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Quality in Mental Health Applications

Contents

1 Introduction

The use technology in the area of mental health and/or behaviour support is becoming increasingly widespread (Barak & Grohol, 2011; Bernhardt, Chaney, Chaney, & Hall, 2013; Hayes, Gardere, Abowd, & Truong, 2008; Luxton, McCann, Bush, Mishkind, & Reger, 2011; Doherty, Sharry, Bang, Alcaniz, & Banos, 2008). Technology can be used to help improve access, engagement, effectiveness, and affordability of treatment and care. In addition, it can be used to help mental health professionals monitor their own practice, support decision-making, and provide further education (Barnett, Corkum, & Elik, 2012; Epstein J.

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N., Langberg, Lichtenstein, Kolb, Mekibib, & Simon, 2011b; Epstein J. N., Langberg, Lichtenstein, Kolb, & Simon, 2013; Lavigne, Dulcan, LeBailly, Binns, Cummins, & Jha, 2011; Mioduser & Margalit, 1997; Ossebaard, van Gemert-Pijnen, Sorbi, & Seydel, 2010; Xie, et al., 2013).

Among other technologies, the following have been used in the area of mental health: electronic health records (EHRs), videoconferencing, remote monitoring systems, smartphones, online therapies, and web portals (Baum, 2013). Doherty, Coyle and Matthews (2010) write that with the development of technology, there have emerged a number of questions and concerns raised about how one can ensure quality and ensuring technologies developed meet the needs of those who are using them.

This document sets out a series of guidelines with regard the design and procedures for developing technologies for use in the mental health field. In the selection of the guidelines, consideration has been given to the applicability of the guidelines to the WHAAM project (which aims to design a multifunctional tool to support behaviour observation and monitoring of ADHD).

2 The European Foundation for Quality Management (EFQM) Excellence Model

The European Foundation for Quality Management (EFQM) Excellence Model is a framework for helping organize and manage systems to ensure quality. It can be used in a variety of organisations and for a variety of different purposes. The model includes nine criteria or dimensions to follow. The nine criteria are as follows; leadership, people, policy/strategy, partnership/resources, processes, people results, customer results, society results, and key performance results.

Included with the model are eight fundamental concepts which are grouped as either ‘enablers’ or ‘results’. These can be described as follows:

- Enablers – All factors (e.g. people, policies, resources and processes) which ‘enable’ or support the achievement of the overall objectives. The process, structure, and means of organisation.
- Results – Specific objectives and deliverables as well as a larger spectrum of outcomes; for example, impacts of the project on partnership, communities, education institutions, and society at large.

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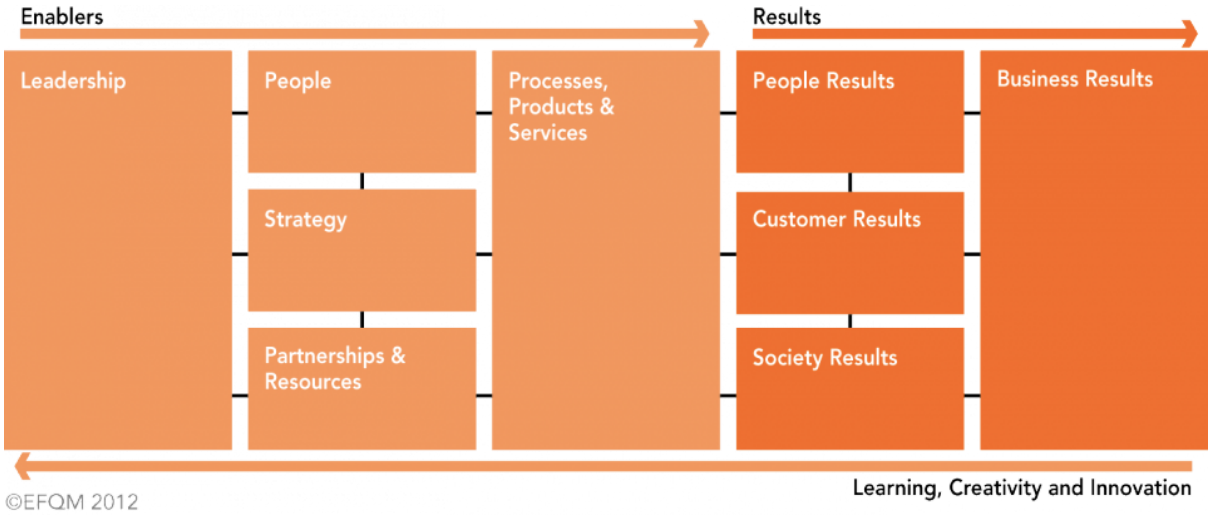
The EFQM Model is based on the idea that enablers direct and drive the results. In the case of the development of technologies for mental health, it will require a well-developed research team with partners who will help ensure a quality product that will result in positive change.

As seen in Figure 1 below, the 'Enablers' criteria cover aspect of what an organisation does and how it does it; including strong leadership and clear strategic direction. Enablers develop and improve partnerships and processes in order to deliver value-adding products and services. The arrows in the figure emphasise the how learning, creativity and innovation help improve the Enablers that in turn lead to improved results.

Figure 1: From EFQM Website



The EFQM Model helps ensure that the goals are focused and demands are balanced between short-term demands and longer-term goals. The Model provides a holistic tool for assessing effectiveness, and developing a focused strategy. By implementing the Model and also taking into consideration user-centred design and key issues in the field mental health care, technology developers and mental health providers can create quality technology tools.

Gulliksen et al. (2003) identify and set out number key principles for the development of user-centred systems. These principles are useful in the development of technologies and help guide organisation and research. They are as follows:

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- The work practices of the end users controls the development – There needs to be an early focus on users and tasks. The designers and developers need to acquire a thorough understanding of the users, their cognitive behaviour, attitudes, and characteristics of their work tasks.
- Active user participation throughout the project – The end users (or some form of stakeholders who represent the end users) must be involved throughout the analysis, design, development, and evaluation of the project. This can be achieved by incorporating interviews and observations throughout the process.
- Early prototyping – Creating prototypes from an early stage helps the design and development team create solutions and build a shared understanding about the needs of the end users and how the technology solution will help meet those needs.
- Continuous iteration of design solutions – By facilitating a cyclical process of design, evaluation, and redesign, the development/design team further refines their concepts of the solution and ensures that it will meet the needs of the end users. This can be considered a type of evaluation and it is recommended it includes empirical measurement where users perform real tasks on working prototypes.
- Use of multidisciplinary design teams – By including usability designer along with developers and end users, this helps ensure various angles are covered in the design and development of a technological solution.
- Integrated design – There is a need to ensure that the system, the work practices, on-line help, training, and organisation are developed in parallel.

These principles ensure there is a clear focus on the end user and emphasizes how a professional attitude contributes towards the project. In the mental health field in particular, it has been suggested that there is a need to consider the end user in terms of the mental health professional involved and some consideration of how one might evaluate the impact technology will have on the desired therapeutic outcome (Doherty et al, 2010).

It has been suggested an action research approach is a useful way to ensure these user-centred principles are met. Action research involves amongst other activities and actions, the use of qualitative data collection, for example, observing the work of the end user and carrying out semi-structured interviews based on open-ended questions. As a first port of call, establishing a set of goals and desired outcomes helps provide a way of measuring the success of a system. Following on from this there is a need to consider how collaboration

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will be facilitated, and how user-centred design will be achieved. These concepts are discussed in the following sections of this document.

2.1 Identifying Desired Outcomes and Goals

Technology solutions have been developed for a variety of different purposes in the area of mental health; for example, to help increase access to care, to provide new treatment, to monitor and track outcomes. Due to the fact that technology can be used for a variety of different purposes, there is a need for designers and mental health professionals alike to be aware of the specific objectives of the technology solution being developed.

In general, with design projects, it is beneficial to set goals and identify outcomes that a system will seek to achieve. These goals may include usability and user experience goals alongside the specific impact a technology will have on the end user; whether that is a mental health professional, a client, the overarching organisation, or some combination of these users.

Campbell et al. (2000; 2007) suggests spending time at the preclinical theory phase, phase I (modelling) and phase II (exploratory trial) as part of one larger research activity geared towards designing an intervention for evaluation. These phases identify the need to explore relevant theory to ensure the best choice of intervention and predict issues in design. They advocate researchers identify and describe the various components of an intervention and creating a feasible protocol for evaluation. Identifying desired goals and outcomes must be completed at the outset of a project and can be re-interpreted at various stages as more collaboration and consolation occurs.

2.2 Collaboration

The idea of collaboration between designers and mental health professionals is essential in creating successful and high-quality technological solutions. However, interdisciplinary collaboration brings its own set of challenges (Newell and Gregor, 2000). Due to the fact that mental health professionals and technology developers come from different backgrounds, they have different terms used to describe concepts. In

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addition, difficulties arise when mental health professionals have limited exposure or knowledge of technology and vice versa, when technology developers have little knowledge of the day-to-day practice of providing treatment and care to people with mental health difficulties.

It has been suggested there is a need to actively foster and develop a cooperative team where designers and end-users work together in discussion and collaboration (Boyd-Garber et al, 2006; Coyle and Doherty, 2009; Johnson et al., 2005); Newell et al., 2003). Workshops where collaborating professionals from different disciplines make presentations can support this goal and allow for balanced input.

In addition, identifying a set of key decision-making criteria and ensuring that both technology and mental health issues are covered is important. These include a discussion of issues such as engagement, ethics, considering the day-to-day experiences of mental health professionals in addition to a discussion of the potential and limitations for technology solutions. This can be achieved by consulting with various stakeholders, those with a vested interest in the project and completing in-depth qualitative interviews before projects commence and in various stages of the design process.

2.3 User-Centred Design

Each project involving the development of a technology solution is going to have a slightly design process; however, a broad framework can be useful in planning and considering design activities. At the very least, a collaborative process with mental health professionals is necessary so that the needs, wants, and limitations of end users are given attention at each phase of the design process. User-centred design is considered a process where development/design teams analyse how users are likely to use a product and also test how users behave while using the solution.

User stories can be used as a first step in planning. In the field of software development, a user stories is a very brief description of what a user does or needs to do as part of their job. It aims to capture the ‘who’ , ‘what’ , and ‘why’ of a requirement in a simple and concise way using everyday language (Cohn, 2004). They are used to clarify who the users are and what their tasks and goals are for the technology solution. Creating a description of the typical users, tasks, and scenarios and sharing these amongst the design and development teams helps keep the focus on the end user (Gulliksen et al., 2003).

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It has also been recommended that representative users or stakeholders have an active involved in the process (Gulliksen et al., 2003). This can be achieved by having users directly involved in the development, organisation, and design phases. These users need to be representative of the intended user group; therefore, in the mental health field, this may include mental health professionals themselves or clients who might use the end product. Plans for involving users, whether they are to be involved from the beginning in a very active way or if they will be consulted using interview methods, should be specified from the very start of the project.

In terms of design, Gulliksen et al. (2003) suggest activities need to be explicit and that the process should contain dedicated design activities. The user interface and interaction deign are important to the success of the system and there is a need to set these phases as a structured and prioritized activity. In human-computer interaction, paper prototyping is a widely-used method in user-centred design process. It involves creating rough, often hand-sketched drawings of an interface to use as models of a design (Sefelin, Tscheligi, & Giller, 2003; Snyder, 2003). Paper prototypes can then be used to generate feedback from end users by carrying out qualitative interviews. They also are useful in facilitating communication amongst members of the design and development team. Because they are rough designs, the aim is to further refine user requirements and ensure usability is achieved.

Prototypes can then be used for usability and design testing with real users. In usability and design testing, the end user performs realistic tasks by interacting with the prototype. The prototype is either manipulated by another person (reflecting how the software will react to user actions) or if a computer-based prototype is used, some functionality will be incorporated into the prototype. This ensures that issues around navigation and layout are considered along with further consideration of how the software meets the needs and desires of the end user.

3 Conclusions

This document has set out a series of guidelines with regard the design and procedures for developing technologies for use in the mental health field. The European Foundation for Quality Management (EFQM) Excellence Model is a recommended framework for helping organize and manage systems to ensure quality.

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In designing a technology solution for use in the mental health field, action research approaches can be used to ensure these user-centred principles are met. Action research involves amongst other activities and actions, the use of qualitative data collection, for example, observing the work of the end user and carrying out semi-structured interviews based on open-ended questions.

Research activities that are recommended include making explicit the goals and outcomes that a system will seek to achieve; ensuring that collaboration occurs amongst end-users, designers, developers, and usability experts; and creating user stories, paper prototypes, and more sophisticated working prototypes. By carrying out these activities, it has been suggested a high quality product is developed, one which meets the needs of the end user.

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