# Enabler for Interdisciplinary eHealthcare: A Qualitative Study

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**Abstract.** The complex relations between Health Technologies and clinical practices have been the focus of intensive research in recent years. This research represents a shift towards a holistic view where evaluation of health technologies is linked to organisational practices. In this paper, we address the gaps in existing literature regarding the holistic evaluation of e-health in clinical practice. We report the results from a qualitative study conducted to gain insight into e-health in practice within an interdisciplinary healthcare domain. Findings from this qualitative study, provides the foundation for the creation of a generic measurement model that allows for the comparative analysis of health technologies and assist in the decision-making of its stakeholders.

**Keywords.** e-health, health technology, evaluation framework, health technology assessment, health informatics evaluation

## Introduction

WHO formally defines e-health as *"the cost effective and secure use of information and communications technologies in support of health and health related fields"*[1]. E-health evaluation serves various purposes including the determination of its effectiveness, identification of unintended effects and consequences, and support for the creation of healthcare policy[2,3]. In contrast to medical technologies such as pharmaceutical drugs where formal frameworks are in place for evaluation, there is a lack of standard evaluation methods for e-health technologies. This absence limits the opportunity to examine the quality, value and benefits of e-health through comparative analysis. A strong evidence base for e-health with an understanding of its impact on financial and clinical outcomes is important for ensuring safe and effective technology-enabled healthcare.

E-health is broadly assessed through the comparison of the intervention against a standard of outcome measures. Measures generally reflect a stakeholder's satisfaction with the intervention, improvements in health, and quality of the intervention[4], however the assessment must ultimately consider each stakeholder involved and the input and outputs of the system. As e-health is different to generic information systems, medical devices and pharmaceutical drugs, it presents unique challenges that need to be

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considered during evaluation, such as the timing and indirectness of the impact of e-health. The impact of e-health on an individual's health is not immediate, thus there is a time lag between service use and its impact[5].

A number of frameworks have been proposed for the evaluation of e-health. While some frameworks provide evaluation guidelines of specific aspects of health information such as its quality, others provide evaluation criteria that encompass a range of aspects such as costs, benefits, and technical performance of the intervention[6,7]. Catwell and Sheikh[8] proposed a framework involving high level criteria and focused on understanding the relationships between environmental variables as part of the evaluation of e-health. Others such as Hamid and Sarmad[9] focused on the user's perspective such as the costs and benefits experienced by using the system. While these frameworks share similar factors, there is not one which encompasses all factors that may be important for the evaluation of e-health. The aim of this research is to gain insight and an in-depth understanding of clinician perspectives and attitudes towards the use of e-health within an interdisciplinary team and the workplace.

## 1. Methods

### 1.1. Study Methodology and Participant Recruitment

A qualitative study involving one focus group was conducted. Traumatic Brain Injury (TBI) was chosen as the domain due to the interdisciplinary nature of the work and the potential benefits e-health can bring to such work[10]. Using the purposive sampling technique, five (5) participants, from a rurally based organisation in New South Wales (Australia), were recruited to participate in the focus group. The organisation provides rehabilitation services to the community with the aim of helping clients transition back to normal lives. The participants are from various healthcare backgrounds and work in the same rehabilitation team that provides services to people with TBI.

### 1.2. Data Collection

Four key questions were used to facilitate discussion between participants. The questions presented were open-ended and aimed to elicit discussion that uncovered the participants' experiences with e-health, the challenges they faced, and their attitudes towards the use of e-health in interdisciplinary healthcare. Additional sub-questions and visual prompts were provided as required to ensure that the discussion among the participants was relevant to the research. Four researchers facilitated the focus group and collected data: the primary moderator, assistant moderator, and two assistants. All four researchers took notes, and the discussion was digitally recorded and later transcribed verbatim. The transcript was de-identified to ensure anonymity of participants and organisations, and was checked for accuracy against the digital recording by the researchers. The final transcript and a summary of key points were then emailed to participants for verification (member checking). No request for alteration to the transcript or summary was made by any participant.

## 1.3. Data Analysis

The focus group transcript was analysed using the simple analysis framework proposed by Krueger and Casey[11.] This involved three main steps: categorisation of raw data, descriptive statements and interpretation of data. Two researchers independently analysed and categorised the data. These categories of raw data were then cross-analysed and discussed by a group of researchers to ensure consensus and reliability in the development of descriptive statements for each theme.

Once consensus was achieved on the themes and categories of the data, the descriptive statements were interpreted. As the analysis of focus group data involves a level of subjectivity, care was taken during the analysis to ensure that bias was not introduced in the interpretation of the results. We took into consideration researcher preconceptions, the specific words spoken by the participants and the context of their statements, and the internal consistency and specificity of statements. To reduce subjectivity, findings were strengthened by having two researchers analyse the data independently, and the results and findings given to an independent reviewer for validation.

**Table 1.** Summary of participants' characteristics.

| Factor | Focus group |
|---|---|
| Region | Rural New South Wales (Australia), 400km from the city of Sydney |
| Organisation type | Non-government organisation |
| Services provided | Public inpatient and outpatient rehabilitation |
| Disciplines of the health care professionals | <ul><li>Speech pathology</li><li>Occupational therapy</li><li>Medical</li><li>Nursing</li><li>Care coordinator</li></ul> |
| Years working in the team | <ul><li>One over 10 years</li><li>One 5-10 years</li><li>Three 1-5 years</li></ul> |

## 2. Results and Discussions

Six main themes emerged from the data analysis.

## 2.1. Organisation Structure

The participants expressed a positive attitude towards being located at one site as it allows for effective information flows and easier communication between team members. Co-location of the team was often described as allowing for strong relationships to be developed within the team. Robust team dynamics and a positive and strong team base were demonstrated by the interactions between the team

members. The team also expressed positive attitudes towards working well face-to-face, leading to a period where they can improve processes and be proactive in using and integrating e-health and technology into their workflow processes. They believe that they are reaching a point *"where we'll be able to really be really proactive, and really improve things"* through the use of e-health.

## 2.2. Culture and Attitudes Towards Technology

Despite the lack of a technological background, the participants generally presented a positive attitude towards the use of e-health within their roles. While *"there are certainly a number of people have embraced the technology really well and so they're really keen",* others were more hesitant in embracing technology. The team perceived their situation as *"lucky"* and were grateful for having technology and demonstrated a positive attitude towards using technology in supporting their work. Despite some expressions of concern in relation to the use of e-health, participants described a positive team culture towards improving how they work through the use of technology stating that with technology: *"We could be magnificent. There's huge scope".* This attitude suggests that the clinicians have an understanding of the potential benefits technology can bring to the team. While the team presented a positive attitude towards technology, they also expressed their concern that their ignorance of what could be done in regards to technology hinders their potential to find new and innovative solutions.

## 2.3. External Organisations

The team interacts with various external organisations including government organisations, hospitals and private practitioners. In fact, funding of services for people with TBI may bring together clinicians from a variety of organisations to provide interdisciplinary care for a client. Furthermore, clinicians frequently interact with the organisations previously involved in the care of their clients and with those who refer patients, such as acute hospitals, or metropolitan brain injury rehabilitation units.

Lack of access to the electronic client records held by other organisations involved in client care means that clinicians rely heavily on traditional communication methods, such as telephone, to access client information. Such communication is variable in its quality and efficiency. Timely, efficient communication is generally experienced with other TBI unit services rather than generalist rehabilitation services as effective communication is fostered through a common understanding of TBI service delivery and clinicians' information needs. The development of external provider knowledge together with an understanding of TBI services allows for effective interdisciplinary teamwork and communication between organisations. The participants have a positive perception of working with external organisations the team has ongoing relationships with. For example, the team prefers to work with private providers with whom they already have developed a relationship, as *"if we work with them most often it's easier. We tend to go back to a few of the same".* However, differences in communication methods utilised by each organisation can hinder effective communication. For example, one government organisation uses mail or phone to communicate, while another government organisation only uses email. This can cause inefficiencies for the clinicians, as they need to have an understanding of which communication method is appropriate for an external organisation.

## 2.4. IT Support

The level of support provided by the IT specialists varied due to having IT support located off-site in Sydney. Not being co-located with IT support makes it difficult for clinicians to communicate IT issues effectively over the phone or email. Misunderstandings occurred between the two parties, as the IT staff *"didn't really understand what we wanted, what we needed"*. The problem is further accentuated by clinicians having *"difficulty in actually knowing the tech talk to know what to ask or know what the options [are]"*. Although this is a concern for the participants, they demonstrated a positive attitude in wanting to improve their understanding in IT, to minimise the technical expertise gap, stating *"we'd be keen to learn that tech talk and know what to go for"*.

Furthermore, the change management process in obtaining sufficient support is long and complex, and often there was no response from IT specialists. The participants needed to continuously ask for something to be completed: *"we just keep asking and asking"*. In addition to communication challenges, the long and complex process in gaining access is a barrier to effective use of the system to deliver services to clients.

## 2.5. Technology, Facilities and Infrastructure

Client management is a core component for the organisation and electronic health records is one of the key systems used to support it. The team uses a number of different electronic health record systems to access client information. Although these systems share a purpose and perform similar functions, each provides varying information, resulting in duplication of data and inconsistencies in the information shared across the team. Moreover, a lack of interoperability between systems makes it difficult to transfer and share information smoothly. Having a single system used consistently in all organisations would improve communication and sharing of information, and would be easier for clinicians to learn and use.

The availability of technology and facilities to support the use of technology can be a barrier to effective work processes. For example, there is no video conferencing facilities onsite for the team to use, so they need to go to another community venue that provides the technology. The venue is not always accessible for clients and, as such, is not suitable to be used for client-based services. When these situations occur, the teams generally make do with the facilities that are available or revert to traditional, easily accessible communication technologies such as telephones. One participant described the situation as sufficient, but believed that the team could achieve *"not just a great job, but a magnificent job, if we had more"*, suggesting that if technology and the respective facilities are available, it would provide the means for the clinicians to perform better.

Many technologies and systems utilised by the team rely on the internet and the presence of a strong network connection. Variations in internet quality and speed are hindering the effective use of technology and systems within the organisation. Furthermore, in rural regions, there are blackspots and 4G network restrictions due to the lack of infrastructure in place to support these network services. As such, the location of the organisation in rural NSW together with the lack of infrastructure creates an extra hindrance to the effective provision of services and use of technology.

The team attempts to work within their limitations but without basic infrastructure in place they are unable to use even the most basic systems that can enable effective

service provision. The participants strongly believe the lack of infrastructure, rather than the attitudes of the clinicians, is a barrier to working with technology and drives the team back to traditional means of performing processes: *"so it's not the therapists being the barrier to progression… and moving with the times, it's we don't have those infrastructures to try and do that."*

## 2.6. Policies and Guidelines

The internal policies and guidelines on technology use are insufficient and lack clarity. In general, individuals within the teams have restricted or no access to systems and technology such as Skype. The level of restriction varies from individual to individual, with some having full access and other having no access. This has resulted in confusion for staff due to inconsistencies in the interpretation of policy.

Moreover, simple actions such as sending text messages and emailing photos are restricted, creating barriers to the effective use of technology. There are situations where the number of restrictions on the technology makes it infeasible to use. For example, one participant requested a new smartphone to use for client communication. However, there were so many restrictions, such as the inability to download or use applications, and no access to the internet, that the device was unusable and as a result, the individual returned the device. The restrictive nature implies a lack of trust within the organisation culture, where employees are not trusted to work with IT as many applications and systems are restricted. The participants believe that there is a culture of treating the staff as children rather than professionals: *"It's like instead of treating us like we're all professionals, professional people, you're treated like children who can't do that"*. There is a consensus that the restrictions need to be removed or a suitable level of access should be provided to clinicians to allow for effective and efficient work. Currently, the teams make do with what they have access to *"make it work, but it's not the best"*.

## 3. Conclusion and Potential Implications

The results from the qualitative study confirms the need for rigorous evaluation of e-health and the importance of considering the technology-environment fit. The findings also moved beyond the literature and offers new factors that need to be considered during the evaluation of e-health. One of the most interesting findings from the study is that although the clinicians faced a number of challenges in regards to the use of e-health and were unable to achieve the full benefits that it can offer, they presented positive attitudes towards e-health. The majority of issues highlighted by the study are touched upon in literature; however the focus is still largely on the technological aspects of evaluation such as functionality and the quality of the system, rather than having an equal focus on the external and environmental impacts on technology. Without understanding organisational processes and policies, and having infrastructure in place, even if the technology is effective, it will not likely to be successfully implemented. Thus, factors from both health technology and health informatics evaluation should be drawn to provide the foundation for a rigorous e-health evaluation model that considers both the effectiveness of technology and the fit of technology within its environment.

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