

# Project SAM: Developing an app to provide self-help for anxiety

# PART 1: REPORT

Phil Topham, Department of Health and Social Sciences Praminda Caleb-Solly, Department of Computer Science and Creative Technologies Paul Matthews, Department of Computer Science and Creative Technologies University of the West of England, Bristol October 2015



# **Contents**

Summary	2
Introduction	3
Background	4
Project SAM	5
Rationale	8
Models of change	15
Therapeutic structure	22
Self-help options	34
Legal and Ethical frameworks	44
Development and Evaluation	48
Promotion	52
Management	55
Project Review	58
References	64

Appendix I	Preparation
Appendix II	Structure
Appendix III	Self-help content
Appendix IV	Legal and ethical
Appendix V	Usability evaluation
Appendix VI	Management

# Summary

An interdisciplinary team at the University of the West of England (UWE) was commissioned and funded to develop a mobile phone app which would provide self-help options for the management of mild to moderate anxiety. The completed app would extend the range and availability of psychological support for student well-being at UWE and other higher education institutions.

The project team consisted of two computer scientists and one psychologist who were responsible for the technical, functional and clinical specification of the app. A local mobile app development company was appointed and the teams collaborated on the design, build and evaluation of the app. The self-help structure and components were developed in consultation with therapeutic practitioners, in and out of UWE. The developer team advised on and constructed multi-media features to realise the self-help aims of the app.

The UWE project team promoted an iterative approach to development, evaluating each stage of development through trials with expert users, practitioners and students. The app, named SAM (Self-help for Anxiety Management), was developed for Apple and Android operating systems, to be usable on smartphones and tablets.

SAM was launched in the app stores in July 2013, globally available and free to download for the first year of operation. It was promoted to students, educational institutions, mental health organisations and charities as well as a range of professional and informal contacts.

A UWE-based Advisory Board was convened to oversee the maintenance and development of the university's investment in SAM. Members include the project team, researchers, therapists and other staff with an interest in its use to support student well-being. Three key tasks of the Board are to ensure SAM's financial sustainability, to oversee developments in its usability and self-help components, and to obtain funding for the evaluation of its therapeutic impact.

# Introduction

In the UK's large and diverse higher education population, students suffer a range of common mental health problems yet are often reluctant to seek help. Anxiety in various forms is prevalent and may be caused or exacerbated by features of the current university experience. Sustained anxiety leads to unhealthy behaviours and conditions in vulnerable students, with subsequent impact on life-chances and quality of life. With limited resources and a proactive orientation to student health, universities are looking to online systems to enhance their student support services. In this context, mobile applications may offer an accessible and effective self-help facility. This report describes a UWE-funded project to develop a mobile app which will offer self-help options for learning to manage anxiety.

#### <u>Note</u>

- *i.* This report was compiled initially by the psychologist on the UWE project team (Phil Topham) and may be biased towards therapeutic aspects of the app's development: psychological bases, clinical structures, self-help options and user processes.
- *ii.* The project team discovered significant overlaps between interaction design and psychological self-help with regard to cognitive science, user engagement and social support.
- *iii.* Computer science colleagues on the project team (Praminda Caleb-Solly and Paul Matthews) were invited to supplement this report in order to reflect more adequately the contributions from both psychology and computer science.

# Background

The project to develop an app to provide self-help for anxiety was instigated by John Rushforth, UWE's Deputy Vice-Chancellor (Operations), in the context of increasing demands on student services and rising expectations of quality by students. The student experience is a strategic priority for the university while the growing prevalence of mental health concerns is comparable to that of the general population from which students are drawn.

For some years the university had invested in research and development focused on the student experience and on psychological support for students. One strand of research explored social anxiety in learning situations via student surveys at UWE and at the University of Plymouth (Topham, 2009; Russell and Shaw, 2006), leading the authors to propose a web-based support facility for students with social anxiety.

Discussion of this proposal with colleagues in the Department of Computer Science and Creative Technologies led to agreement on a final-year student project module to design a mobile app that would provide self-help for anxiety (Caleb-Solly and Mathews, 2011). The outcomes of that project module а successful funding application to UWE's HEAT supported network (http://www.uwe.ac.uk/research/heat/) for the development and evaluation of a prototype app to provide self-help for social anxiety. With the funding made available, the project achieved the following:

- Built a prototype app that profiles and records features of social anxiety;
- · Conducted usability workshops and trials with students ;
- · Demonstrated that students with social anxiety will participate;
- · Maintained a multi-professional project team;
- · Completed work to extended project deadline and within budget;
- · Engaged staff and students with aims and progress;
- · Reported progress via events at UWE and University of Plymouth.

Reflections on the therapeutic issues involved in developing a self-help app for anxiety management were explored in Topham, 2012. The project was highlighted in a review of innovative UK research: 'Big Ideas for the Future' (Research Council UK and Universities UK, 2011).

# **Project SAM**

Following the pilot project, university management advanced funding for the commercial build of a UWE-branded mobile phone app to provide self-help for anxiety. Based on surveys of smartphone platforms most used by students, it was intended that the app would be built for use on Android and iPhones and be available to download from 2012. In addition to its primary role in student support, the online global availability of the app could enhance the reputation of the university; it would also be a valuable research and teaching tool for the university in areas such as mobile health, interaction design and usability evaluation.

UWE students working on the prototype project had suggested that the app be named SAM, a friendly, gender-neutral title that subsequently became an acronym for 'Self-help for Anxiety Management.'

'The best model for developing the app will be with an external developer but with as much transparency and knowledge exchange in the development process as possible'. [PM, project team]

Consultation with UWE colleagues, with professional colleagues outside UWE and with trial users of the app was a key feature of the project. The outcomes of consultations and trial evaluations, including sample quotations, are reported in relation to the stages of design and development of the app.

# Specification

A Technical and Functional specification document for the app was drawn up by the project team (Appendix I). This drew on the workshop studies and user evaluations of a prototype app for social anxiety, on relevant research and on the professional experience of the project team in therapeutic psychology, mobile development, interaction design and web-based communities.

## Procurement

A commercial developer for the app was sought following guidance from the university's Purchasing Department for projects costing <£30K. Quotations against the specification document were obtained from three UK software companies with expertise in app development.

# Protection of intellectual property rights

The specification document was made available to prospective developers subject to their signing a standard university non-disclosure agreement. The specification document sought confirmation that

the chosen developer agreed that UWE would own the intellectual property rights to the application, design and source code. In addition to commercial considerations, the team anticipated drawing on this initial design as a template for further app development including variants on the current app and apps for other common mental health concerns.

#### Selecting a developer

Following university procedure, a summary of quotations was compiled for consideration by the Purchasing Department. The project team met with the project funder to evaluate the quotations and to identify the preferred developer. Apart from cost, key criteria were previous experience of developing health apps and constructive engagement with the proposed specification.

The preferred developer was identified as MyOxygen, a local software developer with long experience of developing for mobile devices and recent contracts to provide information apps for the health service (<u>http://www.myoxygen.co.uk/?g=home</u>) including a local NHS Health Trust.

Following re-negotiation of the specification agreement, the app development cost agreed with MyOxygen was £25K + VAT. The standard university purchasing agreement was drawn up and staged payments were agreed with the Purchasing Department to ensure that the developer, a small organisation, would not suffer liquidity problems as a result of waiting for payment until the end of the project. The stages were re-negotiated on one occasion, to mutual agreement, during the project period.

# Funding and Budgetary control

The project was funded from the university's Strategic Development Fund. £30K was made available with an undertaking to pay the necessary VAT on purchases made from that budget. As the project commenced towards the end of the 2010-2011 financial year, arrangements were made with Management Accounts to carry forward the funding to 2012-2013. The budget signatory was the Head of the Department of Psychology, with the Project Lead (PT) certifying that work had been satisfactorily completed for each staged payment. The project funder allowed the balance of £5k from the total budget of £30K to be held for other project-related costs. Costs for PCS and PM were covered by the Faculty of Environment and Technology research budget.

## Sustainability

In discussion with the funder and the developers, the initial proposal to charge a fee for downloading SAM was abandoned on the grounds that it would probably reduce the volume of downloads, thereby limiting accessibility to students and reducing reputational gain to the university. A proposal for a differential pricing mechanism that favoured UWE students was also abandoned

after finding that there was no provision for the mechanism within the app stores (Android and Apple).

It was agreed with the funder that SAM could be downloaded free for the first year of operation but that it would have to be sustainable after the first year. Options for achieving sustainability include charging a download fee, gaining research funding which also supported development, partnership with an outside agency, or licensing the app for use by other institutions. The app was not intended to make a profit but the income stream would need to cover web hosting, routine maintenance and software upgrades. Ideally, it would also provide for the enhancement of therapeutic content and usability features, and further development (e.g. specialised versions) using the app template and coding.

# Rationale

## Anxiety and its impact

*…anxiety represents a prominent manifestation across all areas of mental ill-health and is often an early manifestation of subsequent problems.*' [Psychiatrist]

One quarter of routine GP consultations in the UK are for people with a mental health problem, with anxiety and depression the most common. Mental illness costs the economy in the region of GBP 47 billion a year, with over GBP 15 billion in lost employments and GBP 10 billion in benefit payments. In 2006-07 the NHS in England spent £8.4 billion on mental health services (excluding substance misuse) for all age groups. This was the highest spend on any individual area of healthcare. (National Audit Office, 2007)

Across the countries of the European Union, the 12-month prevalence for anxiety disorders is 14%, the highest frequency of all mental health disorders surveyed (Wittchen, Jacobi, Rehm et al., 2010). Anxiety is associated with considerable economic costs owing to lost work productivity and high medical resource use (Hoffman, Dukes and Wittchen, 2008). Expenditure on anxiety medication in England tripled between 2002 and 2007 (NHS Business Authority, 2011).

Studies of adult mental health show that variants of anxiety co-exist (Goisman, Goldenberg, Vasile and Keller, 1995) and that there is marked co-morbidity with depression and somatisation (Lowe, Spitzer, Williams et al, 2008). Social anxiety is evident in 20% of cases of adult depression (Ohayon and Schatzberg, 2010) and depression is reported by 24% of university students with social anxiety (Topham, 2009). Anxiety in young adults has been linked to alcohol and substance abuse (Lopez, Jay Turner and Saavedra, 2005; Cranford, Eisenberg and Serras, 2009) and, across the age range, to suicidal ideation and attempts (Cougle, Keough, Riccardi and Sachs-Ericsson, 2009). Meta-analyses indicate that the quality of life and psychosocial functioning is significantly impaired in people suffering from persistent anxiety (Olatunji, 2007; Mendlowitcz and Stein, 2000).

## Anxiety and students

'I expect to see an increased amount of stress over the next few years due to students having raised expectations of themselves, and also additional pressure from parents or others who are providing the funding.' [Student Adviser]

In the academic year 2010-2011, there were over 2.5 million students in UK higher education (Higher Education Statistics Agency, 2010). Research in the UK, US and Australia indicates that mental health problems are prevalent and persistent in student populations (Zivin, Eisenberg, Gollust, Golberstein et al., 2003; Royal College of Psychiatrists, 2003) and that these have become

more severe in recent years (Kitzrow, 2003). The prevalence of anxiety-mood disorders in students has been estimated at 19-20%, significantly higher than in the general population (Andrews and Wilding, 2004; Stallman, 2010). In undergraduate students, levels of anxiety rise in the first year and, despite fluctuations, do not return to pre-university levels (Cooke, Berwick, Barkham et al., 2006). For university counselling services in the UK, anxiety in some form was the primary presenting problem for 28.8% of student clients, second only to depression (Association for University and College Counselling, 2007). A more recent survey by the National Union of Students has reported that, at some time during their university career, stress was experienced by 80% of students, anxiety by 55% and panic by 38% (NUS Services Ltd, 2013).

'Social anxiety is very widespread in students.....it always scores as the most common of our presenting problems alongside depression, (and the two are often inter-linked) in Counselling, so the need for the app is quite broad.' [Student Counsellor]

The impact of anxiety on academic achievement is variable and may depend on the form of anxiety (Seipp, 2007). The effects of <u>test or exam anxiety</u> are well-documented (e.g. Hancock, 2001) and research continues to explore its mediating variables (e.g. Eum and Rice, 2011). Approximately 10% of students report marked to very severe <u>social anxiety</u> in social and academic performance situations (Russell and Shaw, 2009). Social anxiety has been associated with withdrawal from secondary school (Van Ameringen, 2003) while university students have reported a significant impact on their ability to engage with learning and academic performance situations (Russell and Shaw, 2006). <u>Financial anxieties</u> have been shown to have an impact on academic performance (Andrews and Wilding, 2004) and the advent of an entirely fee-based HE sector in 2012 is unlikely to reduce this effect. Universities now regard anxiety and stress due to competing demands as significant threats to student health and well-being (Association of Managers of Student Services in Higher Education, 2010).

'If the app can make it easier for a student to access professional help this will be of benefit to those students who end up leaving the course simply because they cannot cope with the social aspect of attending, speaking in seminars or working on group projects or assignments, not because they cannot reach the required academic level.' [Student Counsellor]

Although the age range of most students (18-25) is also the period of peak onset for mental and substance use disorders, research reviews indicate few examples of prevention or early intervention with depression or anxiety in higher education settings (Reavley and Jorm, 2010). A recent study of young people aged 16-25 in the UK found that less than half of them (48%) would feel comfortable

talking to their G.P. about their emotional or mental health (Right Here Brighton and Hove, 2012), while Hunt and Eisenberg's (2010) report indicated that only a minority of U.S. students with anxiety disorders seek treatment. The barriers to help-seeking in student populations were identified as lack of time, privacy concerns, lack of emotional openness, lack of a perceived need for help, being unaware of services and scepticism about treatment effectiveness. Low emotional competence (Ciarrochi and Deane, 2001) and discomfort with emotions (Komiya et al. 2000) have also been indicated as factors which may inhibit university students from seeking professional or personal help. However, young participants in the Right Now study (above) did want to be active, well-informed participants in the decisions made about their health. They felt that being involved in decision-making helps them feel more in control and have a sense of independence, and often assists in their recovery. And Hanley (2009) showed that online counselling can engage young people who might not feel comfortable accessing face-to-face services, who prefer anonymity and want to stay in control of the pace of therapy.

#### Self-help

*'I think self-help and developing mental approaches for coping is going to be even more key (sic) for students in the coming years.'* [Student Advisor]

In a review of psychosocial responses to mental health concerns, Kazdin and Blase (2011) observe that there is insufficient resource to meet the global level of demand. Although face-to-face therapy is effective, resource limitations indicate that practitioners should think more in terms of prevention. They suggest that interventions which have a marginal impact should be employed if they can prevent or ameliorate distress such that more complex and expensive interventions are avoided. To that end, they argue that health providers should adopt a wider portfolio of therapeutic interventions, including self-help, beyond those currently in use.

The proposal for a mobile app for anxiety was rooted in the domain of self-help. Much personal change and development takes place without professional intervention, with research suggesting that self-help practices are the norm rather than the exception (Gianakis and Carey, 2011). Self-help by the individual occurs in three forms: independently seeking and utilising resources (autonomous self-help); being supported in making changes by a professional helper or social relationship (guided or augmented self-help); and through mutual arrangement with a group of fellow sufferers (peer self-help). Self-help involves both interventions and support and analogies can be drawn with formal procedures for personal development such as education and psychotherapy.

The rationale for self-help includes increased awareness and control of one's health, the benefits of making changes in vivo and, for some, increasing motivation to seek specialist help when needed.

Self-help interventions typically provide information about an area of concern (e.g. weight) and its impact on health; they may provide a tool for monitoring the concern (e.g. charts or diaries); they may also provide general guidance on how to make changes in the area of concern (e.g. dieting, exercise).

Self-monitoring of experience and behaviour is a long-established element of therapeutic interventions (e.g. McFall, 1970; Taylor, 1985). In a review, Korotitsch and Nelson-Gray (1999) offer explanatory models of self-monitoring, evaluate its contribution to assessment and intervention and identify the research gaps. Discussing the reactive (therapeutic) impact of self-monitoring, the authors note that:

'Although fairly small and transient, reactive effects have the advantage of being fairly immediate. These small but immediate improvements may help to maintain the client's initial investment in therapy.' (Korotitsch and Nelson-Gray, 1999; p.12)

Monitoring of psychological variables is central to cognitive-behavioural therapy (CBT), an evidence-based therapy for anxiety. Anxious feelings and thoughts, physiological responses and consequent behaviours can be quantified against individual baselines. A running record enables clients to reflect on their subjective states and behavioural responses, increasing clarity and a sense of control over previously chaotic and demoralising conditions. Crucially, self-monitoring helps to identify psychological variables and problematic situations for intervention, and subsequently to provide feedback on therapeutic change.

The active monitoring of symptoms and functioning is recommended practice within the UK National Health Service (NHS) stepped-care approach to common mental health issues such as mild to moderate anxiety and depression. The initial self-monitoring stage is maintained and complemented by options for independent or facilitated self-help (e.g. Kennerley, 2009) and, if required, by referral to face-to-face therapy (e.g. National Institute for Health and Clinical Excellence, 2011).

In their advice to practitioners providing psychological self-help, NHS Scotland (2006) suggests a three-level approach to using self-help resources. At Level 1, information is provided on common mental health problems. Level 2 provides advice on coping with psychological problems with sign-posting to services and sources of support. Level 3 is conceived as a

'Self-Directed Structured Plan: This material is self-directed.... It is reflective. The user records progress through observation of changes. When using the material, the user plans and implements changes to their behaviour/routine.' (NHS Scotland, 2006; p.3)

These practices are consonant with the views of our student participants. When they were asked to prioritise features for the prototype app, building a profile of their anxiety, monitoring anxiety levels

and tracking events were highly rated, together with access to sources of support and information about social anxiety and how to manage it.

#### Effectiveness of self-help

Self-help for physical and mental health concerns is well-established although its evidence base is somewhat uncertain (Khan, Bower and Rogers, 2007; National Institute for Mental Health, 2003). Research evidence for face-to-face therapies tends to be stronger and clearer than for self-help and is limited regarding online and mobile technology. A review in the pre-app era (Newman, Erickson, Przeworski and Dzus, 2003) was generally encouraging about self-help for anxiety while discriminating its impact with regard to types of anxiety and level of therapist contact.

Following a meta-analysis of self-help interventions for anxiety, Hirai and Clum (2006) were cautiously positive about the value of self-help with and without minimal therapist contact. They noted that some anxieties (e.g. social anxiety) are less amenable to self-help and that there is a lack of research evidence about its impact across the range of anxieties. There is most evidence of benefit where guided self-help procedures are based on a cognitive-behavioural model of change (Lewis, Anderson, Araya et al., 2003); although more evidence for CBT may be available, in part, because it is an approach that is focused on observable variables, can be standardised and is thus more amenable to randomised control trials.

Reviews of the effectiveness of self-help for anxiety are optimistic while being conscious of the methodological limitations of studies to date (van Boeijen, van Balkom, van Oppen et al., 2005; Papsworth, 2006). Routes and barriers to the use of self-help methods amongst professionals and clients have been explored (Khan, Bower and Rogers, 2007; Pratt, Halliday and Maxwell, 2009); considerations included matching self-help options to individual profiles, engaging clients to persist with the self-help programme, and balancing independent with guided self-help.

Cuipers and Schuurmans (2007) have shown that guided self-help delivered on-or off-line, is effective for people with a range of anxieties. Self-help - grounded and online - has been shown to be more effective for social anxiety than a waiting list control group (Furmark, Carlbring, Hedman et al., 2009) and a number of online programmes are now available (e.g. Shy No Longer, 2008). Studies on the therapeutic uses of mobile phones have included a controlled trial of anxiety management in students (Preziossa, Grassib, Gaggiolia and Rivaa, 2009) and a pilot study of adolescent mood charting using a mobile phone app (Matthews, Doherty, Sharry and Fitzpatrick, 2008). Fully automated online self-help programmes have achieved significant reductions in anxiety ratings (Klein, Meyer, Austin and Kyrios, 2011) while a systematic review of self-help for anxiety disorders showed that effectiveness may be improved by the addition of web-based and multi-media materials, an important consideration for our proposed project (Lewis, Pearce and Bisson, 2012).

#### Students and mobile technology

'The rationale for online self-help makes sense as does the highlighted emotional relationship that people have with their phones.' [Psychiatrist]

In their review of approaches to delivering therapy, Kazdin and Blase (2011) showed how technology in the form of phone, smartphone and web-based services can enable practitioners and self-help to reach larger numbers of people in need, including those who are harder to reach by virtue of location, demographics or reluctance to access traditional services. They noted that such technologies can enable therapy with little or no therapist contact; and can provide refined assessment and feedback to patients and to clinical services.

A large proportion of the current generation of university students have grown up interacting with technology from an early age. A mobile device is a natural communication tool, with an increasing number of students accessing information on the web via a smartphone ('47% of teenagers own a smartphone'; Ofcom, 2011). Additionally, mobile devices offer a higher level of portability, media capability, a sense of personal ownership and ability for personalisation, location awareness and connectivity of social networks. Ease of access to a mobile application may be a significant element in engaging users who are reluctant to seek help through other channels while the ubiquity of mobile phones may enhance their acceptance as a tool for self-help. The user has control over the level of privacy and the depth of engagement with the application.

As in face-to-face therapy, there may be therapeutic benefits from having a mobile facility to practice self-help options for managing the immediate experience of anxiety. These include being able to conduct self-monitoring *in vivo* and speed of feedback where self-help is supported by peer or therapist, increasing commitment to the self-help process (Preziosaa, Grassib, Gaggiolia and Rivaa, 2009).

#### Target users

The app was funded to enhance student support but, as it could be downloaded from the Apple and Android app stores, would also be available to the general public. We were informed that a studentonly download from the app stores was not possible, although there were differential pricing options whereby a basic version would be free with a fee being charged for additional features. After discussion with the funder, we agreed to develop and promote the app for general (student

and non-student) use, for reasons that were therapeutic, reputational and economic:

1. The student demographic and its mental health profile increasingly match that of the general population from which students come and to which they return; this reduces the rationale for a student-specific app.

- 2. Academic staff tended to focus on the potential of the app to provide support for student learning anxieties. In contrast, the psychologist on the team with experience of student counselling (PT) held a view of student concerns being multiply-determined, as in the general population (see, for example, Cramer, Waldorp, van der Maas and Borsboom, 2010). From this perspective, self-help for anxiety involves developing generic skills as well as managing specific challenges.
- 3. The (UWE-branded) app was to be promoted to substantial numbers of students beyond higher education: students in further education and in age 16+ secondary education; also to international students considering higher education in the UK and particularly at UWE. The reputational gain for the university arising from a widely-used and effective app would be significant;
- 4. Large-scale uptake of the app, free of charge for the first year, by students and the general public would enable a small download fee to be charged, sufficient to support ongoing maintenance and software upgrades;
- 5. A download fee with national or global uptake could also support the development of specialist variants of the app (e.g. for social anxiety in learning situations) and apps for other common mental health concerns (e.g. mild to moderate depression);
- 6. The necessary evaluation and longer-term development of apps would ideally involve partners in the health sector who serve the general population; arguably, research funding bodies would be more welcoming to bids with a wider public health focus.

# Models of change

Designing the app presented a number of challenges. The field of mental health apps was new, relatively small and diverse (for a summary, see Topham, Caleb-Solly, Matthews et al. 2015); there was no conceptual basis or standard design for a self-help app although research in self-help and in psychological therapies offered a range of possible approaches; there was little practice-based evidence to inform decisions about the content and process of a self-help app for anxiety.

In the project team's favour was a commitment to user involvement together with a willingness to debate and consult on psychosocial change processes and their implications for the design of mobile self-help. We studied generic models of personal change, structural models of self-help and models of therapy in order to find ways of framing mobile self-help as a human change process. These are outlined below, together with their implications for the design of the app.

#### Generic models

The <u>Trans-theoretical Model of Behaviour Change</u> identifies a person's readiness to engage in making personal changes through five stages: Pre-contemplation, Contemplation, Preparation, Action, Maintenance (Prochaska and DiClemente, 1983; 2005). People engage in cognitive, affective, and evaluative processes to move through the first three stages. When they take action to make personal change and work on its maintenance, they rely more on commitment, conditioning, environmental controls and social support. This suggests that a self-help app should provide a progressive range of features for inviting and supporting changes in user behaviour.

We assumed that users and potential users of the app will engage with self-help in general accordance with this model. We assumed that, initially, many will cluster round the second and third stages: they will contemplate addressing their anxiety concerns or will be making preparations to do so, perhaps by considering some small changes. Some may be already committed to the fourth stage of taking action and some might become so.

Taking an educational perspective, the <u>Kolb Learning Cycle</u> comprises four distinct, linked aspects of learning (Kolb, 1984). The cycle can be entered at any point but all aspects must be addressed in sequence for successful (complete) learning to take place:



The Learning Cycle indicates that it is not sufficient to have an experience in order to learn. It is also necessary to reflect on the experience in order to make generalisations and formulate concepts which can be applied to, and which must be tested out in, new situations. The learner must make the link between theory and action by planning, acting out, reflecting and relating outcomes back to theory.

The Learning Cycle suggested to us that a self-help app should offer opportunities for reflection as well as providing information and self-help activities. It provided a basis for presenting the app as a psycho-educational tool, an orientation that may be preferable for users who do not wish to associate their anxieties with mental health treatment. It also framed a self-help app as a tool to be used, thoughtfully and intentionally, rather than as a passive source of data, stimulation, entertainment or intervention.

The <u>Skilled Helper Model</u> (Egan, 2002) describes a structure of helping for a counsellor or therapist working with a client. It identifies the key focus at each stage of the therapeutic process and has validity for a range of helping roles.

Stage 1: Exploration				Stage 2: Understanding				Stage 3: Action			
Focus	on	feelings	and	Focus	on	insight	and	Focus	on	making	and
sensations				understanding				evaluating changes.			

In this model of helping, the client may enter at any stage and, rather than a linear progression, help-seeking is understood to involve an iterative cycling between stages. It therefore offered a flexible framework within which to locate an individual's self-help activities. It suggested core structures for a self-help facility while its flexibility of access appeared particularly relevant to the idea of mobile, personalised self-help.

# Models of self-help

We identified several models of self-help processes which could inform the therapeutic structure of a mobile app:

The <u>Linear Model</u> draws on the traditional medical model, outlining a sequence comprising Assessment > Diagnosis >Treatment selection > Monitor and Review.

In contrast, the <u>Core and Options Model</u> offers a core curriculum with additional options for the user to select from according to need. An example focused on anxiety management might look like this:



(Adapted from Bennett-Levy et al., 2010)

The <u>Snowflake Model</u> is a variation on the Core and Options Model. There is no core curriculum and the user selects the area of concern or interest from the available options:



(Adapted from Bennett-Levy et al., 2010)

Guidance may by located within and specific to each option and this may suit users who are clearly focused in their concerns and do not feel the need for more general guidance.

The <u>Reciprocal Interaction Model</u> (Creer, Holroyd, Glasgow and Smith, 2004) is based on studies of how people manage long-term health conditions such as asthma or arthritis. Creer and colleagues write that the self-management of chronic conditions has often been seen as a linear process: assessment and information lead to decisions about intervention; action is then taken and evaluated and so on. They suggest that successful self-help programmes are not necessarily a linear process but that

'a reciprocal process is continually taking place among the different processes of selfmanagement....as patients are experiencing the condition, they are the ones who often know the best way to manage it'. (Creer, Holroyd, Glasgow and Smith, 2004; p.726.)



(Adapted from Creer, Holroyd, Glasgow and Smith in Bergin and Garfield 2004, p.726)

Through the process of reciprocal interaction, the user becomes progressively more proficient at selecting the self-help resources that are best matched to their needs and preferences; again, this is consonant with the idea of enabling mobile users to personalise their apps, not for aesthetic reasons but in order to shape the most personally relevant self-help facility.

These structural models suggested some of the strategies by which users may construe and navigate self-help pathways. As with face-to-face therapy, we assumed that some users may focus on achieving the endpoint of a personal change sequence (Linear Model) while others may choose to work within an ongoing process (Reciprocal Interaction Model); the choice may reflect the user's usual approach to problem-solving, helpful or otherwise. For self-help users this is more likely to be implicit, whereas access to professional help is likely to involve an explicit model or choice of

models. In an app, the choice of self-help model will depend on the degree of flexibility built into the structure of the app and the guidance given to users.

All the models assume that users will engage in self-exploration or profiling in order to guide their self-help activity. Some users may explore and evaluate self-help-options without profiling, although it is difficult to see how this would be effective unless the user is working from some prior knowledge of self. Alternatively, using the analogy of dipping into the pages of a new book, it might indicate a preference for playful exploration of self-help resources prior to a more systematic approach; or, considering the Trans-theoretical Model of Change, indicate a period of Contemplation prior to committing to self-help.

## Models of therapy

A <u>Self-Management model</u> (Kanfer, 1970) has been used by Matilla (2010) to design an app for health management (e.g. weight reduction or fitness enhancement), comprising a three-stage feedback-loop for implementing behavioural change:



(Kanfer, 1970; adapted from Mattila, 2010)

This cyclical approach to health behaviour change is similar to early models of social behaviour used for socials skills training (see Argyle and Kendon, 1967). It identifies functions that would be useful in a mobile health app (e.g. self-monitoring) but without reference to emotional experience or the impact of cognitive processes.

These were included in our prototype app for social anxiety. Its therapeutic structure was based around the <u>Five Areas</u> approach, developed as an accessible format for the assessment of anxiety and depression in clinical settings (Williams, 2001a; Wright, Williams and Garland, 2002). The Five Areas are affect, cognitions, physical symptoms, behaviour and social context. They feature in models of anxiety (e.g. Beck, 1997) and social anxiety (e.g. Clark and Wells, 1995) and were

prevalent in our student surveys as anxious feelings, anxious thinking, physiological responses to anxiety and the avoidance of anxiety-provoking learning situations. The prototype was developed sufficiently to enable profiling of the user's (social) anxiety in accordance with the Five Areas approach; the therapeutic structure of the subsequent working version was further informed by two major models of psychological change.

#### A CBT app with a humanistic ethos

Research has demonstrated the importance of cognitive processes and styles in everyday functioning and <u>Cognitive Behaviour Therapy</u> (CBT) is now established as an evidence-based therapy for a range of psychological concerns (e.g. Salkovskis, 1997; National Institute for Health and Clinical Excellence, 2011). CBT involves the semi-structured exploration and functional testing of cognitive-emotional processes in order to moderate those which contribute to personal distress and dysfunction.

Therapist-led CBT requires the establishment of a strong working relationship between therapist and client and a commitment to therapeutic activities ('homework') between sessions. Clients engaged in CBT for anxiety will learn to monitor psychological variables, to identify triggers for anxiety, understand processing biases, programme self-help activities and target situations for change. Elements of this therapeutic structure that have been replicated online and in computerised packages have been shown to be effective (Barak, Hen, Boniel-Nissim & Shapira, 2008; Bennett-Levy, Richards, Farrand et al, 2010). Recommendations for self-help using CBT include the following elements (Improving Access to Psychological Therapies (2010) :

- Engaging the person
- Identifying key problems and goals
- · Identifying appropriate self-help materials
- · Supporting the person in their efforts to change
- · Use of measures to help assessment and review progress

This structured approach and focus on observable variables (goals, materials, measures;) appeared well suited to a mobile app.

A second major approach to psychological therapy holds that intentional engagement with self-help reflects an inner-directed drive for change and a potential for self-healing. This is the central assumption of the <u>Humanistic</u> philosophy of personal change and development (e.g. Rogers, 1951). The humanistic model predicates a less instrumental and more relational view of the person. It assumes a basic trust in the individual's ability to make the best choices for their well-being and

development. While mobile industry standards require a focus on the user experience of the app, the humanistic model invites attention to the person of the app user as an active and autonomous agent of self-help.

We recognised that trust in the autonomous user may not rest so comfortably with institutional providers of self-help facilities who are concerned with risk, duty of care, consumer rights and legal redress for harm. Nonetheless, autonomy is a primary goal of human development and, in terms of being able to help ourselves, is the default setting for adult functioning. When mental health is severely impaired, autonomy may be challenged to the extent that the individual becomes dependent on therapeutic or medical support. For lesser mental health concerns, the sense of autonomy remains strong and can drive self-help behaviour; thus there are psychological and ethical arguments for an app with a humanistic ethos.

#### <u>Note</u>

We were aware that cognitive-behavioural and humanistic approaches to psychological therapy represent Western philosophical traditions which tend to privilege the individual over the group, community or society. The emphasis on autonomy, and self-esteem, as primary goals of adult development is not universally shared.

In other cultural traditions, 'self-help' may involve a greater input from the community than is evident in western cultures. It is unclear how the ongoing globalisation of mobile usage and smartphone communication will impact on such traditional values and practices.

One argument is that anxiety is a universal response which is suffered individually; one response is to ensure that the evolving design of mobile health apps provides the flexibility for them to be used across both individualistic and collectivist cultures.

# Therapeutic structure

## Requirements

The outline requirements for the app were initially set out by the project team in the Technical and Functional Specification document (Appendix I). The design requirements were the collective responsibility of the UWE project team with individual members taking responsibility for their areas of expertise. The therapeutic structure of the app built on the profiling structure of the prototype and its user evaluations to include a range of self-help options and a social networking module. The design was informed by the models and perspectives reviewed above and through consultation with practitioners and other professionals working in the health and education sectors.

#### Consultation process

Given the stated aim of a generic app for a diversity of users, it was important to obtain a wide range of informed opinion as to how that might best be realised (for a list of contributors, see Appendix I). Considerable efforts were made to consult with therapeutic practitioners and other relevant professionals throughout the planning and design stages with regard to:

- The rationale and specification for the app
- The general ethos and content of the app
- The selection of specific self-help options

The consultation responses, collated with user feedback from the prototype project, helped to inform the therapeutic structure and provided many recommendations for the self-help content. We did not expect to adopt every recommendation but we did consider each one and how it might usefully influence and integrate with the aims and ethos of the app. Costs and time were constraints, as was the aim of producing a therapeutically coherent device. Judgements were made; examples of these and their rationale are included in the following sections.

When the initial wireframes and, later, the app walkthroughs were produced by the developers, their functions, features, navigation and ethos were reviewed for congruence and completeness with reference to the earlier consultation responses. This comparison process was repeated when working versions of the app were built.

# **Rationale and Specification**

In the first round of consultation, a paper on the Rationale for the app together with the draft Technical and Functional Specification document was sent to a small group of practitioners for their consideration and comment (Appendix I). Respondents agreed on the impact of anxiety and were positive about the value of a self-help app. They offered suggestions for the therapeutic structure together with some general views and cautions about mobile self-help.

'Need to exercise care regarding what the app may open up. In introducing the app to users, be clear that it is to help them work on current anxiety concerns rather than issues from their past.' [CBT therapist and trainer]

'I see an app as immediate help/reassurance in that it can give information about the physical and mental symptoms of anxiety, much in the same way that psycho-education courses operate.' [Senior Mental Health Care Practitioner]

'In developing the app, you need to proceed with caution, because some students will be 'frightened of being frightened' – in other words it is hard for them to tolerate knowing more about their own anxiety. They may be helped by some 'normalising' about anxiety, and how we need a certain level of it for self-protection, and how it is part of the existential experience of being human, particularly as a young adult.' [Student Counsellor]

*'I would see it as a useful vehicle for offering hope, reassurance, problem solving and encouraging continuation through gratitude for continued use.'* [Psychiatrist]

There were differences of viewpoint amongst the professionals consulted which - allowing for it being an unsystematic sample - may have reflected differences in professional training and workplace (e.g. NHS clinical psychologist vs. independent psychotherapist). These were not universal and may also have reflected personal value systems around the philosophical basis of therapy (e.g. humanistic vs. cognitive-behavioural). For example, a concern expressed by several respondents on the Clinical Psychology Forum was that the app and its phone could be used as a form of safety behaviour. Safety behaviours are those thoughts, words of deeds which people employ to cope with their anxiety. Their habitual use stops people from facing their anxieties and working to overcome them. Avoidance is a commonly-used safety behaviour (phobic and social anxieties); others include talking to much (social anxiety), over-preparation (performance anxiety) and the use of drugs and alcohol (all anxieties). Thus a primary goal of CBT for anxiety is to help people give up their safety behaviours and to learn more useful strategies. Our view was that if, for some users, using the app was a safety behaviour then it was unlikely to be causing harm (an ethical requirement); and that if the user was working with a psychologist their use of safety behaviours would be addressed as part of the therapeutic strategy.

Another concern was that the self-profiling option could lead to hyper-vigilance, a tendency to constantly check one's anxiety levels at the expense of doing anything about them. This concern would be particularly relevant when working with people who have severe and entrenched anxiety, as NHS clinical psychologists frequently do. In this case, we included guidance text on the anxiety profiling screen suggesting to users that they did not need to profile their anxiety more than once a day.

One expectation had been that the consensus of consultation recommendations would be for a 'pure', diagnosis-driven tool that would offer users a structured set of CBT self-help options - and some such recommendations were made. While no therapy can be considered effective if it does not result in changes in thinking and/or behaviour, CBT is not the only model for achieving these (for a review of alternatives, see Elliott, Greenberg and Lietaer, 2004). And CBT may not be every client's choice as individuals tend to prefer models whose rationale fits their own understanding of their problems (Khan, Bower and Rogers, 2007). But, overall, consultation responses on the rationale and specification of the app encouraged our preference for a holistic approach to the therapeutic structure and made clear that it could embrace a range of therapeutic factors.

#### Therapy analogue

'I think these days people's phones are extremely important to them as are the apps they have on them.' [Counselling Psychologist]

Using an app may not be equivalent to a face-to-face meeting with a psychological therapist, but we found it helpful to consider the former as an analogue of the latter. Our assumptions were (1) that common change processes are involved and (2) that theory and practice in the psychological therapies are at least partially transferable to online self-help. (See Lamproupolis 2001 for an exploration of change processes across different categories of social interaction).

This <u>therapy analogue</u> enabled an overview of the user-plus-app as a therapeutic whole while drawing attention to specific therapeutic issues to be considered. It provided a framework for evaluation of the app, during development, as a quasi-therapeutic facility for self-help. Together with team reflection and external consultation, it helped to draft the boundaries of the app's capability.

#### Contracting

As with commencing face-to-face therapy, people who engage in self-help are making a psychological contract with themselves to bring about change. A psychodynamic view is that the functioning adult of the client takes dysfunctional aspects of self (hurt, anxious, distressed) to the

therapist and contracts for a period of therapy. This notion of an adult intentionally engaging with a therapy is equally applicable, as a necessary first act, to the user of mobile self-help.

The Health Beliefs Model (Becker, 1974) proposes that individuals engage in therapeutic activity if they believe that: their health is being seriously affected, that the proposed intervention will be effective, and that the benefits will outweigh any disadvantages of the intervention (Redding, Rossi, Rossi et al., 2000). It is particularly important to protect users who are lacking support and guidance, or are otherwise vulnerable.

Thus an app that offers self-help for mental health concerns should provide guidance about its use and its limitations, information about its focus (e.g. anxiety) and links to sources of professional help. These provisions address potential users' health beliefs, set appropriate user expectations and contract an ethical framework for mobile self-help.

#### Containment

'One's smartphone can symbolise many things.... the app could come to represent a storehouse of benign authority and positive validation.' [Psychotherapist]

A mobile application has the potential to provide emotional relief by virtue of its immediate accessibility. A useful concept from psychotherapy is that of <u>containment</u>: the idea that the usability and self-help features of the app might provide emotional holding or support until such time as anxiety remits or the user is able to access face-to-face support. We assumed that mobile users would expect helpful features for when their anxiety is more intense, such as

- · Clear signage and a reassuring style of communication;
- · Information about the normal and self-correcting nature of anxiety;
- · Basic self-help options to moderate physiological symptoms;
- · Multimedia features to distract attention from anxious thoughts and feelings;
- · Links to social and professional support.

A sense of control follows from emotional containment, gaining perspective and exercising self-help options. Effective containment of immediate anxieties will give confidence in further use of the app as a psycho-educational tool for learning to manage anxiety. One example, discussed in the team and in consultation, was whether to use 'My anxiety' or 'Your anxiety' in app labelling and guidance (e.g. the profiling function 'How's my anxiety right now?'). The conclusion was that either was acceptable and that both might contribute to the internal ('My') and external ('Your') containment of anxiety.

#### **Common factors**

*`...overall I think the motivation will be from the perceived usefulness/effectiveness of the app.'* [Counselling Psychologist]

There are 'common factors' in the context and delivery of psychological therapies (Lambert and Bergin, 1994) which have been shown to influence the course and outcomes of face-to-face therapy, independent of specific therapy models.

A useful starting point is the notion that people seek help because they feel demoralised (Frank and Frank, 1993). In the case of anxiety, they seek help when their anxiety has become intolerable, in intensity and duration, and because they feel unable to reduce or manage its impact. Remoralisation - the instillation of hope - is an initial and significant benefit of therapeutic contact and a motivator for further engagement in therapy. In addition, the credibility of the therapy offered is a predictor of therapy outcomes (Meyer, Pilkonis, Krupnick et al., 2002), while a sense of autonomy in the client enhances therapy outcomes and their maintenance (Ryan and Deci, 2008). Topham (2012) has proposed that factors such as these may transfer to mobile self-help and may be induced by an app which, as discussed below, is suitably engaging.

#### Working alliance and user engagement

'I would definitely recommend any format that increases engagement in a self-help process, a relational model would be a good way to do this.' [Psychiatrist]

Face-to-face therapy starts with the creation of a working alliance between therapist and client that is linked to the therapeutic task (Horvath and Symonds, 1991). Therapeutic change requires commitment (Gianakis and Carey, 2011) and the working alliance involves an emotional bond with the therapist which supports clients to engage with the challenges of therapy. That bond is more likely to evolve where clients experience the therapist as trustworthy and able to contain distress; where clear expectations of therapy are communicated and where, as above, the therapy is perceived to be rational, credible and relevant.

Drawing a parallel with the working alliance, a key aspect of mobile design where the members of the interdisciplinary project team found common ground was the importance of user engagement with the app. A survey of smartphone users (n=395) by the U.S. Consumer Health Information Corporation (2011) showed that 26% of apps were downloaded and used only once. Of the people who confirmed using their apps, 74% dropped out by the 10th use, while 26% were used repeatedly. Nearly 50% of those who stopped using did so because the apps were not engaging or user friendly.

It is clear that people have strong relationships with their mobile phones (Vincent, 2006); phones store significant personal contacts and information (including pictures) which symbolise the socioemotional life of the user and, as for consumer purchases in general, may enhance the sense of self (Belk, 1988). Thus there is a positive attachment to the phone, there are positive expectations of its use and it has credibility as a source of well-being. Such emotional bonds may parallel the positive transference to a therapist which is a component of the working alliance and a pre-requisite for engagement with face-to-face therapy (Mikulincer and Shaver, 2007).

Research into the emotional experience of using online devices suggest that positive emotion is stimulated in the user in order to maintain engagement (e.g. Menon and Kahn, 2002) and may also support persistence with self-help programmes by, for example, recording instances of gratitude (Geraghty, Wood and Hyland, 2010).

We assumed that the conditions for emotional engagement with mobile self-help would parallel face-to-face therapy and would be communicated by careful selection and evaluation of all the components of the app, but particularly its usability, communication style and multimedia ethos.

#### User characteristics

As with help-seeking in general, engagement with self-help for anxiety - including whether it is an option at all - will be influenced by personal considerations such as:

- · Intensity of distress
- · Availability of support (personal and professional)
- · Personality factors (e.g. optimism, openness)
- · Coping strategies
- · Attitude to help-seeking
- · Previous experience of self-help
- · Familiarity with online devices

We expected users to be diverse in their experience of anxiety, their attitude towards it and their motivation towards addressing its impact. Some users would want an immediate remedial response in panic situations. Others would want a managed change in their anxieties and be prepared to work at it over time. The Trans-theoretical and Health Beliefs models of change, above, suggest that some people would just be 'visiting' the app to see what might be possible were they more motivated to use it. As with face-to-face therapy, we expected that the domain of mobile self-help would attract its visitors and explorers, the ambivalent, the cautious and the committed.

#### Navigating the self-help process

*'It would benefit from flexible, non- formulaic pathways to enhance engagement.'* [Psychiatrist] *'Don't make the app too complicated.'* [Psychotherapist]

The model of Reciprocal Interaction offers a flexible rationale for how users might engage with a self-help app while, in a study of individuals' use of self-help, Marley (2011) concluded that:

'the experience of emotional distress and subsequent use of self-help is complex and multidimensional, involving a number of factors....' (Marley, 2011; p.323.)

She suggested that people will select self-help methods with which they are familiar and that they have found helpful. And writing about the application of cognitive-behavioural therapy interventions for generalised anxiety disorder, Newman and Borkovec (1995) advised that:

*Within these interventions, clients are taught multiple techniques. This allows the client to experiment with a variety of strategies to determine what works best for them and helps to establish flexible choices to combat previous rigid modes of responding.* 

(Newman and Borkovec, 1995; p.5.)

We assumed that mobile users would employ varied ways of engaging with the app, its options and features; and, maintaining the analogy with face-to-face therapy, that users would explore self-help content within a process of engagement. Navigation of an app for anxiety does not have to be linear; some users might wish to start with information about anxiety, others might go straight to the options for self-help. Some users would be methodical in their approach, others would be more organic. Overall, reflection on help-seeking and psychotherapy processes suggested that styles of engagement with a self-help app could include:

- · Crisis-driven, high-arousal search for symptom relief
- · Intermittent, unreflective use for reassurance
- · Playful, exploratory trials of self-help options
- · Intuitive, organic processing of options and features
- · Structured engagement from profiling to outcome evaluation

These engagement styles are not exclusive and might be utilised at different phases of a sustained self-help process. Some, such as intermittent use for reassurance, appear less likely to result in sustained and useful engagement. Others, such as the intuitive and structured styles, reflect models of change and self-help outlined above. We assumed that, in the world of mobile self-help, therapeutic process would be directed by the large and diverse population of users.

Trial participants experimenting with an app to promote emotional self-awareness were able to grasp the key concepts and to use them creatively to help themselves and to empathise with others (Morris, Kathawala, Leen et al., 2010). In trials of our prototype app for social anxiety, it was clear from comments on and observation of their use of apps that student users were critical consumers of the health apps market and other interests. Their close relationships with their laptops and phones meant that they had acquired a facility - manual and cognitive - for working with digital media; they would bring that facility to their use of apps for self-help.

Given the diverse user population, the views of consultants and our consideration of models, above, the design decision was to enable a range of engagement styles. The cost of that decision was that any one style (such as a structured, CBT approach) would be less well-resourced than in its standalone format. On balance, we concluded that options for creative and flexible engagement with the app would be better suited to the mobile user.

#### Defining personal concerns

It is difficult to consider solving a problem without first identifying it; this is the function of assessment and appraisal processes in many domains including psychological self-help. Observing and recording personal concerns moves the mobile user from contemplating change to preparing to make changes (Prochaska and DiClemente, 2005), hopefully reinforced if they continue to monitor their progress. From a psychodynamic perspective, information-seeking and recording serve to contain anxieties by identifying them and making them concrete. From a humanistic perspective, developing a non-judgmental attitude to one's own psychological processes through self-observation and reflection facilitates openness to change. From a cognitive behavioural perspective, profiling of anxieties and situations enables choices about goals and tasks to achieve them.

We intended the app to be useful for mild to moderate levels of anxiety; for people whose anxiety is a concern but which probably does not meet criteria for the clinical diagnosis of an anxiety disorder (such as a single phobia or social anxiety disorder). Persistent and/or high levels of anxiety would warrant their (self-) referral to a psychologist or psychiatrist who can offer a diagnosis and treatment with the appropriate evidence-based intervention.

We knew from consultation with self-help agencies such as AnxietyUK that some clients feel reassured by symptom checklists summarised with a diagnostic label; we knew from therapeutic experience that others can feel stigmatised by the implied association with mental illness. Self-profiling of anxiety could enable app users to make a quasi-diagnosis based on criteria from the Diagnostic and Statistical Manual or the International Criteria for Diseases, yet there are many who suffer from anxiety who would not reach the diagnostic threshold. And the capabilities and user context of a mobile app do not equip it for the diagnosis and treatment of anxiety disorders. On

balance, we decided not to offer diagnostic self-assessment but to provide links to further information and professional support for those who might prefer that option.

Researchers have proposed that the assessment and treatment of emotional disorders could more usefully focus on elements which disorders have in common, rather than on the signs and symptoms of a specific diagnosis (see Barlow, Farchione, Fairholme et al. (2011) for an elaboration of this <u>transdiagnostic</u> approach). The various forms of anxiety, diagnosable or otherwise, have a common neurophysiological structure and manifest common features such as physiological arousal and ways in which individuals process threat-related information: anxious individuals typically overestimate the extent of a threat and of its impact while under-estimating their ability to cope with it (See Salkovskis, 1997; Bar-Haim, Lamy, Pergamin et al., 2007).

Practitioner consultation supported this perspective on mobile self-help for anxiety as potentially more applicable to users who do not meet, or seek, diagnostic criteria. In addition, we were inclined to the views that

(1) Anxiety is intrinsic to the human condition, a structural and existential given rather than a pathological entity; and that

(2) Individual anxiety response styles are learnt; they can be identified and, to some extent, unlearnt.

Nonetheless, reference to diagnostic criteria for anxiety disorders was helpful in guiding the design of the app to ensure that it offered functions and features that addressed the range of anxiety experiences (Appendix II). This referential process also identified symptoms of anxiety such as insomnia and obsessive thinking which we decided were outside the current capabilities of the app. There were constraints on how much we could afford to include and there was a lack of relevant clinical expertise in the team. Insomnia, for example, is a major problem for the UK population with much invested in research and intervention. We judged that our design could only incorporate a superficial level of self-help on these topics and opted to omit them rather than offer a partial resource.

Such exclusions suggest that health apps cannot be both generalist and specialist without becoming unduly complex. Functionality decreases with a generalist model but a generalist model is accessible to more users. Nonetheless, there may be ethical dilemmas in offering self-help options that are incomplete and/or less effective in comparison to best practice in face-to-face therapy.

#### The anxiety profile

The therapeutic structure of the app was centred on a four-factor self-appraisal of the user's experience of anxiety ('How's my anxiety right now?'). The initial aims of profiling are to increase the user's awareness of the dynamics of their anxiety response and to help them focus self-help activity. Monitoring the profile over time enables them to review progress and, where positive, helps

to reinforce engagement with self-help. An instruction to the developers detailed the therapeutic rationale for these functions (Appendix II).

In designing the profiling function we took account of user feedback on the prototype app. As described above, the profiling component of the prototype was based on the Five Areas approach to therapeutic assessment, four of which are domains or dimensions of human experience. Continuing with this approach, we drew on common features of anxiety identified above to construct a four-factor profile, inviting users to rate the intensity of their experience with regard to:

- · Feelings of anxiety and tension
- · Unpleasant physical sensations
- · Worrying thoughts or images
- · Avoiding things I fear

Each factor could be rated on a scale of 0 (no anxiety) to 100 (maximum possible anxiety); the ongoing record is presented graphically for reflection and review. The wording of each anxiety factor on the profile was chosen to minimise ambiguity and to maximise semantic separation from the other factors. We accepted that the wording would be vulnerable to user interpretation although we assumed that the user would be internally consistent, and that the overall profile would be coherent to the user.

The four-factor anxiety profile and its ongoing record allowed users to work towards a systematic understanding of their anxiety and its impact. With appropriate guidance, this dimensional self-appraisal aimed to enable a reflective approach to self-help which is functionally distinct from apps whose primary aims are to reassure and resource the user through providing information, or to provide cognitive-motor challenges with increased arousal, as in gaming.

There is a further, separate function for users to profile anxiety-provoking events and situations which are of concern to them and that they wish to target with the support of self-help activities. This function allows users to describe the event in their own words and to rate how difficult it is on the four anxiety factors. Future instances of an event can be logged on a calendar and reminders set up for users working on managing their anxiety around that event. As with the user profile, event ratings are presented graphically and can be revised in the light of experience.

#### Gamification

One aspect of the therapeutic structure that was debated within the project team was the value and extent of gamification – the use of multimedia games to engage and support behaviour change. Games require users to set targets or goals and to receive rewards for meeting them. Goal-

achievement allows progression to a higher (more demanding) level of game and more rewards which may be given as points, verbal praise or permission to engage in a pleasurable activity.

The debate around gamification referenced alternative models and ethos for the app. On one hand, the predominance of games, goal-setting and explicit reward structures; on the other, a range of features for self-exploration, sometimes playful, with options to utilise them in a more or less structured way. This tension between intrinsic and extrinsic drivers remained healthily unresolved but with the intention that the app's usability would be enhanced by incorporating both perspectives. As described below, cost proved to be a major factor in limiting the extent to which individual games-based options could be included and therefore any fuller consideration of games as a core structuring device for the app.

#### Towards a model of mobile self-help

Research, consultation and discussion across UWE and developer teams suggested a schematic model of engagement and self-help that is consistent with the intended reach and ethos of the app (Appendix II). The initial draft of the therapeutic structure, with the rationale for each module, is shown in Appendix II.

As a result of collaborative work on its rationale and design, we have tentatively identified some key characteristics of SAM as a source of psychosocial self-help:

- 1. The ethos the character of SAM is found at the overlap of education, psychotherapy and personal development.
- 2. SAM is designed to respect the autonomy of the individual user and to engage their curiosity about anxiety.
- 3. It draws on cognitive-behavioural and humanistic philosophies, offering linear and organic pathways to user engagement.
- 4. It uses an analogy with face-to-face therapy to guide the design of a coherent therapeutic structure. The therapy analogue holds that features and functions of the app's structure will enable comparable therapeutic processes.
- 5. It offers the user a bio-psycho-social framework for self-profiling. Information about anxiety and the user profile help to clarify and normalise anxious experience. Users learn to make connections between their anxious thoughts, feelings and sources of anxiety.
- 6. A range of low-intensity self-help options invite users to learn to manage their anxiety.
- 7. Self-help options which focus on attentional and cognitive biases reduce vulnerability to anxiety and start to build an insight-based resilience to future challenges.

- 8. Perceptions of increased control over anxiety increase self-efficacy, the belief in one's ability to address concerns and to bring about change (Bandura, 1977). Self-efficacy is important for users starting to practice anxiety management skills *in-vivo*, gradually increasing their exposure to anxiety-provoking situations.
- 9. Repeated exposure promotes habituation of the anxiety response and a positive cycle of engagement.
- 10. SAM provides a secure social network through which users can access peer support and advice, helping to encourage and validate persistence with self-help.
- 11. SAM may help to prevent user anxiety becoming unmanageable and leading to more serious mental health concerns. It is not recommended for people who have severe and/or persistent anxiety although that recommendation, and associated links to professional help, will not deter some users.
- 12. Positive experience of its ethos and impact may encourage users to seek professional help where they have previously been reluctant.
- 13. Where SAM is used to augment a face-to-face therapeutic relationship, it can be used to extend in-session exploration and practice.
- 14. It may also be used as a post-therapy tool for the maintenance of behaviour change and the elaboration of therapy gains through controlled social networking.

# Self-help options

'Low-intensity psychological interventions are delivered on the explicit premise that people are the best managers of their own mental health.' (Improving Access to Psychological Therapies, 2010, p.7)

## Criteria

The portfolio of self-help options was constructed to be consistent with the aims and ethos of the app as described above. Following the consultation on rationale and specification, the selection and presentation of options was guided by the following criteria:

- To be appropriate for users with mild to moderate anxiety;
- To allow for users having varying degrees of commitment to self-help;
- To communicate a friendly, adult approach to self-help;
- · To enable user pathways that can be structured or exploratory;
- To offer a coherent structure of self-help options in a range of media formats;
- To offer options for observation, information, reflection and action;
- · To offer options covering a range of psychological modalities;
- · To include elements of humour and fun, including games;
- · To achieve an overall balance of options and formats;
- To remind users of key themes such as self-care, persistence and gradual improvement.

The therapeutic structure and its self-help content were designed to operate within a mobile context and to take advantage of the navigational and multimedia features of that context. Adapting selfhelp content to the mobile context involved three-way discussions, creative drafting and modification between psychologist, computer scientists and app developers.

'Have just had a look at the model – think it looks great. It presents a sophisticated idea in I think most simple format possible without reducing the idea down.' [Clinical psychologist]

#### Sources

Self-help options were obtained and selected from several sources:

- · Online databases of self-help resources local, national and international;
- · Self-help resource lists supplied to NHS / IAPT practitioners;

- · Book and journal publications containing self-help materials;
- · Consultation with psychological therapy practitioners.

Where self-help resources were not clearly stated to be out of copyright, written permission was sought and obtained for their use. Many common or long-established techniques (e.g. progressive relaxation, meditation) were found in varying formats from different sources. To avoid infringing intellectual property rights, the underlying principles were used to generate new and unique guidance text for use with SAM, copyrighted to UWE Bristol. A list of sources and indicative references for self-help materials is given in Appendix III.

'Comprehensive and well-thought out. Lots of models covered.' [Clinical Psychologist]

#### Evaluation and selection

'I think the interventions listed in the attachment are the ones I would be thinking of. Hopefully, you would be able to incorporate all of these but I guess that it's a big list.' [Clinical Psychologist]

Although we were given no limit on how much information we could include on the app, a large array of self-help would have been too time-consuming to assemble and evaluate, and would have been harder for users to engage with in a mobile context. Inevitably, aspects of anxiety management were left unaddressed and many desirable self-help options were excluded; as mentioned previously, there were topics such as insomnia which justified a more comprehensive coverage than we were able to provide on one app.

The evaluation and selection of individual self-help options by research and consultation took six months to complete, with revisions continuing through to the pre-build stage of interactive prototyping. There was constant review of their integration with the overall therapeutic ethos of the app to ensure flexibility and coherence for the user.

'I can't see anything you've sent which wouldn't fit well with the CBT theories/treatments around GAD as far as I can remember them. I wouldn't have any reservations about any of my clients using the material you've sent.' [Psychotherapist]

#### Screen contents

Excluding the profiling and social network modules, the app was populated with 46 self-help screens. Nine screens were general guidance items on using the app and its self-help options for effective anxiety management; the remaining 37 screens offering self-help options were divided between the following modules:
•	Help for Anxiety NOW	4 screens	2 multimedia
•	Information about anxiety	4 screens	2 multimedia
•	Thinking and anxiety	6 screens	1 multimedia
•	Relaxation - physical	5 screens	2 multimedia
•	Relaxation - mental	6 screens	3 multimedia
•	Health and anxiety	4 screens	2 multimedia
•	Take small steps	8 screens	0 multimedia

## Data structures

Good practice in interaction design recommends that the design stage of online devices elaborates its <u>data structures</u>, a specification of each element to be included on the device and its format. Data structures include user guidance about the purpose of the option and how to make use of it; they help the user to select and use the option that they require at a particular time and place. The data structure for each self-help option on SAM was described in terms of

- The title of the option
- · A summary of the aim of the option
- · The full-text user guidance
- The type of option (Reflection or Action)
- Its Learning Level (1,2,3)
- · Its duration (in minutes)
- · Its format (text and/or media options)

The complete list of self-help options, together with their data structures, is given in Appendix III. Overall, the data structures helped to define a self-help app that was truly mobile: accessible across user locations, schedules and stages of personal development.

### **Reflection and Action options**

Options were divided into Reflection and Action options to encourage an intentional and thoughtful approach to self-help. This is consistent with a learning cycle approach (Kolb, 1984, above) and with face-to-face therapy practice where insight, behaviour change and evaluation are cyclically linked. For Reflection options we assumed a level of user motivation that would include related drives such as curiosity as to their meaning and the inclination to pursue it, the ability to apply reflection to their own circumstances, and the desire to find out more by active search and enquiry outside the realm of the app.

#### Learning Levels

The Learning Level gave users a rough guide to the personal challenge offered by an option; the estimation of Learning Levels was made by the psychologist (PT) on the basis of therapeutic experience. It was anticipated that the choice of Learning Level would be determined by factors such as the user's confidence, stage of personal change (Prochaska and DiClemente, 1993, above), familiarity with self-help materials and degree of social or professional support. It could therefore operate to discourage users from taking on self-help activity for which they were not yet ready and where engagement might not be beneficial. An example is the 'Mystical Monitor' which offers the option to repeatedly audio-record and to reflect on personal concerns. For new users this could reinforce their sense of demoralisation while more experienced and confident users, assuming more objectivity about their concerns, would be better able to make some therapeutic use of it.

#### Duration

The Duration of an option is an estimate of the time required to engage with an option. It enables users to distinguish between options that require a clear period of focused attention, possibly in a single location, and those that can be accessed briefly while on the move or in temporary locations.

#### Format

The Format of self-help options was primarily text-based with alternative / additional media formats being suggested by the prototype users, the project team, the consultation group and the developers. Each option had to include clear text guidance for use while a balance of text and other media formats was considered to be more engaging for users. Media formats included page background, text style, static and moving images, schematic diagrams, timers, audio options and games.

#### Self-help content and User guidance

*`.....I have made a couple of suggestions of where you might be more directive and explicit as I found myself wondering what exactly it was I was expected to do.'* [Counselling psychologist]

The content of each the self-help option was described in detail. For Reflective options and textbased Action options, user information and guidance was shown on-screen. For multi-media Action options, most of the user guidance was provided via an Information button on the lower right of the screen. The data structures included brief additional guidance on how to make the best use of each option, such as finding a quiet location or the importance of regular practice. Where appropriate, they also provided guidance on recognising and responding to any adverse effects of using selfhelp options; this could involve cessation of use and contacting medical or other professional help.

### Personal pathways

'I like the sound of clients monitoring their anxiety profile, identifying trigger situations and trying out self-help interventions.' [Clinical Psychologist]

We envisaged users constructing a four-dimensional profile of their anxiety as a guide to selecting and reviewing the focus and impact of their self-help activity. An initial proposal had been to link self-help options to the anxiety profile but research and consultation provided us with no evidential or ethical bases to justify such matching. Even evidence-based interventions for diagnostic categories comprised multiple components whose individual application required expert clinical judgement and client collaboration. Alternatively, and in support of user autonomy, we aimed to offer users general guidance on using their profile and its ongoing record, as illustrated by this extract from the initial user guidance ('Working with SAM'):

#### Using your anxiety profile

#### Study your anxiety profile and ask yourself:

On which of the four anxiety factors do I score high and low? What is my usual range of scores for each anxiety factor? Which anxiety factors concern me most? What methods do I already use for managing anxiety? Think about your answers when trying out the self-help options.

We assumed that users would find and evaluate the options they needed and preferred through a self-directed process as suggested by the models of learning and reciprocal interaction described previously. This process would be facilitated by clear signage, adequate guidance and accessible, flexible navigation throughout the app.

Flexibility was supported by enabling users to explore the self-help options in accordance with their personal interests and goals. Where appropriate, links activated by screen buttons enabled them to move between modules and pages. For example, users could move from a Reflection option, concerning the relationship between thinking and anxiety, to an Action option offering mental relaxation, then back to their Profile to check on recent levels of worrying thoughts. To illustrate how users might work from their profile to the selection of self-help options, two fictional case examples were included on the 'Working with SAM' screens.

# Balance of self-help options

'Question of balancing self-help on emotions, thoughts, sensations, behaviour / performance.' [Psychotherapist]

The process of compiling the data structures informed the presentation of individual self-help options and supported reflection on the overall balance of self-help options across the app. It was important that the range of self-help options offered a general correspondence to the four factors of the anxiety profile. From the external resource base, options were selected that might usefully impact on feelings of anxiety and/or worrying thoughts and/or physical sensations and/or avoidance behaviours.

Although some options were established in current therapeutic practice (e.g. progressive relaxation for physical tension), the primary aim was to provide a range of modalities. Users could then make choices, informed by their personal profile and the given data structure of each self-help option, about what options might suit their needs at that point in time. This approach to providing self-help options is consistent with the view that individuals are more motivated to engage and persist with a method of therapy that they have actively chosen (Van Audenhove and Vertommen, 2000) and that they believe in and prefer (Glass, Arnkoff, and Shapiro, 2001).

A summary of the data structures for the self-help options, below, suggests that a balanced distribution was achieved with no data category being disproportionately represented. Given that the app aimed to support change, it was judged appropriate to include rather more Action options than Reflection options. In terms of Learning Levels, mid-range options are more frequent but higher and lower levels are adequately provided for, offering user choices for progression. The suggested duration of options (ultimately to be determined by users) is skewed towards briefer durations, which is consistent with the usability of a mobile device and with a model of incremental, practice-based approach to personal development.

Reflection	Action	Learning Level	Learning Level	Learning Level			
		1	2	3			
14	21	7	13	8			
Suggested Duration (minutes)							
1 min.	1-5	5-10	10-30	User choice			
5	11	7	4	7			

### Frequency of self-help options by data structure:

## Text and Multimedia

The project team's experience of interaction design encouraged an emphasis on engagement features and a focus on providing clear and concise information. External consultation helped to

refine the structure and communicative quality of self-help content; text was edited and re-edited for maximum effect with minimum wordage. Web links to other sources of information and help, including self-help, were provided and we assumed that committed users would search for more if they needed more.

SAM was intended for use by a wide and unknown population with, presumably, a range of preferences for the media format of online content. This suggested that the self-help options should be presented in a range of media formats to maximise the potential for intentional reflection and persistent engagement by the user. Multimedia can enhance self-help material although we had observed in other mobile health apps that both text and multimedia could be used disproportionately. Conversely, fewer multimedia options overall might mean that individual options would have more impact because of their novelty value.

There was considerable scope for multi-media formatting although cost was a significant constraint compared to the budgets available to, for example, commercial game developers. Within those constraints, the project team worked with the developers to present individual self-help options in engaging and stimulating formats that underlined or extended the aims of the option.

For any one option, the project team would describe its aims and psychological rationale to the developers and provide a textual and/or graphic base to work from. In some cases, the media format would emerge from joint team discussions but, more often, the developers would receive the option briefing and would respond with their proposal for a media format for consideration and review by the project team. Four approaches to formatting self-options became apparent through the project:

- Presentation of text. A proportion of the self-help content had to be text in order to provide user guidance, to provide information about anxiety, to enable self-reflection, to identify concrete goals and to articulate change processes. Considerable care was taken to ensure that the text throughout was necessary and sufficient, was clear, concise and with attention to layout. Fonts, colours and background images were selected that supported and did not obscure the message.
- 2. Presentation of information about anxiety and its management. Consideration was given to presenting information visually, particularly where graphical media could be used to describe psychological processes. Examples of that are the Anxiety Tracker, a line graph of the user's self-reported anxiety over time, and the Cycle of Anxiety, portraying the cognitive model of anxiety in its dynamic form.
- 3. Modelling psychological processes. In addition to enhancing the presentation of information and ideas, it became clear that multimedia has considerable potential for modelling psychological change processes. An example is 'Stop that thought', based on a thoughtstopping technique for people with persistent intrusive and negative thoughts. The image of

an exploding thought and the accompanying cymbal crash are intended to caricature the process of thought-stopping and its desired outcome. The guidance for thought-stopping is provided in the accompanying text and - were users to mistake the graphic for the intervention - indicates clearly what should be practiced by the user.

4. Using games to support behaviour change. There was a strong case for using games as a way of inviting and reinforcing behaviour change. This was one area where cost, and time to develop and refine games, was a particular constraint such that SAM only contains one self-help option ('Positivity Practice') that can rightly be described as a game. Nonetheless, an indirect outcome of the project was to identify the potential of developing games for anxiety self-help as part of a later built version.

The question of balance was also addressed in relation to media formats. The range of media formats across all self-help options was reviewed throughout development to ensure a balance of text, graphics and multimedia consistent with its self-help functions. In the final built version, just over one-third of the self-help options had a multimedia format, excluding those with static images as background.

The therapy analogue helped to guide the balance of text and other media. For example, information about the app and what users can expect from it (equivalent to the contracting stage of therapy) had to be largely text-based in order to ensure comprehension by users and thus an ethically-based engagement. But when users start to consider self-help options they can take more responsibility for selecting formats which suit their needs and preferences. Again, these were experience-based judgements made by the psychologist on the project team (PT), moderated by contributions from other members of the team and, ultimately, are open to review by users of the completed app.

### Anxiety Toolkit

'The advantage of an app over a self-help book is its ability to be tailored and personalised. This seems to be covered in the "My Anxiety Toolkit" section and it is here that I see the heart of the app.' [Counselling Psychologist]

The initial student proposals for a mobile app had recommended that users should be able to collate their preferred self-help options. For SAM, this was described as the Anxiety Toolkit; its icon was located on the Main Menu for quick access and indicating its value to the user who builds it. Having tried a self-help option, they can assign it a rating from one to five, add a comment on it and, if favoured, add it to their toolkit. Their selection might also be influenced by comments and ratings from other users via the Social Cloud (below). The Anxiety Toolkit gives users quick access to the

self-help options which support their anxiety management goals at that time, and can be adjusted subsequently to meet changing needs and preferences.

### Social Cloud

'Facebook, Twitter etc are commonly used by students so the app could incorporate a forum for students to share their experiences & coping strategies. This may be a level of activity that anxious students are comfortable with.' [Student Adviser]

SAM's self-help options were designed to include access to a social networking module - the Social Cloud - which was hosted on an external, rented server. Many self-help sites for mental health concerns have links to online and offline support groups; they may also offer discussion boards, forums and chat rooms (e.g. Big White Wall; AnxietyUK). Social support and peer guidance is a useful component of managing and overcoming personal concerns; the value of social sharing and online communities has been addressed in relation to development of the prototype app (Caleb-Solly, Matthews & Topham, 2013, in press). Self-help users are particularly susceptible to withdrawal from the self-help process when the challenges become practically or emotionally threatening; this is where online social networks can provide some parity with face-to-face therapy.

Social networks also have the potential to expose vulnerable individuals. Prior to downloading SAM (and also posted on the app), the Terms and Conditions of Use aimed to help potential users determine whether the app offered acceptable levels of psychological challenge. The decision to include the Social Cloud was based on the team's judgement that the potential benefits were significantly greater than the risks.

The Social Cloud operates as a closed network that is available only to users of the app who sign in anonymously or by name. As part of the Terms and Conditions, users are asked to consent to elements of their data being processed (see Data Protection Privacy Notice, Appendix IV, for the information and rationale given to users). Once they have registered on the Social Cloud they are able to communicate with other SAM users in order to share advice, provide encouragement and emotional support, and offer suggestions for self-help options they have tried, on or off the app. Users can sign out of the Social Cloud without losing their anxiety data.

Communications from the app to the server are encrypted using Secure Sockets Layer (SSL) to minimise the risk of access by non-users. Text guidance on the Cloud screen suggests that users advise a fellow user to seek appropriate help if they are concerned by the content or tone of their posts. In accordance with a primary ethical principle - that an intervention should do no harm - unacceptable posts to the Cloud can be automatically deleted at the request of <u>any</u> user. Although there is a possibility that errant users might abuse this facility, it was considered more important to trust the user community in this respect.

At the time of writing, one of the project team acts as an informal moderator by periodically sampling posts made to the Cloud. Longer-term, moderation and the resources to support it will be reviewed by the app's Advisory Board during its first year of operation.

### Making changes

The final module in the portfolio of self-help options was entitled 'Take small steps'. This module followed an approach to making personal and behavioural changes that is established in psychology practice for anxiety management. Progress is intended to be controlled, graduated and incremental, starting with the least challenging situation and working up through a hierarchy of increasing personal challenge and skill development.

'Take small steps' was presented as a series of text screens which provide guidance for the user to construct their personal hierarchy of anxious situations, from the least to the more anxiety-provoking. Learning to manage the anxiety associated with each situation is a small step towards reducing the overall impact of anxiety in their daily life. The guidance includes suggestions for addressing each step on the hierarchy: adequate preparation and rehearsal of anxiety management skills, visualisation, positive self-talk, readiness to experiment with different approaches and the necessity of constant practice. The title of the module - 'Take small steps' - is repeated at the top of every screen in order to underline the importance of this graduated approach to the management of anxiety.

*'I like the practice package but as a user I would like to be able to add my helpful thoughts/distraction/relaxation etc to create my tailored practice package.'* [Counselling Psychologist]

# Legal and Ethical frameworks

# *'I would have reservations around risk and security of personal devices.'* [Senior Mental Health Care Practitioner]

Legal and ethical issues were raised and addressed throughout the design and development of the app. University legal advisers were helpful in shaping information and guidance for users; consultation with practitioners drew attention to therapeutic and ethical concerns which might be associated with mobile self-help. Beyond legal imperatives, the issues raised were considered by the project team and, as far as practically possible, were accommodated within the design and content of the app. (See chapter on Therapeutic Structure for examples of the judgments that were made).

A self-critical review of the prospective value and impact of the app was carried out near the start of the design phase of the project (Appendix I). This aimed to identify possible concerns about introducing the app into student support services such as adverse impact, managing risk and data protection.

### Regulation

At the time of writing there is no UK regulatory body for online self-help devices and resources. The Medicines and Healthcare Products Regulatory Agency (MHRA) is the UK's 'competent authority' for implementing the directives of the European Commission's Medical Devices Directorate. The MHRA has started to review health apps and whether they fall within their regulatory framework; it has established a working group which will issue guidance in due course (see: http://www.mhra.gov.uk/).

Practitioners in the National Health Service are directed to use treatments, including some computerised therapies, which are evaluated and approved by the National Institute for Health and Clinical Excellence (NICE: <u>http://www.nice.org.uk/</u>). NICE will only consider treatments and medical devices for approval after their clinical impact has been evaluated in controlled trials. As of March 2013, the NHS has opened its Apps Library (<u>http://apps.nhs.uk/#</u>) which invites app developers to submit their app for review and approval for inclusion in the Library.

An independent organisation, D4 Research (2012), has produced a useful overview of the current status of regulation for health apps and of the implications for providers and institutional users.

### Terms and Conditions

The legal aspects of placing a self-help app in the public domain were addressed in consultation with the university's Legal Adviser and Technology Transfer Manager. Their guidance focused on

the Terms and Conditions of Use whose acceptance by the user would be a pre-requisite for downloading the app (Appendix IV). The Terms and Conditions have three main aims:

- To clarify for the user the purpose and limits of the app's function and to indicate alternative sources of help if their concerns fall outside those limits;
- Too limit the university's liability for psychological harm to the user as a result of use of the app;
- To assert the university's intellectual property rights, in addition to the stipulations in the nondisclosure agreement and in the contract agreed with the preferred developer.

## Data protection

Users of the app will be collecting personal data as part of their engagement with an intentional process of self-help. Some data (e.g. anxiety profile, ratings) will be stored within the app and some (e.g. posts to the Social Cloud) on an external UK server that is accessed only through the app. The only personally identifiable data within the app is an optional email address for password reminder purposes. Data within the app is not encrypted but Social Cloud posts are sent via a channel that is encrypted using SSL (Secure Sockets Layer).

The Terms and Conditions for Use state that the security of their phone and its data is the responsibility of the user. This is consistent with a general level of personal responsibility that adults are expected to take for their possessions, including other personal data such as address books and financial records.

Prior to downloading the app, potential users are informed about personal data that will be retained and for what purpose via UWE's Data Protection Privacy Notice, (Appendix IV). Users are not given an immediate option to opt out of data retention but may apply to the university's Data Protection Controller to have that data deleted.

## User consent

The app store listing informs potential users that downloading the app implies consent to the Terms and Conditions of Use, and that specified data may be processed in line with UWE's Data Protection Policy. For Apple users, the policies are posted on the app store site; for Android users, the app store provides a link to the policies that are posted on the SAM website.

## Managing Risk

There are ethical implications to offering self-help information and activities. What is offered should comply with the primary ethical principles of maximising benefit and minimising harm. A second

principle upholds the autonomy of the individual and their right to make choices in their own selfinterest.

A self-help app has to assume that independent users will take appropriate care while providing some guidance should they feel unable to do so. Yet too much emphasis on risks may discourage engagement. For institutions and their staff offering self-help resources there is a balance to be struck between signposting self-help options to those who seek to benefit from them and, in doing so, accepting a level of risk that will attach to some users.

Where self-help is offered via mobile phones and other online devices on the open market, the main safeguards for the user are the principle of caveat emptor and of devices being fit for purpose. Registered health practitioners who recommend and support mobile self-help will do so in line with their professional codes of practice. These define ethical responsibilities and principles for addressing ethical issues and dilemmas. In the field of mental health, ethical guidance is provided by the British Psychological Society (2009) and the Ethical Framework of the British Association for Counselling and Psychotherapy (2010).

The personal risks commonly addressed in assessing for and delivering mental health care are selfharm and suicide. Self-harm covers a range of tendencies including substances, physical assault and eating issues. Suicide is associated with severe anxiety and depression together with other predictive factors; it is important to distinguish between suicidal feelings and suicidal intentions. Yet a comprehensive assessment of risk can only be conducted by a qualified clinician or therapist.

With this in mind, the app includes a general caution to all users with the intention of alerting those who may be at risk. This is contained in the Terms and Conditions prior to downloading the app and includes guidance on making contact with professional help. Once the app is downloaded, a sidebar off the Main Menu screen provides links to external sources of support and guidance such as MIND and NHS self-help sites.

Once the app is in use, individual self-help options provide guidance aimed at minimising misuse or harm. These were derived from standard therapeutic practice and from practitioner consultation. For example: (1) user expectations about the pace and duration of change are shaped through initial guidance and reflective text options; (2) users are warned to exit the Calm Breathing option if they feel dizzy; (3) the Social Cloud includes guidance for users about responding to concerns regarding the health and well-being of other users that arise from the tone and content of their posts to the Cloud.

### Duty of care to students

While most HE students are over 18 and therefore legally autonomous adults a university or college has a duty of care to take reasonable steps to ensure their safety and well-being (Eversheds, 2004). Professionals (e.g. student counsellors) working in student services may have an enhanced duty of

care towards students, and particularly in regard to students with known mental health problems. Duty of care responsibilities towards students have been elaborated by the Association of Managers for Student Services in Higher Education (2001). Universities and colleges will need to consider the promotion of online self-help in accordance with their duty of care obligations.

The Project Lead met with UWE's Head of Wellbeing and Disability Services and the Head of Wellbeing Services to introduce the app and to address any concerns they had about its use with students. In turn, the Heads of Service discussed the use of the app with their colleagues. It was agreed that the project team could provide an induction session for staff and that Student Services would provide information sheets and posters about accessing and using the app for staff and students. The Head of Wellbeing Services would also be a member of the Advisory Board which will meet periodically to oversee the management, evaluation and development of the app (see Management chapter, below).

# **Development and Evaluation**

#### Iterative development

Both university and developer teams recognised that this was a relatively complex and innovative project for which we were somewhat lacking in precedents, both technical and therapeutic. A health app, particularly a mental health app, embodies practical and ethical challenges which make it qualitatively different from the majority of apps which are primarily based around the provision of information and the use of gaming technology. There is an assumption that acculturated users can easily appreciate the aims of the app, will know 'intuitively' how to find their way around the features and functions and how to get the best out of them.

These assumptions do not necessarily hold true for a self-help app which is intended to function as a psycho-educational tool. SAM would require active participation by the user whose well-being, in the form of reduced anxiety, is dependent on the success of their engagement, self-reflection and perseverance. The challenge for the project teams was to produce an app that facilitated the user's participation in such a self-help process. To that end, the development of the app from specification document to launch-ready version involved parallel and iterative processes of activity, consultation and evaluation. Development and usability evaluation were integrated and complementary processes.

#### Wireframes and Walkthroughs

The technical and functional specification for the app was initially translated by the developers into wireframes (schematic diagrams of the structure) and then into walkthroughs (online images of app pages, their content and navigational links). These enabled the project team to make corrections and modifications to the design before committing to building the app. Also at this stage, the 'look and feel' characteristics of the app - its appearance, colour schemes, navigational style - were proposed by the developers.

Walkthroughs were prepared by the developers using Axure, an online prototyping tool whereby developer and client teams can review components of the app and its navigation. In its interactive format, use of Axure should reduce the need for later modification of the built prototype; in fact, our developers lacked experience of interactive prototyping and we were unable to benefit fully from this feature. The developer's approach was for most of the usability evaluation to be conducted once they had started to build the app.

Review and evaluation of the app development was conducted by the project team, in joint teams' review meetings and through communication in a shared online workspace (Podio).

Consultation with health and well-being practitioners on the app ethos and on the style and content of the self-help module was conducted while the early wireframes were being constructed. Detailed specification of the self-help options and their data structures involved further practitioner consultation and review. The process of revision and refinement to text and format continued through three successive walkthroughs.

### Mental health icons

A set of screen icons was required for the Main and Self-Help menus on the app. Unlike, for example, the international highway signage, there are no standard icons for use on digital devices in relation to mental health and therapeutic issues. Both teams made proposals for menu icons and a selection of these (in three sets) were sent to a participant group for evaluation. The icons selected by the project team each received preference ratings by at least 60% of participants. These were sent to the developer for graphical refining into a clear and coherent set of menu icons which would be suitable for the screen size of a mobile phone.

## Building the app

The project team reviewed the final walkthrough and presented their comments and queries at a joint teams meeting with the developer team. Both teams were unanimous that the design was now sufficiently well-established that a working version for iPhones could be built. Further revisions could be made during the build and as a result of expert and trial user evaluations (beta testing) of that working version.

Following approval of the final app design, the developers commenced building a series of phonebased prototypes, first for iPhone and then for Android phones. The Social Cloud module, which had particular software, data storage and data protection requirements, was developed separately by a member of the UWE project team in collaboration with the developer team.

### Usability evaluation programme

Evaluation of the app's usability was central to its development and became particularly so when beta prototypes were made available by the developer. A formal programme of evaluation was devised to ensure a systematic and comprehensive process of expert and trial user evaluation of the developing app (Appendix V). The programme benefited from the involvement of a M.Sc. student and web designer who was conducting a project on usability evaluation.

#### Ethical approval

Ethical approval for the user evaluations was sought from the university's Faculty of Environment and Technology Research Ethics Committee. Approval was given following the revision of proposed procedures and related participant information (UWE Reference no. FETREC11-12/32 - Appendix V). The Ethics Committee were keen to ensure that trials of the app did not impact adversely on well-being amongst people who may be particularly vulnerable to anxiety. The project team response to reviewers' concerns is recorded in Appendix V; ethical approval was granted following the Committee's consideration of this response.

The usability evaluation programme was informed by the following codes of practice:

Human Factors and Ergonomics Society Code of Ethics (2005):

http://www.hfes.org/web/AboutHFES/ethics.html

UK Research Integrity Office Code of Practice for Research (2009): <u>http://www.ukrio.org/what-we-do/code-of-practice-for-research/live-document-code-of-practice-for-</u> research/1-0-introduction/

British Psychological Society Code of Human Research Ethics (2010): http://www.bps.org.uk/sites/default/files/documents/code of human research ethics.pdf

#### Participants

Participants were student and staff members of the university community, recruited through advertisement and personal contact, external practitioners, and some members of the team's social network. Participants were invited to comment on Axure prototypes as well as to help with beta testing. 39 trial users were recruited initially although there was a significant drop-out rate by the actual time of engagement, possibly due to a delay between recruitment and time of trials. The number of trial users for iPhones was also constrained by the limited number of Apple Developer licences (seven in total) that were currently available from the university's organisational quota.

In order to make best use of the smaller pool of recruited participants, the intention had been to involve trial users to evaluate the app's usability after this series of 'expert 'evaluations had ensured development to a high level of usability. Later, while users were evaluating the built versions on their own phones via a facility called Test Flight, the developers would also be able to monitor any failures in the app and retrieve usage data for attention.

### Trial user evaluation

An online questionnaire was designed for trial user evaluation of the final semi-interactive walkthrough prior to working versions being built (Appendix V). A small group of trial users (n=8) helped to evaluate the walkthroughs and their findings informed subsequent changes in the design. There were no end-user trials of the (pre-launch) built versions of the app due to a lack of available participants. Most were undergraduate or postgraduate students who were either preoccupied with coursework and assessment during the summer term or who had already left the university for that academic year.

Thus, due to the limited participation of the trial users recruited to the evaluation programme, the usability evaluations of Axure prototypes and built versions were largely conducted solely by the UWE team together with their student and staff associates.

### Expert evaluations

The expert evaluation process consisted of a detailed appraisal of the user components of each successive built version of the app, systematic recording of usability issues, and feedback on those to the developer for action. Over a four-month period, 38 evaluation documents passed between the project team and the developers for the iPhone build. The Android build required less than half that number because the iPhone evaluations could be referenced for many issues. A typical evaluation might include the following:

- Designated features absent or incomplete
- Complete failure of a module, feature or component
- Erratic functioning of a feature or component
- · Proposals to improve the usability or impact of self-help features
- · Designated user guidance missing or poorly located
- Inconsistent graphical or text styles
- · Grammatical errors
- Poor layout of text

Thus usability issues varied in scale, with early-version evaluations tending to identify amendments and corrections at the level of feature design and navigation while later evaluations focused more on detailed concerns within and between features. These later evaluations also attended to the overall usability of the app as an integrated self-help device. Earlier evaluations were also lengthier, some running in excess of 10 screen pages of A4 equivalent (c.100 issues raised) while later evaluations, as one would expect, progressively diminished in size until launch-readiness was agreed by the project team. An example of one of the later-stage evaluations, with responses from the developer, is included in Appendix V.

# Promotion

## Submission to the app stores

At the start of the project, it had been agreed that the developers would manage the process of submitting the app to the Apple and Android stores. During the project period, the university published a Mobile App Development policy in response to the growing number of apps being produced by university departments and individuals. This policy is available on:

http://www1.uwe.ac.uk/its/itpolicies/mobileappdevelopment.aspx

Following from this, a senior member of the university's IT Services took on the oversight of app development for the university and became involved in preparing SAM for submission to the app stores and in conducting the actual submission process. A brief description of SAM and its functions, adapted for each store, was provided to be posted in-store for user information:



# SAM: Self-help for anxiety

SAM is a friendly app that offers a range of self-help methods for people who are serious about learning to manage their anxiety. SAM has been developed by a university team of psychologists, computer scientists and users. Established methods of self-help have been combined with high standards of usability to provide an engaging, flexible, and practical resource.

The key features of SAM are:

- Clearly laid out menus
- User guidance
- External links
- Self-monitoring of anxiety with graphical display
- 25 self-help options covering: Information about anxiety, Thinking and anxiety, Physical relaxation, Mental relaxation, Health and Anxiety
- Guidance on putting self-help into practice
- Closed social network of SAM users

The content of SAM is presented in various media formats in order to support users in learning about anxiety and practicing self-help. Although not text-heavy, users will need to study the guidance to get the best out of SAM. Users are encouraged to build their own

Anxiety Toolkit of anxiety management resources and to draw on this for regular practice in managing situations that are associated with anxiety.

SAM may be used with or without the support of a registered health practitioner but users may wish to consult with their health or well-being practitioner if they are uncertain about using SAM. *Keywords:* 

anxiety, stress, worry, relaxation, self-help, self-assessment, self-management, mental health.

The licensing agreements (for SAM, the Terms and Conditions of Use and the Data Protection Privacy Policy) are addressed differently in the two app stores. For Apple the licensing agreement is posted in-store with the app description and a statement that downloading the app implies compliance with the licensing agreement. For Android, that statement is posted in-store with a link to the app's web page where the licensing agreement is made available. In the Apple submission process, the app was rated suitable for users who are aged 12 years and above because it included references to drugs and alcohol; there was no rating for Android.

The submission process for both stores was a matter of days. At the time of writing, SAM is available from the app stores via the following links:

For the Apple store: <u>http://itunes.apple.com/app/sam/id666767947</u> For the Android store: <u>https://play.google.com/store/apps/details?id=com.uwe.myoxygen</u>

#### Sustainability

SAM was funded primarily as an enhancement to student support at UWE. Global publication would make it available to students internationally and to the general public, with the potential to provide reputational gain for the university. As described above, SAM needed to be self-supporting after one year; thus it was important that it was widely promoted in order to ensure take-up by students and to have a chance of gaining a strong, positive profile, both of which would be more likely to attract or justify future financial support.

#### Branding

The project team set up a SAM website (<u>http://sam-app.org.uk/</u>) to provide information on the progress of the project and to invite people to sign up to be notified of the launch. The SAM logo used was the icon which would identify the app in the Apple and Android app stores, and on phone screens once downloaded. The UWE logo (with web link) is visible on the app icon and main menu

sidebar thus ensuring the association of the two and identifying them to a global audience of potential users. The UWE logo was sized and placed in accordance with university branding requirements. Each contact with UWE's website, via whatever source, had been calculated by the university's Marketing Department to be worth 9p to the university, being a function of the proportion of total website contacts converting to student entrants.

#### Strategy

A strategy for the promotion of SAM was agreed with the university funder. Initially, and as the primary focus was student support, the university's Students' Union (UWESU) agreed to promote it to their members through the various media channels that were available to them. Following that, if the app was well-received locally, they would recommend it to the National Union of Students (NUS) for promotion nationwide through affiliated universities and colleges.

#### Press and publicity

The university's Press Office prepared a press release which was checked for accuracy by the project team. When SAM was confirmed in the app stores the press release was sent to local and national media contacts, and to an agreed list of online media sources. The project team sent the press release to contacts in education, health and the voluntary sector who had previously expressed interest in the app (e.g. UCAS, MIND and local NHS services) and to the editors of professional journals who had considered reviewing SAM when launched. The trial users, consultees and university staff involved with the project were informed about the release together with other professional contacts of the project team. All those informed were asked to help promote SAM by passing on the app store links to other interested parties, and to provide feedback on their experience of using SAM.

Locally, the university's Student Services Department published posters and postcards advertising SAM for distribution across the university campuses. The posters included a QR code so that students could download the app direct to their phone.

It was anticipated that user reviews posted in the app stores would provide the basis for a second round of promotion in the autumn when the new academic year commenced and students were repopulating their university campuses. A short video was made to demonstrate the main features of the app, to be posted on the SAM website for the use of practitioners and users.

# Management

## Ownership

SAM was funded for student support. Once built and launched, its 'ownership' was vested in the university's Student Services Department (SSD), specifically the managers of the Wellbeing and Disability Service (WDS). This service includes counsellors, mental health mentors and wellbeing practitioners – those most likely to suggest SAM to or to use it with their student clients. When an early built version of the app became available it was demonstrated to the Wellbeing team in order to solicit views and concerns about its use with students. The group supported university-wide promotion of SAM and an induction video to guide staff and students in using SAM; an induction meeting with the group was requested for nearer the start of the academic year.

## Advisory Board

It was important to ensure that the university's investment in SAM was protected and enhanced. Although Student Services would be the final arbiter of SAM's development regarding student support, a self-help app is also a potential resource for teaching and research in the university, notably in health, psychology and computer science departments. It was also considered likely that Student Services' staff, with service delivery priorities, would be less available to attend to ongoing issues such as software upgrades and therapeutic updating. For those reasons, the informal management of SAM was transferred to an Advisory Board consisting of all UWE staff members who had or represented an interest in SAM. Thus the Board was convened to oversee routine servicing, technical and therapeutic updating; to review options for evaluation and development; and, crucially, to ensure SAM's financial sustainability. (See Appendix V for the Board's Terms of Reference.) At July 2013, the Board consisted of the following members and their interests:

- · Kieran Kelly: Chair and university e-learning specialist.
- Phil Topham: Counselling psychologist, SAM project team.
- Praminda Caleb-Solly: SAM project team. Lecturer and researcher: human-computer interaction, mobile health and usability evaluation.
- Paul Matthews: SAM project team. Lecturer and researcher: online communities and mobile health.
- Rachel Grimstead: Cognitive-behaviour therapist: therapeutic use of mobile self-help for Student Services Department.
- · Adam Joinson: Psychologist and researcher: therapeutic evaluation of mobile health apps.
- Diane Zimmer: Manager of UWE Wellbeing Service.

• Nike Holmes: Development Manager, Widening Participation, Schools and Colleges Partnership Services.

It was agreed that others, such as the app developers, would be invited to attend meetings on an ad hoc basis.

The notes of the first - pre-launch - meeting of the Advisory Board are shown in Appendix VI. It was clear from colleagues attending that, as intended, SAM was seen as a potentially useful resource for students; that there are concrete proposals for developing it from its current version; and that both SAM and the SAM project could be useful foci for teaching and research.

It was agreed that the interlocking priorities for the first year were to establish a pathway to financial sustainability and to evaluate SAM's therapeutic impact on users. The next meeting of the Advisory Board in the autumn of 2013) would consider how best to address those priorities. Promotion, large-scale downloads, positive user feedback and professional reviews will all help; at the time of writing these are ongoing and the outcomes unknown.

## **Financial support**

To date, options put forward to support SAM's future maintenance, upgrading and development include the following:

- · Charging a download fee
- · Charging a fee to download special features, yet to be determined
- Licensing the use of the software code to other institutions to develop their own apps
- Enter into partnership to support and promote SAM with a Health Trust or Third Sector organisation
- Enter into partnership with a commercial organisation to develop SAM as a commercial product
- Include support and/or development costs as an element of a funding bid to evaluate SAM's user impact

## Future development

Development options that start with the initial version of SAM, a generic self-help app for anxiety, are quite varied in size and scope:

1. Working with users to revise the usability, structure and self-help options in the light of consensual feedback from users and practitioners.

- 2. Assessing the nature and extent of user engagement with SAM and with specific self-help features.
- 3. Exploring how SAM is integrated with other helping interventions by users and practitioners.
- 4. Evaluating the therapeutic impact of persistent user engagement with SAM.
- 5. Working with users to update SAM as a result of the impact evaluation.
- 6. Working with users to update SAM in line with wider developments in research and practice.
- 7. Enhancing self-help options in the current version. Proposals to date include
  - a. Sensors to provide physiological measures of anxiety;
  - b. Graphics to enhance text in the 'Take small steps' module;
  - c. Games with reward elements;
  - d. Audio and video in place of some texts;
  - e. Increased accessibility options.
- 8. Developing variants on SAM's basic structure in order to address specific concerns or to engage specific user groups, such as
  - a. Panic;
  - b. Social anxiety in learning situations;
  - c. Increased graphics and gamification for adolescent users.
- 9. Using SAM's code as a template to develop other self-help apps for common mental health concerns.

# Contact

For further information about SAM, or to discuss research, teaching and practice in mobile health, please contact a member of the Advisory Board listed above.

# **Project Review**

This final section of the report draws on observations and reflections from the UWE project team, made during and after the project period.

SAM, a mobile app designed to provide self-help for anxiety, built for iPhone and Android operating systems, was signed off by as ready to launch in July 2013. We were reminded by the developers that, given the rate of change and their inherent imperfectability, there is no such thing as a finished app; only one that is good enough to be made available to the general public.

'Good enough' implies a certain standard of usability and content; in the case of a mental health app, it also implies that the app is judged safe enough to use. For SAM, we judged that its usability was adequate to help contain user anxiety and that its self-help content offers credible options for learning to manage anxiety. User reviews and evaluations of therapeutic impact will be one key indicator of the therapeutic value of the project.

## Duration

SAM took nearly two years to complete from funding being granted (September 2011) to submission to the app stores (July 2013). A project plan was drawn up at the outset and underwent several revisions as successive stages of the project took longer than anticipated. A retrospective project timeline is shown in Appendix VI.

There were several factors that affected the duration of the project:

- 1. Finding and selecting an appropriately-qualified developer through the university's necessarily rigorous quotation process.
- 2. Members of the project team had other responsibilities, particularly in teaching which took priority during term-time. Only in the second year of the project did their Faculty recognise the need to allocate time for them to work on SAM.
- 3. Although two of the team (PCS and PM) had previous experience and skills in the design of software applications and in user experience design, neither the project team nor the developers had previously worked on a mental health self-help app.
- 4. There were some differences in approach (technical and relational) between the universitybased project team and the commercially oriented developer team.
- 5. The app was larger and more complex to design and build than the developers had anticipated. For example, core therapeutic functions such as the anxiety profile and graphical record required a certain standard of operating detail.

- 6. The planning and construction of the self-help options and the social cloud involved innovative work and testing by members of the project team in collaboration with the developers.
- 7. Paying sufficient attention to legal and ethical aspects involved significant periods of consultation, communication and redrafting of documentation.
- 8. The usability evaluation of the built versions involved a number of iterative evaluations.

We were fortunate to be free of pressure to meet a completion deadline. No party had wished for an extended process and, in the view of the UWE funder, '80% perfect this year is better than 100% perfect in ten years' time'. We had time to address and work through the factors above to the stage and standard where both teams could agree that SAM was ready to launch.

## Cost of an app

#### Direct costs

The budget for Project SAM was £35K to include VAT. The cost breakdown was as follows:

External developer (technical and functional specification)	£25,000	
VAT on developer costs @ 20%	£5,000	
Service contract with developer (2 platforms for 6 months)		
VAT on service contract @20%	£700	
Web hosting for Social Cloud (3 years server rental)	£180	
Security certificate for rental server	£47	
Market research	£260	
Tablet for usability testing	£100	
Total cost	£34,787	

#### Indirect costs

Over 50 people, in and out of UWE, were involved in the project. Three permanent members of UWE academic staff at Senior Lecturer grade contributed to the project over a two-year period; an estimate of the cost of their time is £60K. The trial users, consultants and other advisers to various aspects of the project did not charge for their time although employed contributors would generally have been contributing at some cost to their employer (UWE, NHS and self-employed). Thus it would not be unreasonable to estimate the overall cost of the app as being in excess of £100K.

# Recommendations

We have summarised below the recommendations that might be found useful for the future development of self-help apps for mental health and wellbeing:

# Preparation

- Draft a model of the app which indicates its therapeutic structure and functions.
- Be clear about the need and justification for the proposed app. Construct a rationale which incorporates a critical review of the relevant research.
- Consult widely on the need for the app, its rationale and draft specification. Consider modifying the project aims and content in the light of consensual feedback from consultation.
- If there is to be a charge for the app, conduct detailed market research to assess whether it is likely to be financially viable.
- Ensure that all costs for the proposed specification can be met within the agreed budget, including VAT, servicing, promotion and contingencies. (See references to specific item costs, below.)
- Decide who (person, department or organisation) will 'own' the app after launch and will be responsible for overseeing the servicing, upgrades, development and financial sustainability.

# Project team

- For a health app, and especially a mental health app, it is essential to have a therapeutic practitioner on the project team to represent and champion the users' interests in relation to the therapeutic function of the app.
- The role of Project Manager is time-consuming and involves both strategic oversight and constant follow-up of small details. Project SAM required 2-3 days a week of project management time over two years.
- The project team as a whole need to be committed to making regular time available for working on the project. Regular meetings are particularly important in the early stages while the design is being clarified. They also help to build team solidarity which is important when problems arise during the project period.
- Project SAM benefitted from having team members with expertise in specific areas of the project: therapeutic practice, online communities and usability evaluation.

# Project planning

• Construct a critical path analysis (CPA), or similar project management tool, to ensure the timely and balanced allocation of resources for each stage. The CPA can help to identify

tasks and resources that need to be established in advance. For example, we had not recognised that there were no standard icons for a mental health app and had to invest time in conducting a survey to establish which icons would be most useful.

• The CPA will also draw attention to the need to establish the availability of consultees, trial users and specialist contributors during the project period.

### Developer team

- If employing an external developer, it will be helpful to obtain a developer team who are psychologically-minded and who can translate psychological concepts into designs for online structures. It would be worth testing that aptitude at the quotation stage.
- There is considerable scope for the use of multimedia to model, symbolise and inform the user's psychological processes and self-help interventions. However, game-based and more complex features can be expensive and an estimate of their costs should be determined with the developer at the start of the project. A cost-benefit decision on the use of multimedia features should then be made in relation to the overall aims of the app.
- Ensure that the developers have sufficient experience of prototyping. It is essential to the validity of the finished app that they can construct interactive walkthroughs for user trials and respond to feedback by revising functions, features and navigation. The alternative is to employ an in-house member of staff who has sufficient developer expertise and is available to work on the project as required.
- The agreement with the developer should include stage-based payments to ensure that the project adheres to specification – task and quality. Small developers may require an initial deposit and purchasing departments can advise on these processes.

### Communications

- After contracting with an external developer but before work starts, agree on an online workspace with which both teams are comfortable and which will meet the changing needs of the project.
- Ensure that members of the project and developer teams have regular meetings throughout the project and particularly during the design stage. These will help to (1) establish and clarify the roles of all concerned; (2) reduce misunderstandings about the specification and its realisation; (3) build positive working relationships.
- For university-based project teams, it may be helpful to be aware of the possibility of tensions arising due to different working styles of academics and commercial developers. These may arise in relation to the standard of work and also the level of consultation that is considered normal in their respective fields. Developers may be inclined to work with less

consultation on the assumption that they are contracted to take sole responsibility for the finished product; academics may promote ways of thinking and standards of practice that, while ideal, are not always realistic within the budget and time-frame of the project.

# App development

- Identify the functions and features that are central to the therapeutic impact of the app and ensure that sufficient time is given to their design and realisation in the early stages of the project.
- Usability is crucial for supporting users to engage and stay engaged with a self-help app.
  For an anxiety-focused app, it was important that containing and minimising anxiety was built into SAM's usability as well as its self-help content.
- Emphasise the value of keeping things 'simple and reliable' from the start. We were sometimes distracted by impressive-looking features that would not work well for the user. Simple was almost always found to be more usable than complex in the working of the selfhelp options and in the general layout of the SAM. (This is being confirmed by user feedback to date.)
- Mobile users may be less inclined to read guidance text on their apps. However, it is therapeutically and ethically important that guidance and cautions are provided, and adequately signed, in order that users can fully and safely engage with the self-help potential of the app.
- Pay careful attention to the quantity, quality and placement of text. Quantity and location will need to be judged in the context of the aims of the app and of specific screens. Our style priorities were to be clear, concise, relevant, friendly and adult. Correct spelling and grammar supports those priorities and the overall credibility of the app.
- There are creative and practical challenges in converting therapeutic self-help into mobile features. Frequent and open communication between project team and developers (by phone, email and face-to-face) is essential to avoid having to make expensive changes to software.
- Aim for a balance of function and fun, reflection and action, across the app and its features.

## Usability evaluation

- Make adequate, advance preparation for conducting usability trials of interactive prototypes and built versions with a range of participants.
- Apply for ethical approval of the usability evaluation programme and ensure that the demands on unpaid trial users will not discourage them from participation.

- It is worth investing time and effort in interactive prototyping and its evaluation. Both major concerns and small details can be addressed by this process, allowing more time for evaluating the built versions, their overall functioning and usability as a self-help app.
- For built versions of the app, conduct expert evaluations (by members of the project team) before user trials, and filter feedback from trial users before passing it to the developer team for action. Note that, for iPhone apps, the number of trial users will be constrained by the quota of Apple Developer licences (currently a maximum of 100) that are available per organisation, regardless of size.

# References

Albarracin, G., Rovira, J., Carreras, L. & Rejas, J. (2008). Economic and epidemiologic aspects of generalized anxiety disorder: a review of the literature. *Actas Esp Psiquiatr*. 36 (3), 65-76.

Association of Managers of Student Services in Higher Education (2001). *Responding to student mental health issues: 'Duty of Care' responsibilities for student services in higher education. Good Practice Guide.* AMOSSHE: Winchester: <u>http://www.amosshe.org.uk/.</u>

Andrews, B. & Wilding, J.M. (2004). The relation of depression and anxiety to life-stress and achievement in students. *British Journal of Psychology*, 95, 509–521.

Anxiety UK. <u>http://www.anxietyuk.org.uk/?gclid=CLzY\_aLog7QCFefMtAodajQABQ.</u>

Argyle, M. & Kendon, A. (1967). The experimental analysis of social performance. *Advances in Experimental Social Psychology*, *3*, 55–97.

Association of Managers of Student Services in Higher Education. (2010). *Working with Student Services: Student Health and Well-Being.* Presentation to English National Healthy Universities Network: Ames, M., University of Bath.

Association for University and College Counselling (2007). *Annual Survey for academic year 2006-*7. http://www.aucc.uk.com/

BACP (2010). *Ethical Framework*. British Association for Counselling and Psychotherapy. <u>http://www.bacp.co.uk/ethical\_framework/</u>

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review*, 84 (2), 191-215.

Barak, A., Hen, L., Boniel-Nissim, M. & Shapira, N. (2008). A Comprehensive Review and a Meta-Analysis of the Effectiveness of Internet-Based Psychotherapeutic Interventions. *Journal of Technology in Human Services*, vol. 26 (2/4), 109-159.

Available online at http://jths.haworthpress.com.

Bar-Haim, Y., Lamy, D., Pergamin, L., Bakermans-Kranenburg, M.J. & van Ijzendoorn, M.H. (2007). Threat-related attentional bias in anxious and nonanxious individuals: a meta-analytic study. *Psychol Bull.* 133 (1), 1-24.

Barlow, D.H., Farchione, T.J., Fairholme, C.P., Ellard, K.E., Boisseau, C.L., Allen, L.B. & Ehrenreich May, J.T. (2011). *Unified Protocol for Transdiagnostic Treatment of Emotional Disorders: Therapist Guide.* New York: Oxford University Press 2011.

Beck, A.T. & Clark, D.A. (1997). An information processing model of anxiety: automatic and strategic processes. *Behavior, Research and Therapy,* 35 (1), 49-58.

Becker, M.H. (1974). The health belief model and personal health behavior. *Health Education Monographs*, 2, 324-473.

Belk, R.W. (1988). Possessions and the extended self. *The Journal of Consumer Research*, 15 (2), 139-168.

Bennett-Levy, J. Richards, D., Farrand, P. et al. (eds.) 2010. Oxford Guide to Low Intensity CBT Interventions. Oxford University Press.

*Big Ideas for the Future: UK Research that will have a profound effect on our future.* Chapter on *Technology that makes us healthy.* Research Councils UK and Universities UK, 2011, p.58. <a href="http://www.rcuk.ac.uk/Publications/reports/Pages/BigIdeas.aspx">http://www.rcuk.ac.uk/Publications/reports/Pages/BigIdeas.aspx</a>

Big White Wall. http://www.bigwhitewall.com/my-account/login.aspx?ReturnUrl=%2f

British Psychological Society (2009). *Code of Ethics and Conduct*. British Psychological Society: <u>http://www.bps.org.uk/sites/default/files/documents/code of ethics and conduct.pdf</u>

Burmeister, O.K. (2001). Usability testing: Revised Informed Consent procedures for testing Internet sites. Paper, 2<sup>nd</sup> Australian Institute of Computer Ethics Conference, Canberra, Australia. December 2000. J. Weekert (Ed.), Conferences in Research and Practice in Information Technology, Vol. 1.

Topham, P., Caleb-Solly, P., Matthews, P., Farmer, A. and Mash, C. (2015). Mental health app design – a journey from concept to completion. In: MobileHCI 2015: 17th International Conference on Human-Computer Interaction with Mobile Devices and Services, Copenhagen, Denmark, 24-27 August 2015. Placed in UWE Repository September 2015: <u>http://eprints.uwe.ac.uk/26610/</u>.

Caleb-Solly, P. & Matthews, P. (2011). A real-world mobile interaction design task. *ITALICS*, 10 (1), 64-71. ISSN: 1473-7507.

Chiu, M., Chang, S., Chang, Y., Chu, H., Chen, C.C., Hsiao, F. & Ko, J. (2009). *Playful bottle: a mobile social persuasion system to motivate healthy water intake.* Proceedings of the 11th international conference on Ubiquitous computing: ACM, New York, USA, pp. 185.

Ciarrochi J. V. and Deane F. P. (2001). Emotional competence and willingness to seek help from professional and nonprofessional sources. *British Journal of Guidance and Counselling*, 29 (2), 233-246.

Clark, D.M. & Wells, A. (1995). A cognitive model of social phobia. In R. Heimberg, M. Liebowitz, D.A. Hope & F.R. Schneier (Eds.) *Social phobia* (pp.69–93.). New York: Guilford Press.

Consumer Health Information Corporation (2011). *Motivating Patients to Use Smartphone Health Apps*.

http://www.consumer-health.com/press/2008/NewsReleaseSmartPhoneApps.php

Cooke, R., Bewick, B.M., Barkham, M. Bradley, M. & Audin, K. (2006). Measuring, monitoring and managing the psychological well-being of first year university students. *British Journal of Guidance & Counselling*, 34 (2), 505-517.

Cougle, J.R., Keough, M.E., Riccardi, C.J. & Sachs-Ericsson, N. (2009). Anxiety disorders and suicidality in the National Comorbidity Survey-Replication. *Journal of Psychiatric Research*, 43 (9), 825-829.

Cramer, A.O.J., Waldorp, L.J., van der Maas, H.L.J. & Borsboom, D. (2010). Co-morbidity: A network perspective. *Behavioral and Brain Sciences*, 33, 137-193.

Cranford, J.A., Eisenberg, D. & Serras, A.M. (2009). Substance use behaviors, mental health problems, and use of mental health services in a probability sample of college students. *Addictive Behaviors*, 34 (2), 134-145.

Creer, T.L., Holroyd, K.A., Glasgow, R.E. & Smith, T.W. *Health Psychology*, Chap 15, p. 726. In Lambert, M.J. (ed): Bergin and Garfield's Handbook of Psychotherapy and Behaviour Change, 5th ed. 2004. John Wiley and Sons.

Cuijpers, P. & Schuurmans, J. (2007). *Self-help Interventions for Anxiety Disorders: An Overview. Current Psychiatry Reports*, 9, 284–290.

DSM IV-TR Criteria: American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed, text rev. Washington, DC, American Psychiatric Association, 2000.

d4 research (2012). *Regulation of Health Apps: a practical guide*. Devices 4 Limited. http://blog.d4.org.uk/2012/01/regulation-of-health-apps-a-practical-guide.html

Egan, G. (2002). The skilled helper. California: Brooks Cole.

Elliott, R., Greenberg, L.S. & Lietaer, G. (2004). Research on Experiential Psychotherapies. In A.E. Bergin & S.L. Garfield (Eds), *Handbook of Psychotherapy and Behavior Change* (4th ed); pp. 493-539. New York: Wiley.

Elliott, R. (1985). Helpful and nonhelpful events in brief counseling interviews: An empirical taxonomy. *Journal of Counseling Psychology*, *32*, 307-322.

Eum, K. & Rice, K.G. (2011). Test anxiety, perfectionism, goal orientation, and academic performance. *Anxiety, Stress & Coping,* <u>24</u> (2), 167-178.

Eversheds (2004). *Duty of care responsibilities for student support services in higher education*. Conference paper: Association of Managers of Student Services in Higher Education.

http://www.eversheds.com/global/en/where/europe/uk/sectors/education/higher-education.page

Furmark, T., Carlbring, P., Hedman, E. et al. (2009). Guided and unguided self-help for social anxiety disorder: randomised controlled trial. *British Journal of Psychiatry*, 195 (5), 440-447.

Frank, J.D. & Frank, J.B. (1993). *Persuasion and Healing: A Comparative Study Of Psychotherapy* (3<sup>rd</sup> ed). Baltimore: Johns Hopkins University Press.

Geraghty, A.W.A., Wood, A.M. & Hyland, M. (2010). Attrition from self-directed interventions: Investigating the relationship between psychological predictors, intervention content and drop-out from a body dissatisfaction intervention. *Social Science and Medicine*, 71, 30-37.

Gianakis, M. & Carey, T.A. (2011). An interview study investigating experiences of psychological change without psychotherapy. *Psychology and Psychotherapy: Theory, Research and Practice*, 84, 442-457.

Glass, C. R., Arnkoff, D. B., & Shapiro, S. J. (2001). Expectations and preferences. *Psychotherapy*, 38(4), 455-461.

Goisman, R.M. Goldenberg, I., Vasile, R.G. & Keller, M.B. (1995). Comorbidity of anxiety disorders in a multicenter anxiety study. *Comprehensive Psychiatry*, 36 (4), 303-311.

Hancock, D. R. (2001). Effects of Test Anxiety and Evaluative Threat on Students' Achievement and Motivation. *Journal of Educational Research*, 94 (5), 284-298.

Hanley, T. (2009). Understanding the online therapeutic alliance through the eyes of adolescent service users. *Counselling and Psychotherapy Research*, 12 (1), 35-43.

Higher Education Statistics Agency (2010). Headline Statistics 2010/2011.

http://www.hesa.ac.uk/index.php?option=com\_content&task=category&sectionid=1&id=1&Itemid=1 61

Hirai, M. & Clum, G.A. (2006). A Meta-Analytic Study of Self-Help Interventions

for Anxiety Problems. Behavior Therapy, 37, 99–111.

Hoffman, D.L., Dukes, E.M. & Wittchen, H.U. (2008). Human and economic burden of generalized anxiety disorder. *Depression and Anxiety*, 25 (1), 72-90.

Horvath, A. O. & Symonds, B. D. (1991). Relation between working alliance and outcome in psychotherapy: A meta-analysis. *Journal of Counseling Psychology*, 38 (2), 139-149.

Hunt, J. & Eisenberg, D. (2010). Mental Health Problems and Help-Seeking Behavior Among College Students. *Journal of Adolescent Health*, 46 (1), 3-10.

Improving Access to Psychological Therapies (2010). *Good practice guidance on the use of selfhelp materials within IAPT services.* NHS: <u>http://www.iapt.nhs.uk/silo/files/good-practice-guidance-</u> <u>on-the-use-of-selfhelp-materials-within-iapt-services.pdf.</u>

Kanfer, F.H. (1970). *Self-regulation: Research, issues, and speculations*. In: Neuringer, C. & Michael, J.L. Behavior modification in clinical psychology. New York, NY, USA: Appleton-Century-Crofts. Pp. 178–220.

Kazdin, A.E. & Blase, A.L. (2011). Rebooting Psychotherapy Research and Practice to Reduce the Burden of Mental Illness. *Perspectives on Psychological Science*, 6 (1), 21-37.

Kennerley, H. (2009). *Overcoming anxiety: a self-help book using cognitive behavioural techniques.* Robinson.

Khan, N., Bower, P. & Rogers, A. (2007). Guided self-help in primary care mental health: Metasynthesis of qualitative studies of patient experience. *The British Journal of Psychiatry*, 191, 206-211.

Kitzrow, M.A. (2003). The Mental Health Needs of Today's College Students: Challenges and Recommendations. *NASPA Journal*, 41 (1), 165-179.

Klein, B., Meyer, D., Austin, D. & Kyrios, M. (2011). Anxiety Online—A Virtual Clinic: Preliminary Outcomes Following Completion of Five Fully Automated Treatment Programs for Anxiety Disorders and Symptoms. *Journal of Medical Internet Research*, 13 (4):e89. Kolb D.A. (1984). *Experiential Learning experience as a source of learning and development.* New Jersey: Prentice Hall.

Komiya, N., Good, G. E. & Sherrod, N. B. (2000). Emotional openness as a predictor of college students' attitudes toward seeking psychological help. *Journal of Counseling Psychology*, 47(1), 138-143.

Korotitsch, W. J. & Nelson-Gray, R.O. (1999). An overview of self-monitoring research in assessment and treatment. *Psychological Assessment*, 11(4), 415-425.

Lambert, M. (Ed.), 2004. *Bergin and Garfield's Handbook of Psychotherapy and Behavior Change* (5th ed.); New York: Wiley.

Lambert, M.J & Bergin, A.E. (1994). The effectiveness of psychotherapy. In A.E. Bergin & S.L. Garfield (Eds), *Handbook of Psychotherapy and Behavior Change* (4th ed); pp. 143–189. New York: Wiley.

Lamproupolis, G.K. (2001). Common processes of change in psychotherapy and seven other social interactions. *British Journal of Guidance & Counselling, 29,(1).* 

Lewis, C., Pearce, J. & Bisson, J.I. (2012). Efficacy, cost-effectiveness and acceptability of self-help interventions for anxiety disorders: systematic review. *The British Journal of Psychiatry*, 200 (1), 15-21.

Lewis, G., Anderson, L., Araya, R., Elgie, R., Harrison, G., Proudfoot, J., Schmidt, U., Sharp, D., Weightman, A. & Williams, C. (2003). *Self-help interventions for mental health problems.* Report to the Department of Health Research and Development Programme.

http://www.nimhe.org.uk/downloads/self-help.pdf

Liebowitz, M. R. (1987). Social phobia. *Modern Problems in Pharmacopsychiatry*, 22, 141-173.

Lopez, B., Jay Turner, R. & Saavedra, L.M. (2005). Anxiety and risk for substance dependence among late adolescents/young adults. *Journal of Anxiety Disorders*, <u>19</u> (3), 275-294.

Löwe, B., Spitzer, R.L., Williams, J.B.W., Mussell, M., Schellberg, D. & Kroenke, K. (2008). Depression, anxiety and somatization in primary care: syndrome overlap and functional impairment. *General Hospital Psychiatry*, <u>30 (3)</u>, Pages 191-199.

Marley, E. (2011). Self-help strategies to reduce emotional distress: What do people do and why? A qualitative study. *Counselling and Psychotherapy Research*, 11 (4), 317-324.

Matthews, M., Doherty, G., Sharry, J. & Fitzpatrick, C. (2008). Mobile phone mood charting for adolescents. *British Journal of Guidance & Counselling*, 36 (2),113-129.

Mattila, E. (2010). *Design and evaluation of a mobile phone diary for personal health management,* p.19. VTT Publications 742.

http://www.vtt.fi/inf/pdf/publications/2010/P742.pdf

McFall, R. M. (1970). Effects of self-monitoring on normal smoking behavior. *Journal of Consulting and Clinical Psychology*, 35(2), 135-142.

Mendlowicz, M.V. & Stein, M.B. (2000). Quality of Life in Individuals With Anxiety Disorders. *Am J Psychiatry*, 157, 669–682.

Menon, S. & Kahn, B. (2002). Cross-category effects of induced arousal and pleasure on the internet shopping experience. *Journal of Retailing*, 78 (1), 31-40.

Meyer, B., Pilkonis, P. A., Krupnick, J. L., Egan, M.K., Simmens, S. J. & Sotsky, S. M. (2002). Treatment expectancies, patient alliance and outcome: Further analyses from the National Institute of Mental Health Treatment of Depression Collaborative Research Program. *Journal of Consulting and Clinical Psychology*, 70 (4), 1051-1055.

Mikulincer, M. & Shaver, P.R. (2007). *Attachment in adulthood: structure, dynamics, and change,* pp. 424-425. Guilford Press, NY.

Morris, M.E., Kathawala, Q., Leen, T.K., Gorenstein, E.E., Guilak, F., Labhard, M. & Deleeuw, W. (2010). Mobile Therapy: Case Study Evaluations of a Cell Phone Application for Emotional Self-Awareness. *Journal of Medical Internet Research*, *12(2):e10.* 

National Audit Office Report (2007). *Helping people through mental health crisis : the role of Crisis Resolution and Home Treatment services.* National Audit Office, London.

http://web.nao.org.uk/search/search.aspx?Schema=&terms=mental+health

National Institute for Health and Clinical Excellence (NICE). *Clinical guideline CG113: Generalised anxiety disorder.* January 2011. <u>http://www.nice.org.uk/CG113</u>

National Institute for Health and Clinical Excellence (2007). *Anxiety (amended): Management of anxiety (Panic disorder, with or without agoraphobia, and generalised anxiety disorder) in adults in primary, secondary and community care.* London: NICE.

National Institute for Mental Health in England (2003) *Self-help interventions for mental health problems*. Policy Research Programme Expert Briefing. London: Department of Health.

National Union of Students (2013). Mental Distress Survey. MRS for NUS Services Ltd.

Newman, M. G., & Borkovec, T. D. (1995). Cognitive-behavioral treatment of generalized anxiety disorder. Reprinted from *The Clinical Psychologist, 48*(4), 5-7.

http://www.apa.org/divisions/div12/rev\_est/cbt\_gad.html

Newman, M.G., Erickson, T., Przeworski, A. & Dzus, E. (2003). Self-Help and Minimal-Contact Therapies for Anxiety Disorders: Is Human Contact Necessary for Therapeutic Efficacy? *J Clin Psychol*, 59, 251–274.

NHS Business Service Authority. *Anxiety disorders: Cost of anxiolytic medication*. NHS: Data Focussed Commentary; Downloaded August 2011.

http://www.npc.co.uk/therapeutics/cns/anxiety/resources/anxiety\_dfc.pdf

NHS Scotland. *Guide to self-help resources for depression and anxiety: a practitioners' resource.* Scottish Executive, March, 2006.

Nutt, D.J., Ballenger, J.C., Sheehan, D. & Wittchen, H-U. (2002). Generalised anxiety disorder: comorbidity, comparative biology and treatment. *International Journal of Neuropsychopharmacology*, 5 (4), 315-325.

Ofcom (2011). A nation addicted to smartphones.

http://consumers.ofcom.org.uk/2011/08/a-nation-addicted-to-smartphones/

Ohayon, M.M. & Schatzberg, A.F. (2010). Social phobia and depression: Prevalence and comorbidity. *Journal of Psychosomatic Research*, 68(3), 235-243.

Olatunji, B.O., Cisler, J.M. & Tolin, D.F. (2007). Quality of life in the anxiety disorders: A metaanalytic review. *Clinical Psychology Review*, 27 (5), 572-581.

Papsworth, M. 2006. Issues and outcomes associated with adult mental health self-help materials: a "second order" review or "gualitative meta-review". *Journal of Mental Health*, 14(4), 387-406.

Pratt, R., Halliday, E. & Maxwell, M. 2009). Professional and service-user perceptions of self-help in primary care mental health services. *Health and Social Care in the Community*, 17(2), 209-215.

Preece, J., and Maloney-Krichmar, D. (2005). Online communities: Design, theory, and practice. *Journal of Computer-Mediated Communication*, *10*(4), article 1.

http://jcmc.indiana.edu/vol10/issue4/preece.html

Preziossa, A., Grassib, A., Gaggiolia, A. & Rivaa, G. (2009). Therapeutic applications of the mobile phone. *British Journal of Guidance & Counselling*, 37 (3), 313-325.

Prochaska, J.O. & DiClemente, C.C. *The transtheoretical approach*. In: Norcross, J.C. & Goldfried, M.R. (eds.) *Handbook of psychotherapy integration*. 2nd ed. New York: Oxford University Press; 2005, pp.147–171.

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51, 390-395. Reavley, N. & Jorm, A.F. (2010). Prevention and early intervention to improve mental health in higher education students: a review. *Early Intervention in Psychiatry*, 4, (2), 132–142.

Redding, C.A., Rossi, J.S., Rossi, S.R., Velicer, W.F. & Prochaska, J.O. (2000). Health Behavior Models. *The International Electronic Journal of Health Education*, 3 (Special Issue), 180-193. http://www.iejhe.siu.edu

Right Here Brighton and Hove (2012). Young people's views and experiences of *GP* services in relation *emotional and mental health*. Mental Health Foundation.

http://www.righthere.org.uk/home/assets/pdf/young-people-views-experiences-gp-services-report.pdf

Rogers, C. (1951). *Client-centered Therapy: Its Current Practice, Implications and Theory*. London: Constable.

Rowney, J., Hermida, T. & Malone, D. (2011). Disease Management Project: Anxiety Disorders; Prevalence and Risk Factors. Center for Continuing Education, Cleveland Clinic: Cleveland, OH. <u>http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/</u>

Royal College of Psychiatrists. (2003). *The mental health of students in higher education*. Council Report CR112. Royal College of Psychiatrists: London.

Russell, G.C. and Shaw, S. (2009). A study to investigate the prevalence of social anxiety in a sample of higher education students in the United Kingdom. *Journal of Mental Health,* 18 (3), 198-206.

Russell, G. & Topham, P.W. (2012). The impact of social anxiety on student learning and wellbeing in higher education. *Journal of Mental Health*, 21 (4), 375-385.

http://informahealthcare.com/doi/abs/10.3109/09638237.2012.694505.

Ryan, R.M. & Deci, E. L. (2008). A self-determination theory approach to psychotherapy: The motivational basis for effective change. *Canadian Psychology*, 49 (3), 186-193.

Salkovskis, P.M. (Ed). (1997). Frontiers of Cognitive Therapy. New York: Guilford Press.

Salters-Pedneault, K., Tull, M.T. & Roemer, L. (2004). The role of avoidance of emotional material in the anxiety disorders. *Applied and Preventive Psychology*, 11, 95–114.

Seipp, B. (2007). Anxiety and academic performance: A meta-analysis of findings. *Anxiety Research*, 4 (1), 27-41.

Shiels, C., Gabbay M. & Exley, D. (2008). Psychological distress in students registered at a university-based general practice . *Primary Care and Community Psychiatry*, 13 (1), 9-18.

Shy no longer: Coping with social anxiety (2008). *Centre for Clinical Interventions*, Department of Health, Western Australia.

http://www.cci.health.wa.gov.au/resources/infopax.cfm?Info ID=40

Stallman, H.M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist*, 45 (4), 249-257.

Taylor, I. (1985). The reactive effect of self-monitoring of target activities in agoraphobics: A pilot study. *Scandinavian Journal of Behaviour Therapy*, 14 (1), 17-22.

Topham, P. (2009). *Feeling stupid: A survey of university students' experience of social anxiety in learning situations.* Project Report. University of the West of England, Bristol, UK.

https://eprints.uwe.ac.uk/164/

Topham, P.W. (2012). The Future is Appy. Therapy Today, 23 (3), 14-18.

http://www.therapytoday.net/article/show/3000/

Van Ameringen, M., Mancini, C. & Farvolden, P. (2003). The impact of anxiety disorders on educational achievement. *Journal of Anxiety Disorders*, 17 (5), 561-571.

Van Audenhove, C., & Vertommen, H. (2000). A negotiation approach to intake and treatment choice. *Journal of Psychotherapy Integration*, 10(3), 287-299.

Van Boeijen CA, Van Balkom AJLM, Van Oppen P, Blankenstein N, Cherpanath A and van Dyck R. (2005). Efficacy of self-help manuals for anxiety disorders in primary care: a review. *Family Practice*, 22 (2), 192-196.

Vincent, J. (2006). Emotional attachment and mobile phones. *Knowledge, Technology and Policy*, 19 (1), 39-44.

Williams, C. J. (2001a) Overcoming Depression: A Five Areas Approach. London: Arnold.

Wittchen, H.U., Jacobi, F., Rehm, J., Gustavsson, A., Svensson, M., Jönsson, B., Olesen, J., Allgulander, C., Alonso, J., Faravelli, C., Fratiglioni, L., Jennum, P., Lieb, R., Maercker, A., van Os, J., Preisig, M., Salvador-Carulla, L., Simon, R. & Steinhausen, H-C. (2011). The size and
burden of mental disorders and other disorders of the brain in Europe 2010. Report prepared by the European College of Neuropsychopharmacology and the European Brain Council. *European Neuropsychopharmacology*, 21, 655–679.

Wright, B., Williams, C, Garland, A. (2002). Using the Five Areas cognitive-behavioural therapy model with psychiatric patients. *Advances in Psychiatric Treatment*, 8, 307-315.

http://apt.rcpsych.org/cgi/reprint/8/4/307

Zivin, K., Eisenberg, D., Gollust, S.E. & Golberstein, E. (2009). Persistence of mental health problems and needs in a college student population. *Journal of Affective Disorders*, 117, (3), 180-185.