population. In an educational setting, online programmes have the advantage that they can be delivered without any specialist training. Furthermore, the privacy offered by online programmes means that they are less vulnerable to classroom dynamics. At the same time, offering participants support in completing the programme increases engagement rates and improves outcomes.

Aims and objectives
This study examines the use and delivery of an online mental health promotion programme, MoodGYM or SPARX, in the context of Youthreach, Ireland’s national second-chance education programme for early school leavers aged 15-20 years. The objectives of the study are:

- To examine the needs and preferences of Youthreach staff and students in relation to online mental health promotion
- To explore the optimal way of delivering online mental health promotion interventions in the context of Youthreach
- To assess the immediate and long term effects of an online mental health programme on young people’s mental health and well-being
- To assess user satisfaction and acceptability of an online mental health promotion programme

What are MoodGYM and SPARX?
MoodGYM is an interactive online depression prevention programme developed by researchers at the National Institute for Mental Health Research at the Australian National University. It is based on techniques of cognitive behavioural therapy (CBT). The programme consists of 5 modules each taking 20-40 minutes to complete. It has been proven to be effective in improving wellbeing and reducing symptoms of depression and anxiety in young people.
For more information on the programme please visit https://moodgym.anu.edu.au/.

**SPARX** is an innovative online game, designed for young people to decrease symptoms of depression and increase wellbeing. It is also based on CBT and has been developed at the University of Auckland, New Zealand. It has seven modules, each taking approximately 20-30 minutes to completed. It has been found to be effective in reducing symptoms of depression in young people attending alternative education in New Zealand, with high levels of user satisfaction. Based on the views of young people, a revised version of SPARX has been developed. Like its predecessor, SPARX-R aims to teach young people important social and emotional lifeskills. However, it is less exclusive about depression and therefore more appealing to a wider audience of young people. For more information on this programme please visit https://research.sparx.org.nz/about.

**How is the study conducted?**
This will be a mixed methods study conducted in two phases.

**Phase 1** explores the needs and preferences of the Youthreach staff and trainees in relation to the implementation of online mental health promotion programmes. The aim of this phase is to

1) Explore young people’s needs and preferences in relation to receiving support for their mental health and wellbeing online
2) Select the programme that is more appropriate for use in Youthreach Centres
3) Identify possible barriers and supports to the delivery of online programmes in Youthreach Centres.

This phase will consist of focus groups with Youthreach staff and participatory workshops with Youthreach trainees. The staff and trainees will be introduced to two online programmes, MoodGYM and SPARX. Based on their views, the more appropriate programme will be selected for evaluation in Phase 2. With the participants’ consent, the focus groups and workshops will be audio recorded. The focus groups and workshops will be held at four Youthreach Centres in rural and urban areas in Ireland. The programme will also be run and tested in these Youthreach Centres prior to implementing the second phase of the study.

**Phase 2** will examine the use and impact of MoodGYM/SPARX in the context of Youthreach Centres. This phase will be conducted as a randomised control trial, with Centres being randomly assigned to either receive the intervention or act as a control. The Centres that serve as the control have the possibility to deliver the programme to their trainees after the study has finished. The programme will be completed online during class time over the period of five to seven weeks. The programme can be delivered as part of on-going mental health promotion programmes, or other relevant modules being thought at the Centre. The tutors will act as moderators who will monitor the completion of each module and answer any incidental questions. The moderators will be provided with programme manuals.
All participants (including control) will complete a pre-intervention assessment questionnaire one week before the beginning of the trial, directly after the intervention and at 6 months follow-up. These assessment questionnaires will measure participants’ levels of psychological wellbeing (e.g. self-esteem, satisfaction with life) and symptoms of depression. The questionnaires will be completed online using Survey Monkey. Furthermore, user satisfaction questionnaires will be filled in by the moderators and the students after each module of the programme.

**What will happen to the study results?**
The findings from the study will be written up in the form of a doctoral thesis and submitted to the National University of Ireland, Galway. The study results will also be in International peer-reviewed journals. All participating Centres will be provided with a report of the findings. This study will be used to inform the delivery of online mental health promotion interventions at Youthreach Centres in Ireland. It is hoped that the participating Centres will benefit from taking part in the study by being able to incorporate online mental health promotion programmes in their curriculum in the future.

The study is funded by the NUI Galway Hardiman Research Scholarships. It has been granted ethical approval by the NUI Galway Research Ethics Committee (eithne.connell@nuigalway.ie).

If require any further information please contact the researcher Tuuli Kuosmanen:

Phone xxxx
Email t.kuosmanen1@nuigalway.ie
Address Health Promotion Research Centre
Aras na Coiribe
National University of Ireland, Galway
Preparing for PHASE 1

Staff focus groups

Before meeting with the young people, I wish to meet with some of the Youthreach staff members to explore their views on:

1) The needs of the young people attending your Centre in relation to their mental health and wellbeing
2) The relevance of the two specific online programmes, MoodGYM and SPARX
3) The delivery of such programmes at your Centre.

The focus groups will take approximately 1 hour. Any relevant staff members, such as Youthreach Coordinators, Tutors (SPHE or other) and Counsellors can attend the focus group.

Before the focus groups

Before attending the focus groups, I would like to ask you to familiarise yourself with both of the programmes, so that we can better discuss your views on these resources. Please spend about 15min on each programme. You can spend more time viewing the programmes if you wish. You can access the programmes through the following links:

**SPARX:**
Please go to the website [www.linkedwelsness.com/playsparxnow/](http://www.linkedwelsness.com/playsparxnow/). Click on Play SPARX now on the top right corner. In order to play the game, you will be asked to install the Unity Web Player, by clicking on the icon and following the instructions. This should take less than a minute. Wait until the game downloads. The young people will be introduced to a slightly different version of the programme, SPARX-R, which is less exclusive about depression and instead talks about low mood. However, this will give you an idea of what the programme looks like.

**MoodGYM:**
Please go to the website [www.moodgym.anu.edu.au](http://www.moodgym.anu.edu.au). Click on Login – Registered users. Your username is YRCork and password corkLSS. I have created an account for you so that you will not have to spend time registering for the programme yourself. However, if you prefer you may also create a personal account to test the programme. You can do this by going on the main page and clicking on Login – New Users.

If you need any assistance with the programmes, please do not hesitate to contact me.

Youth participatory workshops
The Youth Participatory Workshops are designed to explore young people’s needs and preferences in relation to online mental health promotion and their views on the two specific programmes. The workshop will take approximately 1h 30min. Please find a draft of the Workshop Protocol attached for your information. There is likely to be some changes to this protocol.

What is needed for the workshop?

The workshop should be held in a room with computer facilities and Internet connection. The participants will work in pairs, and one computer will be needed for each pair. The participants will not be asked to view the two programmes prior to attending the workshop. It is also that a member of Youthreach staff could accompany the researcher for the workshop, if at all possible.

Recruiting young people for the workshop

Ideally the group of young people, who will take part in this workshop, will also go through the programme when it is being implemented at your Centre. It is up to you to select the group of young people you wish to take part in the study. The group should consist of approximately 8-10 young people.

- **Participant Information Sheets and Consent** – I have attached participant Information Sheets and Consent Forms to this letter. Please hand these out to the group at least a week before the workshop, so that they will have ample time to decide whether they wish to take part. If the participants have difficulties with understanding written text, I would also ask you to please offer to read the Information Sheet to them. If they are happy to take part in the study, they will be asked to sign the Consent Form and bring it to the workshop. When I meet with young people, I will explain the study to them and answer any questions to make sure that the participants understand what is being asked of them. Consent Forms will be collected after this.

- **Parental Consent** – Each participant under the age of 18 years will need permission from the parents to take part in the study. I have attached parental Information Sheets and Consent Forms to this letter. These are “passive” Consent Forms, meaning that parents are asked to return the form if they DO NOT wish their child to take part in the study. Please deliver these to the parents/guardians of the under aged participants preferably at least two weeks before the workshop is due to take place.
What is MoodGYM?

MoodGYM is a free, interactive online depression prevention programme. It was developed by researchers at the National Institute for Mental Health Research at the Australian National University. MoodGYM is the most robustly studied online depression prevention programme to date. It has been proven to be effective in improving wellbeing and reducing symptoms of depression and anxiety in young people. MoodGYM has over 16 000 users across the world and has been translated into 4 languages.

MoodGYM is based on techniques of cognitive behavioural therapy (CBT). It also demonstrates the relationship between thoughts and emotions, and works through dealing with stress and relationship break-ups, as well as teaching relaxation and meditation techniques. MoodGYM explores issues such as:

- Why you feel the way you do
- Changing the way you think
- Changing warped thoughts
- Knowing what makes you upset
- Assertiveness and interpersonal skills training

For more information on the programme please visit [https://moodgym.anu.edu.au/](https://moodgym.anu.edu.au/).

The structure of MoodGYM

MoodGYM consists of five modules, an interactive game, anxiety and depression assessments, downloadable relaxation audio, a workbook and feedback assessment. The modules take 25-40 min to complete and are designed to be completed in order. Each module starts with an anxiety and depression assessment and ends with a summary of the module.

You can find a User's Guide with more detailed information on the programme structure by login in to the programme.

<table>
<thead>
<tr>
<th>Module 1: Feelings</th>
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<tr>
<td>&quot;Why you feel the way you do&quot;</td>
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|  |
| Introduction to programme |
| Depression and anxiety assessment |
| Recognising personal negative thinking patterns |
| Learning about the link between thoughts and feelings |

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<tr>
<th>Module 2: Thoughts</th>
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<tr>
<td>&quot;Changing the way we think&quot;</td>
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| Module 3: Unwarping  
“Changing warped thoughts” |
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<tr>
<td>- Recognising and challenging “warpy” thoughts</td>
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<td>- Identifying personal vulnerabilities</td>
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<td>- Improving self-esteem</td>
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| Module 4: De-stressing  
“Knowing what makes you upset” |
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<tbody>
<tr>
<td>- Learning ways to modify negative thinking</td>
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<tr>
<td>- Improving own areas of vulnerability</td>
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<tr>
<td>- Recognising the activities which bring you enjoyment</td>
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| Module 5: Relationships  
“Relationships and how they work out” |
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<tr>
<td>- Identifying personal stressors</td>
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<td>- Examining family relationships</td>
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<td>- Relaxation exercises</td>
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<tbody>
<tr>
<td>Learning about relationships</td>
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<tr>
<td>Developing problem solving skills</td>
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</table>
What is SPARX?
SPARX is an innovative online game designed to treat and prevent depression in young people. It has been developed in the University of Auckland, New Zealand. At the moment, only New Zealand residents can freely access the programme online. SPARX is based on Cognitive Behavioural Therapy (CBT), helping young people recognise the links between their thoughts, behavior and feelings.

There are several studies showing that SPARX is effective in reducing symptoms of depression and increasing wellbeing in young people. The programme has also been found to be effective in reducing symptoms of depression in young people attending alternative education in New Zealand, with high levels of user satisfaction. Furthermore, there are several planned and ongoing studies on the effectiveness of SPARX around the world including United Kingdom, North America and Australia.

Based on the views of young people, a revised version of SPARX has been developed. Like its predecessor, SPARX-R aims to teach young people important social and emotional lifeskills. However, it is less exclusive about depression and therefore more appealing to a wider audience of young people. For more information on this programme and the research behind it please visit https://research.sparx.org.nz/about.

The structure of SPARX
At the beginning and end of each module, the user interacts, in the first person, with a character called the 'Guide', who provides psychoeducation, gauges mood, recaps previous module’s content and sets the agenda for the current module. The user is then transported to the ‘game world’ to undertake interactive challenges. The user returns to the Guide who puts the skills learnt in the game world into a ‘real life’ context and asks the user to complete short interactive exercises to augment the learning.

SPARX has seven modules (levels), which need to be completed sequentially (The system tracks individual’s progress). Each level covers different core skills for managing mood and overcoming mild to moderate depression.

Each module is set in a different ‘Province’, which reflects the skills it aims to cover. For example, problem solving is taught in the ‘Mountain Province’ using the technique of STEPS (say what the problem is, think of solutions, examine these ideas, pick one, see what happens) in order to climb a mountain.

SPARX is rich in multimedia. The graphics have a three-dimensional (3D) appearance. In the ‘game world’ the user navigates an avatar, which they choose and customise. The user moves the avatar using a computer mouse. There are a number of interactive dialogues between the avatar and non-playing characters (i.e. the characters pre-programmed in the software). All dialogues have voice-overs supplemented by text on screen. In each module, the user has to complete a series of interactive and animated puzzles or quests, e.g. solve a riddle, answer a question correctly, or find a hidden object. In the direct teaching area the Guide speaks directly to the young person (along with text displayed on screen) and the user is asked to
complete interactive and animated exercises (e.g. drag-and-drop exercises).

Skills that SPARX covers:

i) Scheduling activities to improve mood
ii) Problem solving
iii) Learning to recognise automatic thoughts
iv) Stopping negative/unhelpful thoughts
v) Changing unhelpful thoughts into helpful ones
vi) Relaxation and self-calming techniques
vii) Interpersonal and communication skills

SPARX modules
SPARX consists of seven levels or modules, with each level covering different core CBT skills for managing mood. Users are advised to complete one or two modules a week. Each module takes approximately 25-30 minutes to complete.
<table>
<thead>
<tr>
<th>Module 4: Mountain Province</th>
<th>Core Skills:</th>
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<tbody>
<tr>
<td>“Overcoming Problems”</td>
<td>- Problem solving using STEPS</td>
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<td></td>
<td>- Cognitive restructuring: identifying SPARX – positive/helpful thoughts</td>
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<tr>
<th>Module 5: Swamp Province</th>
<th>Core Skills:</th>
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<tbody>
<tr>
<td>“Recognising Unhelpful Thoughts”</td>
<td>- Cognitive restructuring: recognising different types of GNATS (negative/unhelpful thoughts)</td>
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<tr>
<th>Module 6: Bridgeland Province</th>
<th>Core Skills:</th>
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<tr>
<td>“Challenging Unhelpful Thoughts”</td>
<td>- Cognitive restructuring: learning to challenge or ‘swap’ negative thoughts for helpful ones</td>
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<td></td>
<td>- Interpersonal skills continued: negotiation skills</td>
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<tr>
<th>Module 7: Canyon Province</th>
<th>Core Skills:</th>
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<tr>
<td>“Bringing it all together”</td>
<td>- Recap of all skills</td>
</tr>
<tr>
<td></td>
<td>- Mindfulness: tolerating distress</td>
</tr>
<tr>
<td></td>
<td>- Relapse prevention: knowing when to ask for help</td>
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</tbody>
</table>
Youthreach Staff Focus Groups: Consent form [Paper II]

“Using Technology to Support Young People’s Mental Health and Wellbeing”

Researcher: Ms. Tuuli Kuosmanen
Health Promotion Research Centre
National University of Ireland Galway

Please tick as appropriate

I confirm that I have been provided with sufficient information on the study

I am satisfied that I understand the information provided and have had enough time to consider the information.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason, without my legal rights being affected

I agree to take part in the above study

Name of Participant: __________________________
Date: __________________________
Participant’s signature: __________________________

Name of Researcher: __________________________
Date: __________________________
Researcher’s Signature: __________________________
Participant Information Sheet [Paper II]

"Using technology to promote young people’s mental health and wellbeing – Youth Participatory Workshop"

We would like you to take part in a workshop about an online programme to help young people. This Information Sheet will tell you more about the study and what it would mean to take part.

**What is this study about?**
We are carrying out this study to see if a computer programme can help young people to deal with issues in their everyday lives and feel better. We are running workshops to hear what young people think about these kinds of programmes.

**What would you be asked to do?**
We want you to have a look at two online programmes and tell us what you think about them. The programmes will be in English. The workshop will take about 1h 30min and will be done at your Youthreach Centre. Other young people from your Youthreach Centre will also take part in the workshop.

**Do you have to take part?**
No. It is up to you to decide whether or not to take part. If you do decide to take part you will be given this Information Sheet to keep and will be asked to sign a Consent Form.

**Can you change your mind later?**
Yes. You are free to leave the study at any time. You don’t need to say why you leave. A decision to leave the study or a decision not to take part will not affect your rights in any way.

**Who is carrying out this study?**
This workshop is part of a doctoral research study at the Health Promotion Research Centre, National University of Ireland, Galway. Tuuli Kuosmanen, a doctoral student, will run the workshops. Tuuli is being supervised by Professor Margaret Barry.

**Confidentiality – Will anyone else know what you say?**
The workshop will be audio recorded. This will be done to make sure that we don’t miss anything important that has been said. Only the researcher (Tuuli) will ever listen to the recordings. You will not be able to be identified when we write up the results as no names will be used. All the information collected during the workshops will be stored securely at the University for five years, after which it will be destroyed.

We also ask that the participants will not talk about what has been said at the workshop to anyone outside the group. But we cannot guarantee this. Remember, taking part in the study is up to you and you are free to leave the study at any point.
Are there any risks to taking part?
We don’t think there are any risks attached to taking part in the workshop.

Why might you want to do it?
By taking part in the workshop, you will have a say on choosing the programme that will be delivered at your Youthreach Centre.

What will happen to the results from this study?
Results from workshops will be written up and a report will be published. We will give a copy of the report to all the Youthreach Centres that took part.

More questions?
If there is anything you are not clear about we will be happy to explain it to you. Please contact the researcher Tuuli Kuosmanen:

Phone xxxx
Email t.kuosmanen1@nuigalway.ie
Address: Health Promotion Research Centre
         Aras na Coiribe
         National University of Ireland Galway.

Thank you for reading this Information Sheet. If you are happy to take part in the workshop, please sign the Consent Form and bring it to the workshop. I look forward to meeting you and hearing what you have to say.

The study has been granted ethical approval by the NUI Galway Research Ethics Committee (eithne.oconnell@nuigalway.ie).
Youth Workshop: Consent form [Paper II]

“Using Technology to Support Young People’s Mental Health and Wellbeing”

Researcher: Ms. Tuuli Kuosmanen
Health Promotion Research Centre
National University of Ireland Galway

Please tick as appropriate:

I confirm that I have read the information sheet

I am satisfied that I understand the information provided and have had enough time to consider the information.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason, without my legal rights being affected

I understand that while the researchers will maintain confidentiality, this cannot be promised on behalf of the other study participants, although it will be requested

I agree to take part in the above study

Name of Participant: ________________________ Date: ________________________ Participant’s signature: ________________________

Name of Researcher: ________________________ Date: ________________________ Researcher’s Signature: ________________________

HPRC
Health Promotion Research Centre

NUI Galway
Parent Information Sheet [Paper II]

“Using Technology to Support Young People’s Mental Health and Wellbeing – Youth Participatory Workshop”

We would like to invite your child attending Cork City Learning Support Services to take part in a study to see what they think about using a computer programme that helps young people to deal with everyday issues in their lives and feel better. We are asking your permission for your child to take part in this workshop. This Information Sheet will tell you more about the study and what is involved, so that you can decide whether you want to give permission for your child to take part.

What is this study about?
The study is being carried out to see if a computer programme can teach young people important skills in dealing with everyday stressors in their lives and help them feel better. This computer programme will be delivered in Youthreach Centres. The programme has already been tested and evaluated with young people in other countries.

As the first step of the study, we wish to talk to young people attending Youthreach Centres. We wish to hear what young people think about these kinds of programmes. As well as talking to the young people, we will also interview Youthreach staff members.

What is involved in taking part?
At the workshops, the young people will be asked to have a look at two online programmes using computers. They will then be asked to tell us what they thought about the programmes. The programmes will be in English. This workshop will take approximately 1 hour 30 minutes and will be carried out at the Youthreach Centre. Other young people from the Youthreach Centre will also take part in the workshop.

Are there any risks to being in the study?
There are no foreseeable risks attached to taking part in this research.

Are there any benefits to being in the study?
It is hoped that young people will benefit from taking part in the study by having a say on the delivery of online programmes at their Youthreach Centre.

Who is carrying out this study?
This study is being carried out as a doctoral research project in the Health Promotion Research Centre, National University of Ireland, Galway. A doctoral student, Tuuli Kuosmanen, is carrying out the study and will run the workshop. Tuuli is being supervised by Professor Margaret Barry.

What about confidentiality?
The group discussion will be audio recorded. This will be done to make sure that we don’t miss anything important that has been said. Only the lead researcher (Tuuli) will ever listen to the recordings. Your child will not be able to be identified when we are reporting the findings from this research as no names will be used. All the information collected will be stored securely in the University premises for five years after the research project has ended, after which they will be destroyed. We will ask that the participants will not discuss what has been said at the workshops with anyone outside the group. However, this cannot be guaranteed. Your child’s participation in the research is voluntary and they are free to leave the study at any point.

**What will happen to the results from this study?**
Results from workshops will be written up and a report will be published. All young people who took part in the study will be able to see a copy of the report. The findings from this study will be used to inform the delivery of online programmes in Youthreach Centres in Ireland.

**How will you tell us about your decision?**
If you are happy for your child to take part in the research, you will not need to contact anyone.

If you would NOT wish your child to take part, you can either:

a) Complete the Consent Form stating your child’s name and your name. Please return this to the Youthreach Coordinator.

b) Contact the researcher by phone or email and let her know that you don’t want your child to take part.

In addition to asking your permission we will also meet with all students whose parents have consented. We will provide them with an Information Sheet and ask them if they consent to taking part in the research project.

**More Questions?**
If you require any further information please contact the researcher Tuuli Kuosmanen:

Phone	xxxx
Email	tkuosmanen1@nuigalway.ie
Address: Health Promotion Research Centre
Aras na Coiribe
National University of Ireland Galway.

Thank you for taking the time to read this information sheet. Please complete the attached Consent Form and return it to the Youthreach Centre if you DO NOT want your child to take part in the study.

*The study has been granted ethical approval by the NUI Galway Research Ethics Committee (eithne.oconnell@nuigalway.ie).*
Youth Workshop: Parent Consent form [Paper II]

“Using Technology to Support Young People’s Mental Health and Wellbeing”

Researcher: Ms. Tuuli Kuosmanen

Health Promotion Research Centre

National University of Ireland Galway

Please tick as appropriate

I confirm that I have read the information sheet dated 30th October 2014

I am satisfied that I understand the information provided and have had enough time to consider the information.

I do not give permission for my child to participate in the youth participatory workshop

Name of Student: ________________________________

Name of Parent: Date: Parent’s signature

________________________ __________________________

Name of Researcher: Date: Researcher’s Signature

________________________ __________________________

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Appendix 4B. Student and parent Information sheets and Consent forms (Papers III and IV)

Parent Information Sheet
“Youthreach Social and Emotional Wellbeing Study”

We would like to invite your child attending Youthreach to take part in a study to see if a computer programme can help young people deal with everyday issues in their lives and feel better. We are asking your permission for your child to take part in this study. This Information Sheet will tell you more about the study and what is involved, so that you can decide whether you want to give permission for your child to take part.

What is this study about?
The study is being carried out to assess if a computer programme can teach young people important skills in dealing with everyday stressors in their lives and help them feel and cope better. This computer programme will be delivered in Youthreach Centres in Spring 2016. The programme has already been tested and evaluated positively with young people in other countries.

What is involved in taking part?
The young people will be asked to take part in an online programme using computers. The programme will be in English. It consists of seven weekly modules (25-30 min in length) delivered at the Youthreach Centre during class time. Other young people from the Youthreach Centre will also take part in the programme. The young people will be asked to fill in a questionnaire about their emotional health and wellbeing at three different times before, and once after the programme.

Are there any risks to being in the study?
There are no foreseeable risks attached to taking part in this research.

Are there any benefits to being in the study?
It is hoped that young people will benefit from taking part in the study by learning skills in dealing with issues in their everyday lives. They will also help us learn how to better help young people feel better.

Who is carrying out this study?
This study is being carried out as a doctoral research project in the Health Promotion Research Centre, National University of Ireland, Galway. A doctoral student, Tuuli Kuosmanen, is carrying out the study and will collect all the information given by the young people. Tuuli is being supervised by Professor Margaret Barry.

What about confidentiality?
Only the lead researcher (Tuuli) will ever see or listen to the information given by your child. Your child will not be able to be identified when we are reporting the findings from this research as the names of the students or the Centres will not be used. All the information collected will be stored securely in the University premises for five years after the research project has ended, after which they will be destroyed.

If your child is expressing high levels of depression or anxiety before or after the intervention, a member of Youthreach staff will be informed. They will then contact you and organise any additional support. Your child’s participation in the research is voluntary and they are free to leave the study at any point.

**What will happen to the results from this study?**
Results from the study will be written up and a report will be published. All young people who took part in the study will be able to see a copy of the report. The findings from this study will be used to inform the delivery of online programmes in Youthreach Centres in Ireland.

**How will you tell us about your decision?**
If you are happy for your child to take part in the research, you will not need to contact anyone.
If you would NOT wish your child to take part, you can either:

a) Complete the Consent Form stating your child’s name and your name. Please return this to the Youthreach Coordinator.
b) Contact the researcher by phone or email and let her know that you don’t want your child to take part.

In addition to asking your permission we will also meet with all students whose parents have consented. We will provide them with an Information Sheet and ask them if they consent to taking part in the research project.

**More Questions?**
If you require any further information please contact the researcher Tuuli Kuosmanen:
Phone xxxx
Email t.kuosmanen1@nuigalway.ie
Address: Health Promotion Research Centre, NUI Galway
National University of Ireland, Galway
Galway

Thank you for taking the time to read this information sheet. Please complete the attached Consent Form and return it to the Youthreach Centre if you DO NOT want your child to take part in the study.

*The study has been granted ethical approval by the NUI Galway Research Ethics Committee (eithne.oconnell@nuigalway.ie).*
Parent Consent form

“Youthreach Social and Emotional Wellbeing Study”

Researcher: Ms. Tuuli Kuosmanen
Health Promotion Research Centre
National University of Ireland Galway

Please tick as appropriate
I confirm that I have read the information sheet dated 9th September 2015

I am satisfied that I understand the information provided and have had enough time to consider the information.

I do not give permission for my child to participate in this study

Name of Student: ________________________________

Name of Parent: ____________________________ Date: ____________ Parent's signature ______________

Name of Researcher: ____________________________ Date: ____________ Researcher’s Signature ______________

HPRC
Health Promotion Research Centre

NUI Galway
Participant Information Sheet

"Youthreach Social and Emotional Wellbeing Study"

You are invited to take part in a research study about an online programme to help young people. This Information Sheet will tell you more about the study and what it would mean to take part.

**What is this study about?**
We are carrying out this study to see if a computer programme can help young people to deal with issues in their everyday lives and feel better. We are running this computer programme at your Youthreach Centre.

**What would you be asked to do?**
We want you to take part in a computer programme that teaches young people important social and emotional life skills. The programme will be in English. The computer programme will be done at your Youthreach Centre over five weeks. Each week you will do one level of the programme that will take about 25-45 minutes. Other young people from your Youthreach Centre will also take part in the programme.

You will also be asked to answer a questionnaire about how you are feeling and how you solve problems in your life. You will be asked to do this before and after the programme. This is so that we can see if the programme did make you feel better. After each level of the programme, we will also ask you what you thought about it. We might also ask to talk to you after the programme. We will only ask to talk to some of the participants. If you are asked, it will be up to you to decide if you want to take part.

**Do you have to take part?**
No. It is up to you to decide whether or not to take part. If you do decide to take part you will be given this Information Sheet to keep and will be asked to complete an online Consent Form.

**Can you change your mind later?**
Yes. You are free to leave the study at any time. You don’t need to say why you are leaving. A decision to leave the study or a decision not to take part will not affect your rights in any way.

**Who is carrying out this study?**
This study is part of a doctoral research study at the Health Promotion Research Centre, National University of Ireland, Galway. Tuuli Kuosmanen, a doctoral student, will collect your responses to the questionnaires. Tuuli is being supervised by Professor Margaret Barry.
Confidentiality – Will anyone else know what you say?
Everything that you say will be kept strictly confidential. You will be given a user name and password to access the programme. Only yourself and a Youthreach staff member will have these details. Nobody will be able to see what you have said on the programme.

You will be asked to state your user name when you answer any questionnaires. Only the researcher (Tuuli) will ever read the responses and she will not be able to link your user name to your personal details.

If based on your responses Tuuli is worried about your wellbeing, she will contact the Youthreach staff member who will be able to link your user name to you. They will offer to organize support for you to help you feel better. If you are under 18 years old, they will also contact your parents/guardians. Remember, taking part in the study is up to you and you are free to leave the study at any point.

The talks after the programme will be audio recorded. Only Tuuli will ever listen to the recordings. You will not have to agree to be interviewed.

You will not be able to be identified when the results are written up as no names will be used. All the information collected will be stored securely at the University for five years, after which it will be destroyed.

Are there any risks to taking part?
We don’t think there are any risks attached to taking part in the study.

Why might you want to do it?
By taking part in the study you will help us learn more about how best help young people to feel better. Doing the programme might also help you feel better.

What will happen to the results from this study?
Results from the study will be written up and a report will be published. We will give a copy of the report to all the Youthreach Centres that took part.

More questions?
If there is anything you are not clear about we will be happy to explain it to you. Please contact the researcher Tuuli Kuosmanen:

Phone (087) 051 8499
Email t.kuosmanen1@nuigalway.ie
Address: Health Promotion Research Centre, NUIG
National University of Ireland, Galway
Galway

The study has been granted ethical approval by the NUI Galway Research Ethics Committee (eithne.oconnell@nuigalway.ie).
Student Online Consent Form

Using Technology to Support Young People’s Mental Health and Wellbeing

Thank you for taking part in this study. Before we can get started, I just want to make sure that you have received enough information to make a decision to take part.

Please tick as appropriate

- I confirm that I have read the information sheet.
- I am satisfied that I understand the information provided and have had enough time to consider the information.
- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason, without my legal rights being affected.
- I agree to take part in the above study.
Appendix 5. Study information for staff (Papers III and IV)

Study Instructions for Staff [SPARX-R]

This instruction sheet provides information on the practicalities of delivering SPARX-R in the context of this study. Please see the Programme Manual for more detailed information on the programme and its different modules.

Preparing for the study

Recruitment

It is up to you to choose the group of students that will take part in this study. The maximum number of students will be determined by the number of computers at your Centre, as each student will require their individual computer for the programme. However, it is possible to deliver the programme to more than one group of students at different times.

Consent

Informed consent is a requirement from all participants before taking part in the study. Please distribute Participant Information Sheets to the students, preferably at least a week before the start of the programme. This is to ensure they have had sufficient time to make a decision on whether or not to take part. The students will be asked to fill in an Online Consent Form at the start of the study.

Furthermore, Parental Consent will be needed from participants under the age of 18 years. Please distribute the Parent Information Sheets and Parental Consent Forms to the parents/guardians of any underaged students preferably at least a week before starting the programme. Parents are being asked to sign and return the Consent Form if they DO NOT wish their child to take part. No action is required from the parents if they are happy for their child to take part.

Installing the programme

As SPARX-R is not available online it needs to be installed on each individual computer. A USB stick with the programme Installer is included in this letter. To install the programme you will need administrative rights to the computers. The programme can be installed by opening the USB file, double clicking on SPARX-R Installer and following the instructions on the computer interface. When the programme has been installed, a SPARX-R icon should appear on the desktop. Please double click on the icon to make sure that the programme opens up. You can then click on 'Quit' to exit SPARX-R.

Headphones

As SPARX-R includes music and talk, the students will require headphones.

Programme start
I will be there for the start of the programme to administer the questionnaire and guide students through the registration process.

**Log in details**

Each student will be provided with a username and password. This username will be used to log in to SPARX-R each week and will also serve as a participant identification code. The participants will be asked to state their username when completing any assessment questionnaires. The staff will be given a list of the login details in the case that students would forget them.

**The students will need to use the same computer each week**, as their details will only be saved on that particular computer. Computer numbers for each student will be included in the list with the login details.

**Pre-assessment questionnaire**

Before the start of the programme the students will be asked to complete a pre-assessment questionnaire. The questionnaire assesses the students’ levels of depression and anxiety, mental wellbeing, emotion regulation and coping. This will take approximately 20 minutes and will be done online by following the link below

[www.surveymonkey.com/r/youthreach](http://www.surveymonkey.com/r/youthreach)

**Registration**

After completing the questionnaire the students will open SPARX-R and click on ‘New user’ to register for the programme. They will be asked to use the preassigned login details. Instead of using their real name they will fill in their given username under ‘Your name’. Students can then proceed to going through the first level of the programme. The next time students login to the programme they select ‘Continue game’ and fill in their login details. This will automatically take them to the next level of the programme.

**N.B.** It is important that students **do not exit the programme before they finish the level**. The programme should close automatically at the end of each level. If a student exits a level of the programme prematurely their progress will not be saved and they will have to redo that level.

**After each level**

After each level of the programme, students will be asked to complete a brief implementation questionnaire about their thoughts on that particular level. This should not take more than a few minutes. The questionnaire can be accessed by following the link

[www.surveymonkey.com/r/sparxlevels](http://www.surveymonkey.com/r/sparxlevels)

Furthermore, the Youthreach staff member who is moderating the session will be asked to fill in a similar online questionnaire. The Moderator Recording Sheet can be accessed by following the link

[www.surveymonkey.com/r/yrstaff](http://www.surveymonkey.com/r/yrstaff)

These short questionnaires will be completed **after each level of the programme**.
At the end of the programme

Post-intervention questionnaire

When the programme is finished, students will be asked to fill in a post-intervention questionnaire. This is similar to the one completed at the start of the programme with the addition of questions around user satisfaction. The questionnaire will take approximately 20-30 minutes. The questionnaire can be accessed by following the link

www.surveymonkey.com/r/yrsparx

The students can complete this questionnaire directly after the last level of the programme or on a separate occasion, however, no later than a week after finishing the programme.

User satisfaction interviews

Some of the Centres will be asked to take part in user satisfaction interviews. The Centres to take part will be randomly selected and will be informed closer to the end of the programme. It will be up to the students to decide whether or not they want to be interviewed. They can take part in the study even if they do not wish to take part in the interviews.

Follow-up assessment

Students will be asked to fill in the assessment questionnaire one final time 3 months after the starting the programme. This assessment can be accessed through the link

www.surveymonkey.com/r/sparx3

Moderator role

As the programme is self-administered minimal input is required from the staff moderator. The role of the moderator is mainly to monitor the completion of the programme and implementation questionnaires each week and to answer any incidental questions. The moderators are encouraged to assist any student who is having difficulty with the programme, for example in relation understanding the meaning of a word or not knowing what to do on the programme. The students may also help each other. The moderators are asked to report their interaction with the students after each level in the Moderator Recording Sheet.

Confidentiality

The students will be asked to fill in their username when completing the assessment questionnaires before and after the programme. Their responses will remain anonymous to me, as they will not be asked for their real names. However, the Youthreach staff will have access to the list of student login details. The staff will be informed of the usernames of any students who are showing high levels of depression or anxiety in the assessment questionnaires and who might require additional support. They will then be able to link the username to the corresponding student.

If the student is underaged, the staff will be asked to inform the parents/guardians and organise access to a counsellor as available in the Centre. Both, the students and their parents are informed of this in the Information Sheets before consenting to take part in the study. Furthermore, if in the course of the programme you were to become concerned of any negative reactions for students, I would ask you to please inform me of these concerns and to organise additional support for the student as needed.
What is SPARX-R?

Welcome to SPARX-R programme, which aims to teach young people important social and emotional life skills. It has been developed in the University of Auckland, New Zealand. SPARX-R is based on Cognitive Behavioural Therapy (CBT), helping young people recognise the links between their thoughts, behaviour and feelings. SPARX-R is a revised version of the original SPARX programme, which was designed to treat depression in young people. Although the two versions of the programme are in essence the same, SPARX-R is less exclusive about depression and therefore more appealing to a wider audience of young people.

There are several studies showing that SPARX is effective in increasing wellbeing and reducing symptoms of depression in young people. The programme has also been found to be effective in reducing symptoms of depression in young people attending alternative education in New Zealand, with high levels of user satisfaction. Furthermore, there are several planned and ongoing studies on the effectiveness of SPARX around the world, including United Kingdom, North America and Australia.

At the moment, only New Zealand residents can freely access the programme online. For more information on this programme and the research behind it please visit https://research.sparx.org.nz/about.

Skills that SPARX-R covers:

- Scheduling activities to improve mood
- Problem solving
- Learning to recognise automatic thoughts
- Stopping negative/unhelpful thoughts
- Changing unhelpful thoughts into helpful ones
- Relaxation and self-calming techniques
- Interpersonal and communication skills

SPARX-R is rich in multimedia. The graphics have a three-dimensional (3D) appearance. In the ‘game world’ the user navigates an avatar, which they choose and customise. The user moves the avatar using a computer mouse. There are a number of interactive dialogues between the avatar and non-playing characters (i.e. the characters pre-programmed in the software). All dialogues have voice-overs supplemented by text on screen. In each module, the user has to complete a series of interactive and animated puzzles or quests, e.g. solve a riddle, answer a question correctly, or find a hidden object. In the direct teaching area the Guide speaks directly to the young person (along with text displayed on screen) and the user is asked to complete interactive and animated exercises (e.g. drag-and-drop exercises).
LEVEL 1: Cave Province

“Finding Hope”

Core skills taught:

- Psychoeducation about depression and introduction to the CBT model
- Introducing GNATS (gloomy negative automatic thoughts)
- Introducing ‘hope’ (people get better)
- Relaxation: Controlled breathing

Level structure and activities:

Guide area

Introduction to programme
The Guide gives an introduction to the programme and cognitive behavioural therapy model.

Mood monitor
At the beginning of each level, the player is asked two questions about how they are feeling at that moment. They will then be presented with a table of how they are progressing.

Customising avatar
The player is asked to customise their avatar. They will be able to make changes to the gender and look of the avatar. This character will stay with them for the whole length of the programme. After this they will travel into the game world.

Game world

Introduction to the story line
The player meets the Guardian of the Circle, who will give an introduction to the story line:

‘A long time ago the ancestors lived in a world that was balanced and harmonious. The peace and prosperity were supported by a Circle of Power and guarded by the Gems of Power. But then the ancestors wanted things to be perfect. They wanted only good times and didn’t want to cope with challenges. In an attempt to make the world perfect they took all negative feelings and thoughts, which they called Gnats, and locked them away in a chest where they multiplied.

One day a Yeti stumbled upon the chest and was very curious to see what was inside. When the Yeti opened the chest all the Gnats escaped and affected the whole world. The escaping Gnats covered the world with negativity and caused the Circle of Power to explode. The seven Gems of Power were scattered and the balance in the world was lost. Once the glowm descended, the Provinces were trapped by difficulties and have been plagued by Gnats since.

Your task is to restore the balance to the land.’

SPARX-R modules

SPARX-R consists of seven levels or modules, with each level covering different skills for managing mood. Users are advised to complete one or two modules a week. Each module takes approximately 25-30 minutes to complete.

At the beginning and end of each module, the user interacts, in the first person, with a character called the ‘Guide’, who provides psychoeducation, gauges mood, recaps previous module’s content and sets the agenda for the current module. The user is then transported to the ‘game world’ to undertake interactive challenges. The user returns to the Guide who puts the skills learnt in the game world into a ‘real life’ context and asks the user to complete short interactive exercises to augment the learning.

Each module is set in a different ‘Province’, which reflects the skills it aims to cover. For example, problem solving is taught in the ‘Mountain Province’ using the technique of STEPS (say what the problem is, think of solutions, examine these ideas, pick one, see what happens) in order to climb a mountain.
The player will then be instructed to talk to the Mentor, who will give advice in relation to the first level of the programme. She will then ask the player to go to the Hokioi, the giant eagle, who will fly him/her to the cave province. Each level of the game follows this same format.

Activity 1: Finding hope
The player is asked to match the words on the wheel to form the sentence 'Hope lies within'. This will release the bird of hope from the chest who will act as a guide throughout the programme.

Activity 2: Breathing exercise
The player meets a man on the way who will teach a breathing exercise, breathing slowly in and out by counting to six.

Activity 3: Releasing the power gem
The player is asked to use his/her staff to destroy the GNATS flying above the pool of calm. This will release the first power gem. The player then needs to find his/her way to the Hokioi and fly back to the Mentor and return the power gem to its place. The player will then need to use the magic portal to travel back to the Guide.

Return to guide area

Exercise 1 - Recognising things that you struggle with
The player is asked to identify things that they personally struggle with and that they would like to change (e.g. feeling hopeless, angry, sad, lonely, sleeping, getting into fights, eating, etc.).

Psychological education about the connectedness of thoughts, actions and emotions. 'Change what you think, change what you do, your feelings will change too'

Exercise 2 - Shield against feeling down
Match the skills to the right part of the shield.
1) Controlled breathing – match with RELAX.
2) Find and defeat the GNATS – match with SPOT IT.

LEVEL 2: Ice Province

"Being Active"

Core skills taught:
- Activity scheduling and behavioural activation
- Relaxation: Progressive muscle relaxation
- Basic communication and interpersonal skills

Level structure and activities:

Guide area
- Mood monitor
- Recap of previous level

Game world

Activity 1: Opening the doors to the tunnel
The player will have to talk to Cass and encourage her to talk to the firemen, who speak a foreign language. They will give her an ember to place on the player’s staff. This will open the door to the tunnel.

Activity 2: Lighting the lanterns
The player will have to light all the lanterns along the tunnel. This will melt the ice at the end of the tunnel and let the player pass through. If the ice hasn’t melted, make sure that all the lanterns have been lit.

Activity 3: Releasing the Yeti
The player will need to free the yeti by melting the ice around him. The power gem will be received by talking to the non-playing character after releasing the yeti.

Return to guide area

Exercise 1
Selecting activities to in the next week that are going to make the player feel better (e.g. play sport, be with friends and family, tidy up room)

Exercise 2
Muscle relaxation exercise.
LEVEL 3: Volcano Province

"Dealing with Emotions"

Core skills taught:
- Dealing with strong emotions: hurt feelings and anger
- Interpersonal skills: assertiveness, listening and negotiation skill

Level structure and activities:

Guide area
- Mood monitor
- Recap of previous level

Game world

Activity 1: Negotiating with the fire spirit
The player needs to cross the explosive ground to proceed in the game. The player will then negotiate with the fire spirit to stop the lava from flowing. He/she is asked to follow the advice of the BUNC stone (Bite your tongue (don't say too much); Look at the speaker; Be interested; No interruptions; Check you understood).

Activity 2: Preventing an explosion
The player is asked to release the pressure in the geysers before they explode. The geysers represent issues that may cause sad or angry feelings in young people (e.g. put downs, bullying, racist comments).

Activity 3: Releasing the fire spirits
The player has to solve three puzzles to free the fire spirits. He/she will then earn the power gem.

Puzzle 1 – Spin the wheels to form the sentence 'Just walk away'
Puzzle 2 – Put the pieces together to form a sheet of paper with the following sentences (in this order):
- Use breathing technique
- Count to twenty
- Talk to someone

Puzzle 3 – Find the following sentences:
- 'Turn it down'
- 'Trash it'
- 'Stop it'

Return to guide area

Exercise 1: Spotting feelings of anger and upset

The player is asked to identify what happens in their body when they feel angry by selecting appropriate sentences from a list:
- e.g. I yell, I tense my shoulders, I get shaky

The player is then asked to do the same with feelings of upset and hurt
- e.g. I have no energy, I feel unloved, I get teary

Finally, the player is asked to identify their personal triggers by selecting from the list:
- e.g. being yelled at, arguments, things not being fair

Level 1 skills - Distraction skills
The player is given a list of ways to distract their mind when they are feeling angry or upset (e.g. walk away, play sport, listen to music). They are asked to pick ones that are relevant to them.

Level 2 skills - Stopping unhelpful negative thoughts
The player is introduced to three ways of stopping unhelpful thoughts:
- Stop it - Think about something else
- Trash it – Write unhelpful thoughts on a piece of paper and throw it away
- Turn it down – Imagine that the thoughts are playing on headphones and you turn the volume down

The player will be asked to practice one of the above skills.

Level 3 skills: Sorting it by listening and being assertive
The player is asked to put the letters of the BUNC stone in place.
- Bite your tongue (don't say too much)
- Look at the speaker
- Be interested
- No interruptions
- Check you understood

He/she is then asked to practice these listening skills with someone in their life.

The player will then practice assertiveness by selecting the right responses to the questions posed by the Guide.
LEVEL 4: Mountain Province

"Overcoming Problems"

Core skills taught:
- Problem solving using STEPS
- Cognitive restructuring: identifying SPARX (positive/helpful thoughts)

Level structure and activities:

Guide area
- Mood monitor
- Recap of previous level

Game world

Activity 1: Helping Darro make a decision
The player is asked to defeat the GNATs (negative thoughts) preventing Darro from making a decision.

Activity 2: Climbing to the top of the mountain
The player will need to select the right ladders to climb to the top of the mountain.

Activity 3: Releasing the power gem
The player will have to find 4 sparks to release the power gem. While looking for the sparks, the player is being introduced to using STEPS to solve problems (Say what the problem is, think of solutions, examine each solution, pick one and try it, see what happens).

Return to guide area

Exercise 1: Identifying problems
The player is asked to identify a problem they would like to solve. They are then asked to use STEPS in their real life to try to solve this problem.

Exercise 2: Identifying SPARX
The player is asked to identify SPARX, positive things about themselves or their future
  e.g. I am strong, my future looks bright, I have people who care about me, I can tell a good joke

The player is encouraged to try to find as many SPARX in their life as possible.

LEVEL 5: Swamp Province

"Recognising Unhelpful Thoughts"

Core skills taught:
- Cognitive restructuring: recognising different types of GNATS (negative/unhelpful thoughts)

Level structure and activities:

Guide area
- Mood monitor
- Recap of previous level

Game world

Activity 1: Recognising GNATS
In order to get across the swamp, the player is asked to trap each GNAT in the right barrel as follows:
  DOWNER: You have ONLY found four gems. You have absolutely no hope of finding the rest.
  DISASTER: You've made mistakes, big mistakes, give up now – it's a disaster! You won't be able to undo the terrible damage you've already done You're a stuff up!
  MIND READER: The Innkeeper thought you were a loser, you can tell by the way he looked at you. He probably hates you.
  GUILTY: You're to blame for what's gone wrong. You should have done more.
  PERFECTIONIST: You need to start your quest again but next time, get it all right you MUST be faultless!

Activity 2: Recognising GNATS
The player comes across more GNATS and is asked to examine and categorise them.

Return to guide area

Exercise 1: Recognising and challenging GNATS
The player is asked to match the type of negative thought with a definition and example.
  e.g. Downer - Ignore the positives and only see things that go wrong, not right. It's the opposite of a silver lining. "We won our game, but anyone could beat that team."

The player is then asked to match the type of negative thought with a helpful question.
LEVEL 6: Bridgeland Province

“Challenging Unhelpful Thoughts”

Core skills taught:
- Cognitive restructuring: learning to challenge or ‘swap’ negative thoughts for helpful ones
- Interpersonal skills continued: negotiation skills

Level structure and activities:

Guide area
- Mood monitor
- Recap of previous level

Game world

Activity 1: Getting to the Gate
The player needs to solve four puzzles and challenge the GNATS using RAPA (reality check, another view, perspective, action) to process through the gates.

- Puzzle 1 – Solve the jigsaw to form the phrase ‘REALITY CHECK’
- Puzzle 2 – Turn the wheels to reveal the phrase ‘TAKE ANOTHER VIEW’
- Puzzle 3 – Arrange letters to form the word ‘PERSPECTIVE’
- Puzzle 4 – Find the word ‘ACTION’

Activity 2: Negotiating with the Temple Guardian
The player needs to practice assertiveness and listening skills in negotiating with the Guardian to gain access to the power gem.

Return to guide area

Exercise 1: RAPA
The player is asked to identify different ways of swapping negative thoughts to more positive ones using RAPA (reality check, another view, perspective, action).

E.g. You don’t get a job you tried for. It could be just a little job or something you really wanted. Here comes the negative thought: “I’m useless, I’ll never do anything good.” = Reality check – I’m not useless, I am good at some things.

Exercise 2: Negotiation skills
 Recap of negotiation skills:
1) Be calm and clear
2) Ask for what you need
3) Listen

Exercise 2: Spotting negative thoughts
The player is asked to spot some of his/her own negative thoughts and write them down in the notebook or on a piece of paper.
LEVEL 7: Canyon Province

“Bringing it all together”

Core skills taught:

- Recap of all skills
- Mindfulness: tolerating distress
- Knowing when to ask for help

Level structure and activities:

Guide area

- Mood monitor
- Recap of previous level

Game world

Activity 1: Gate 1

The player needs to correctly name three skills of coping (solve it, spot it, swap it) and practice controlled breathing to enter through the gate.

Activity 2: Gate 2

The player needs to practice negotiation skills to enter through the second gate.

Activity 3: Asking for help

The player needs to ask for help and then collect enough SPARKS to get down from the cliff top where he/she is stuck.

Activity 4: Recognising G N A T S

The player needs to put the GNATS in the correct barrel to get across the path to the cave. As each GNAT is placed in the correct barrel, the opposing SPARK appears.

Gnat 1: I can tell you that things will only get worse in the future. (MIND READER)

Spark 1: Hey, you can’t read my mind. Nobody can!

Gnat 2: You can’t win this unless you get everything just right. (PERFECTIONIST)

Spark 2: Things can still work out okay, even if you don’t get everything right. Allow yourself to slip up sometimes.

Gnat 3: If the darkness returns, it’s all your fault. (GUILTY)

Spark 3: Are you really to blame? Don’t take the blame for things that aren’t in your control.

Gnat 4: Don’t feel so proud of yourself! You’re only winning because it’s easy… (DEFENDER)

Spark 4: Don’t downplay your achievements! Focus on your strengths and what you’ve achieved so far.

Exercise 1: Reflecting on the final level

The player is asked to correctly match the rows relating to things learned in the final lesson.

<table>
<thead>
<tr>
<th>In the game</th>
<th>How does it relate to life?</th>
<th>What’s the message?</th>
</tr>
</thead>
<tbody>
<tr>
<td>There were paths with dead ends at the beginning.</td>
<td>You don’t always pick the right path.</td>
<td>If what you tried didn’t work, pick another solution.</td>
</tr>
<tr>
<td>You can’t shoot all the GNATS.</td>
<td>Sometimes you can’t rid of all your negative thoughts.</td>
<td>At times you need to carry on even with negative thoughts still buzzing around.</td>
</tr>
<tr>
<td>Hope is overwhelmed by GNATS.</td>
<td>At times it’s hard to have hope – it feels like things won’t get better.</td>
<td>That’s OK, you can carry on anyway and hope will eventually return.</td>
</tr>
<tr>
<td>You get stuck on the cliff top unless you call for help.</td>
<td>You can’t sort everything out by yourself.</td>
<td>Asking for help can work wonders (although sometimes you need to do it several times and maybe ask different people).</td>
</tr>
<tr>
<td>You have to shelter and wait for the storm to pass.</td>
<td>Sometimes feelings might be really strong like a storm.</td>
<td>Just like storms move on, so do strong feelings. You can just wait it out till they pass.</td>
</tr>
<tr>
<td>You have to polish your shield.</td>
<td>You need to polish or practice skills.</td>
<td>You have to use your skills to deal with negative thoughts.</td>
</tr>
<tr>
<td>You have to shield yourself from big GNATS.</td>
<td>GNATS can be really powerful.</td>
<td>You might need to try lots of your skills to make things better.</td>
</tr>
<tr>
<td>You have to work hard to convince the King of GNATS to give up the Power Gem, as he doesn’t believe things could get better.</td>
<td>Sometimes it’s hard to make changes, even if it might make things better.</td>
<td>You don’t need to stay down just because you have got used to feeling low.</td>
</tr>
</tbody>
</table>

Activity 5: Receiving the last Power Gem

The player needs to use his/her negotiation skills to convince the King of GNATS to release the last Power Gem.
Appendix 7. Student workshop protocol (Paper II)

Protocol for Youth Workshops

The goal of this workshop is to learn about young people’s needs and preferences in relation to online mental health promotion and their views on two specific online programmes and their delivery at their Youthreach Centre. Prior to attending the workshop the young people will be provided with an Information Sheet and Consent Form.

Materials: Markers, post-its, coloured cards
Time: 45 min
Space: Computer-lab

Introduction (10 min)

- The workshop will begin with an energiser/name game
- Researcher introduces herself and background to the workshop
  - Overview of research project and rational
  - Outline of workshop
- Researcher asks if the young people have understood the information that has been provided to them and whether they have any further questions.
- Collection of Consent Forms

Activity 1 – Testing the programmes (35-40 min)

The researcher will briefly introduce both programmes to the participants, showing them screenshots and briefly going through the types of exercises used and topics covered (5min). The participants will then be given 15 min to try out the first level of MoodGYM in pairs. They will be invited to talk out loud with their pair as they are going through the programme.

The participants will be provided with pens and post-its, and while viewing the programmes they will be asked to write down one thing that they liked and one thing that they disliked about the programmes. These will be used to facilitate and encourage discussion.

Discussion – Programme views

1) Programme look and feel
   What do you like/dislike about the look of the programme? Do you like the way the programme sounds? Would you change something? How important are these changes?

2) Ease of use
   Did you have any difficulties with going through the programme? Was it easy to understand what you needed to do? What did you think about the language, was it easy to understand?

3) Attention
   Did you like using the programme? Why/why not? What could get in the way of using the programme?

4) Relevance
Do you think the young people in your Youthreach Centre might be interested in using the programme? Why/why not? Who do you think the programme is designed for? Do young people use the internet to look for this kind of information?

5) Confidence
Do you think you could learn something from the programme? Do you think the programme could be useful/worth doing?

Discussion – Programme content
If the participants seem reluctant to talk about prefered programme topics, they can write down their answers on coloured cards, which then will be read out loud by the researcher with the participant’s consent.

“So, if a programme like this would be delivered to young people of your age, to help them feel better and improve their wellbeing."

- What kind of issues/topics should the programme cover? What kind of issues do young people of your age face in their lives?
- Do you think it would be important to have a programme like this available for young people of your age?
- What do you think the young people would hope to get out of the programme? What kind of changes/improvements would they hope to see in themselves? What kind of impact might these changes have on their lives (relationship with family & friends, school work, how they spend their spare time..)?
- What would YOU want a programme like this to do for you? What would you personally want to get out of it?

Discussion – Programme implementation
“So, if we were to roll out the programme (as it is today) at your Youthreach Centre.."

- Would you like to take part in it? Why/Why not?
- Can you think of anything that might make it difficult for young people at your Centre to go through this programme (e.g. problems with reading/writing, computer skills not good enough, young people not interested in computer games, not enough privacy in the classroom..)?
- What could be done to overcome these issues?
- Can you think of anything else that could be done to make the programme work at your Youthreach Centre? To make sure that the young people feel that the programme is relevant to them and that they will engage with the programme?
- What kind of training/support would be required for students, staff?
- Is there anything else that you think would be important to think about if a programme like this was delivered in Youthreach Centres?

Conclusion
The researcher will thank the participants for their time and offer to stay back if anyone has any further questions or comments.
Appendix 8. Student workshops- Participant information questionnaire (Paper II)

Youth Workshop - Participant Information Questionnaire

1. What is your date of birth?

2. What is your gender?
   - [ ] Male
   - [ ] Female

3. What is your year of study at Youthreach? (For example Year 1, FETAC 5)

4. How confident do you feel using a computer?
   - [ ] Not confident at all
   - [ ] Could use some help
   - [ ] Confident
   - [ ] Very confident

5. How often do you use the Internet?
   - [ ] Every day or almost every day
   - [ ] Once or twice a week
   - [ ] Once or twice a month
   - [ ] Less often
   - [ ] Don’t use the Internet

6. Do you play computer games?
   - [ ] Yes
   - [ ] No
   - [ ] Sometimes

7. Which of the two programmes did you like best?
   - [ ] SPARX
   - [ ] MoodGYM

8. If this programme was delivered at your Youthreach Centre, would you like to take part in it?
   - [ ] Yes
   - [ ] No
9. Have you visited other youth mental health websites before?
   - Yes
   - No

   Please list the websites you have visited

10. What kind of topics do you think a programme like this should cover? (For example self-esteem, drugs and alcohol)

11. What do you think young people would like to get out of a programme like this? (For example feel less angry, deal with stress better)

12. Do you have any other comments to make?
Appendix 9. Staff discussion protocol (Paper II)

Youthreach Staff Focus Groups

Prior to attending the focus group, Youthreach staff members will be provided with a study Information Sheet and Consent Form. They will also be given a link to both of the online programmes, MoodGYM and SPARX, and will be encouraged to spend time reviewing the first module of both programmes.

The focus groups will take approximately 45-60 minutes.

Warm up (5min)

Introduction
- Researcher introduces herself and provides background to the workshop
  - Overview of research project and rationale
  - Inspire and systematic review
  - MoodGYM and SPARX
  - Overview of focus groups and topics covered
- Round of names, role at Youthreach

Discussion (40-55min)

The views of staff on specific programmes (25min)

The participants will be reminded about MoodGYM and SPARX by showing screenshots and giving a short overview of both programmes.

So, if we look at MoodGYM first...

- What did you think about the programme?
  - What did you like about the programme? Why?
  - Is there anything that you didn’t like?
- If you think about the young people attending your Youthreach Centre, how appropriate do you think this programme would be?
  - Look, Sound, relevance of topics, Reading level, fun
- So overall, which one of the programmes did you like more? Which one would fit your Centre better?
Young people’s mental health and online mental health promotion (10min)

- If you think about the young people attending your Youthreach Centre, in terms of their mental health and wellbeing, what do you think are the main issues they struggle with/need help with?
- What do you/ your team currently do to help young people who are down or distressed?
- Do you see any challenges in providing the young people with the help they need?
- What do you think about the idea of delivering a computerised programme to support young people’s mental health and wellbeing? (Likes, dislikes, concerns, young people’s potential interest)
- Do you think it would be important to have a programme like this available for young people attending Youthreach?
- What would you hope that young people would get from such a programme? What kind of changes/improvements would you hope to see in them? What kind of impact might these changes have on their lives (relationship with family & friends, school work, how they spend their spare time..)?

Intervention delivery (10min)

- Training and support
  - If you were to deliver a programme like this at your Centre, what kind of training do you think would be needed for the staff?
  - What kind of support would be needed during the implementation?
    - From researcher, IT department, mental health, rest of the Youthreach staff
- Implementation issues
  - Do you foresee some possible issues in implementing such a programme at your Youthreach Centre?
  - How could we overcome these issues?
  - Can you think of anything else that would be important to consider in relation to the implementation of the programme?
- Timing and context
  - When and how would you prefer delivering the intervention?
Appendix 10. Staff discussions – Participant Information Questionnaire (Paper II)

Youthreach Staff Discussions - Participant Information Questionnaire

1. What province of Ireland do you work in?
   - [ ] Ulster
   - [ ] Munster
   - [ ] Leinster
   - [ ] Connaught

2. Do you work in an urban or rural area?
   - [ ] Rural (open countryside or village)
   - [ ] Dublin city
   - [ ] Urban (in a town with population of 1500+)
   - [ ] City other than Dublin

3. What is your age (select one)
   - [ ] 18 to 25
   - [ ] 26 to 35
   - [ ] 36 to 45
   - [ ] 46 to 55
   - [ ] 56+

4. What is your gender?
   - [ ] Male
   - [ ] Female

5. What is your current role?
   - [ ] Youthreach Coordinator
   - [ ] SPHE teacher
   - [ ] Guidance Counsellor
   - [ ] Counsellor
   - [ ] Other, please specify

6. How long have you been working in this profession?
   - [ ] Under 1 year
   - [ ] 1 to less than 6 years
   - [ ] 6 to less than 10 years
   - [ ] 10 to less than 20 years
   - [ ] 20 or more years

7. How confident do you feel using a computer?
   - [ ] Not confident at all
   - [ ] Could use some help
   - [ ] Confident
   - [ ] Very confident

8. How often do you use the Internet for professional purposes?
   - [ ] Every day or almost every day
   - [ ] Once or twice a week
9. In relation to young people's mental health and wellbeing, how much do you agree / disagree with the following statements?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel equipped to promote wellbeing in young people's lives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel equipped to determine if a young person needs mental health support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel equipped to help a young person if they have a mental health problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. How often in your job do you...

<table>
<thead>
<tr>
<th>Activity</th>
<th>Several times a day</th>
<th>Everyday or almost everyday</th>
<th>Once or twice a week</th>
<th>Once or twice a month</th>
<th>Less often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Come across issues related to student mental health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discuss mental health topics with a class of students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discuss students' personal mental health on a one-to-one basis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look for guidance on the Internet (e.g. Google search)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look for help on a dedicated mental health website (e.g. ReachOut.com)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look for guidance in books / journals</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

11. If a young person is experiencing a mental health problem, how likely are you to:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Very unlikely</th>
<th>Unlikely</th>
<th>Likely</th>
<th>Very likely</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consult with the young person's family / relative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Request</td>
<td>Likely</td>
<td>Very likely</td>
<td>Likely</td>
<td>Not sure</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------</td>
<td>-------------</td>
<td>--------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Consult with a colleague</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consult with another professional (e.g. GP, psychologist, health promotion officer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look for guidance on the Internet (e.g. Google search)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look for help on a dedicated mental health website (e.g. ReachOut.com)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look for guidance in books / journals</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Please state other sources of support you might use

12. How useful do you think it would be to deliver an online mental health promotion programme at your Youthreach Centre?
   - Not useful at all
   - Not very useful
   - Somewhat useful
   - Useful
   - Very Useful

13. How confident would you personally feel with delivering a computerised mental health promotion programme to students at your Centre?
   - Not confident at all
   - Slightly confident
   - Moderately confident
   - Very confident

14. Do you have any other comments to make?
**Appendix 11.** Scale to measure perceived helpfulness of SPARX-R (*Paper III*)

Please tick the box (1 = Very unhelpful to 5 = Very helpful) that best describes **how much SPARX has helped you** in the following ways.

<table>
<thead>
<tr>
<th></th>
<th>Very unhelpful</th>
<th>Unhelpful</th>
<th>Unsure</th>
<th>Helpful</th>
<th>Very helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change my behaviour in ways that have made me feel better.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Recognise negative thoughts about myself.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Not let negative automatic thoughts (GNATS) about myself get me down.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Show my feelings and reactions to important people in my life.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Have more satisfying relationships (for example with friends, boyfriend/girlfriend or parents)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Confront issues or problems that I struggle with.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Feel better about myself.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Manage my feelings (for example anger, sadness, frustration)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Please state other ways that you think SPARX has helped you:
**Appendix 12.** Scale to measure the extent of practicing the skills taught in SPARX-R (*Paper III*)

During the course of the programme you were asked to practice several ways of dealing with negative thoughts, feelings or situations. How often did you do the following?

<table>
<thead>
<tr>
<th>Practiced relaxation techniques such as muscle relaxation or controlled breathing</th>
<th>Never</th>
<th>Once or twice</th>
<th>About once a week</th>
<th>Several times a week</th>
<th>Almost every day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identified and made time for activities that make you feel better (e.g. play sport, be with family or friends)</th>
<th>Never</th>
<th>Once or twice</th>
<th>About once a week</th>
<th>Several times a week</th>
<th>Almost every day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tried to stop negative thoughts by thinking about something else, “trashing them” or “turning them down”</th>
<th>Never</th>
<th>Once or twice</th>
<th>About once a week</th>
<th>Several times a week</th>
<th>Almost every day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Practiced listening and negotiation skills using BLINC (bite your tongue, look at the speaker, be interested, no interruptions, check you understood)</th>
<th>Never</th>
<th>Once or twice</th>
<th>About once a week</th>
<th>Several times a week</th>
<th>Almost every day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Used STEPS to solve problems (say what the problem is, think of solutions, examine each solution, pick one and try it, see what happens)</th>
<th>Never</th>
<th>Once or twice</th>
<th>About once a week</th>
<th>Several times a week</th>
<th>Almost every day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identified positive things about yourself and your future</th>
<th>Never</th>
<th>Once or twice</th>
<th>About once a week</th>
<th>Several times a week</th>
<th>Almost every day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recognised your own negative automatic thoughts (GNATS) about yourself or a situation</th>
<th>Never</th>
<th>Once or twice</th>
<th>About once a week</th>
<th>Several times a week</th>
<th>Almost every day</th>
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<th>Tried to swap negative thoughts for more positive ones using RAPA (Reality check, Take another view, perspective, action)</th>
<th>Never</th>
<th>Once or twice</th>
<th>About once a week</th>
<th>Several times a week</th>
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*Adapted from Kuyken et al. 2013*
Appendix 13. Student post-intervention discussion protocol

(Paper IV)

Questions to guide student post-intervention discussions

- Overall, what did you think about the programme? (Any first thoughts, good, bad)

Look and design
- What did you think about:
  - The way the programme looked?
  - The length of the programme?
- What would make the programme better?

Language
- How did you find the language in the programme? (Easy/difficult to understand, confusing etc.)
- How did you feel when reading the information on the programme? (ok, annoyed, frustrated, angry, etc.)

Content
- How about the content of the programme, what they were talking about, any thoughts on that?
  - Was there something you thought was very good/bad/confusing/annoying?
  - Do you think it is important to learn about the things were cover in the programme? (Why/why not? When could this be useful/to whom?)
  - Is there something missing/something you wanted to know more about?

Helpfulness
- Do you think the programme could be helpful/make a difference to somebody’s life? (Why/why not?)
- Did you find it helpful?
- What do you think a programme like this could/could not do?
- Do you think the programme could have a negative impact on somebody/make them feel worse? (Who/why?)
  - Did it make you feel worse?

The idea of cCBT
- What do you think about the whole idea of doing programmes like this on the computer?
  - Good/bad
  - Anything you would be concerned about?
- Would you rather do this kind of programmes face-to-face? (Why/why not?)
- What do you think about doing computerised mental health programmes in Youthreach?
  - Would it be better to do it at home? Why/why not?
  - Should everybody take part or only those who are feeling down?