

Acceptance and Use of ICT by Multidisciplinary Teams in a Healthcare Provider

Thomas Mac Ardle

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Declaration

I declare that the work described in the dissertation is, except where otherwise stated, entirely my own work, and has not been submitted as an exercise for a degree at this or any other university. I further declare that this research has been carried out in full compliance with the ethical research requirements of the School of Computer Science and Statistics.

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Abstract

With the increasing pressures on healthcare budgets, the efficiencies offered by information and communications technology are increasingly attractive to healthcare providers. However, many technology systems fail to deliver their projected benefits. For this reason it is important to understand the reasons for technology acceptance and use. The setting for this research project was a provider of healthcare services for clients with intellectual disabilities in which multidisciplinary teams are a vital element of intellectual disability care.

The project seeks to understand the acceptance and use of technology by members of multidisciplinary teams. It also investigates sources of information about assistive technologies recommended to clients by members of the multidisciplinary teams. This research was carried out by survey and was analysed using the Unified Theory on the Acceptance and Use of Technology. Qualitative data about sources of knowledge on assistive technology was assessed.

The study found that performance expectancy had the greatest influence on the multidisciplinary team members' behavioural intention to use ICT, which was in line with the literature. The next greatest influences were effort expectancy and social influence.

The study also reviewed the sources used by multidisciplinary team members for information on assistive technologies, which they recommend or use with their clients. The study found that colleagues were the most significant source for this information. The sample size used for this research project was small so further research should seek to enlarge the sample size so that generalised findings may be made.

The study concludes that for ICT use to achieve the targeted benefits the technology must be perceived by the users as assisting their goals of better quality of care and increased efficiency. The literature confirms these results and highlights the issue of compatibility with discipline and work practices as the main reasons for under use of ICT.

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Abbreviations

AARS	Average Adjusted R Squared
AFVIP	Average Full Variance Inflation Factor
AGE	Age
APC	Average Path Coefficient
ARS	Adjusted R Squared
AVE	Average Variance Extracted
AVIF	Average Variance Inflation Factor
BI	Behavioural Intention
CPD	Continued Practice Development
C-TAM-TPBP	Combined TAM and TPB
CDSS	Clinical Decision Support Systems
DSS	Decision Support Systems
EE	Effort Expectancy
EHR	Electronic Health Records
EXP	Experience
FC	Facilitating Conditions
GEN	Gender
GoF	Goodness of Fit
GP	General Practitioner
HSE	Health Service Executive
IBM	International Business Machines Corporation
ICT	Information Communication Technology
ID	Intellectual Disability
IDT	Innovation Diffusion Theory
IS	Information Systems
IT	Information Technology
MM	Motivational Model
MPCU	Model of PC Utilisation
PE	Performance Expectancy
PLS	Partial Least Squares
PMT	Protection Motivation Theory
RSCR	R Squared Contribution Ratio
SCT	Social Cognitive Theory
SI	Social Influence
SPSS	Statistical Package for the Social Sciences
SSR	Statistical Suppression Ratio
TAM	Technology Acceptance Model
TCD	Trinity College Dublin
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology
VIF	Variance Inflation Factor
VOL	Voluntariness of Use

CHAPTER 1: Introduction

1.1 Background

Information Communication Technology (ICT), in its many forms, is viewed as the main way of assisting healthcare organisations to meet obligations to their clients in a cost effective way (Willis, El-Gayar and Bennett, 2008; Gagnon, et al., 2014). As Ireland emerges from the financial crisis of 2008, health budgets are a constant source of attention. Yet, as the financial crisis fades into the recent past and the Irish economy grows stronger, the levels of funding for healthcare have remained static (Burke et al., 2014). The Disability Federation of Ireland (2014) pre-budget submission showed that providers of healthcare services to the Health Service Executive (HSE), the body with responsibility for public healthcare in Ireland, are under constant pressure to provide more services with the same or less funding.

Investment in ICT will be crucial for healthcare providers to achieve the required results with limited funding. The importance of information and its transmission to end users is constantly growing (Niehaves and Plattfaut, 2010). However, while ICT investments are substantial in many companies less than 50% of IT projects initiatives ever come close to achieving the anticipated results (Peppard, et al., 2007; Neufeld, et al., 2007). The value of new information systems (IS) in an organisation can only be realised when a system achieves widespread use and acceptance (Umble, et al., 2003).

The setting for this research study is a healthcare provider specialising in intellectual disability services based in Dublin, Ireland. The group of interest for this research study are the members of multidisciplinary teams that provide frontline services to clients with intellectual disabilities. This research project examines the factors that influence the acceptance and use of ICT by multidisciplinary team members in a community setting.

This research project also examines how multidisciplinary teams access and update their knowledge on assistive technologies, which can prove important to their clients. Assistive technology has been defined as "any item piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Technology-Related Assistance Act, 1988, USA. 102 STAT. p 1046). In an intellectual disability service multidisciplinary team members, as a consequence of their clients' needs, must have knowledge of all types of assistive technology so that the appropriate technology can

be recommended. This project looks at how information on assistive technologies is gathered by members of multidisciplinary teams.

In the intellectual disability sector, multidisciplinary teams are vital elements of the frontline staff providing care. According to the HSE “the team members independently treat various issues a patient may have, focusing on the issues in which they specialise” (HSE, 2015). The challenges faced by multidisciplinary teams where a client has an intellectual disability can require multiple interventions at the same time which requires greater inter-discipline cooperation.

Multidisciplinary team members have a dual relationship with technology, as both a consumer and in recommending assistive technologies to their clients. This relationship means it is important to understand the reasons underpinning technology use by multidisciplinary team members and the reasons why certain technologies are accepted.

The literature contains little research on the acceptance and use of ICT by multidisciplinary teams in the community. Most research on the acceptance and use of technology by multidisciplinary teams has focused generally on the acute hospital sector of primary care. Research into individual healthcare worker’s use of technology has tended to focus on physicians. This research project intends to add to the literature by investigating the issues of acceptance and use of ICT by multidisciplinary teams in a community care setting and on the team members’ knowledge sources on assistive technology.

1.2 Aims

This research project has two aims. Firstly, to provide a better understanding of multidisciplinary team members’ willingness to use ICT and secondly to understand the distribution of knowledge on assistive technologies among multidisciplinary team members.

The research is conducted by a survey of multidisciplinary team members in an intellectual disability service in Dublin. Part one of the survey will examine the factors that influence the acceptance and use of technology by members of multidisciplinary teams. Part two of the survey examines how multidisciplinary team members first acquire knowledge of assistive technology, how it can be maintained and seeks suggestions for improvements in sourcing this knowledge.

1.3 Research Questions

RQ1 What factors affect the behavioural intention to use Information Communication Technology by multidisciplinary team members in an intellectual disability service?

RQ2 Where do multidisciplinary teams first learn about assistive technology, what are the primary information sources used by multidisciplinary teams for assistive technology and how can this be improved?

1.4 Importance of Research

This research is important because there is little research in the literature on the acceptance and use of ICT by multidisciplinary teams in a community care setting. Most technology acceptance research has been conducted in general purpose business systems (Williams, Rana and Dwivedi, 2015). Where research has been conducted, multidisciplinary team research has focused on acute hospital systems and decision support systems for doctors and specialists. This study examines the factors that affect the behavioural intention to use ICT in the workplace by multidisciplinary teams, rather than examining an individual system.

In the intellectual disability sector of healthcare, assistive technologies can have life changing effects (Edutopia, 2005). Understanding when, how and where this information is acquired by the members of multidisciplinary teams will allow re-examination, improvement and expansion.

1.5 Beneficiaries of Research

The research on acceptance and use of ICT by multidisciplinary teams will be of interest to all healthcare bodies that are planning ICT investments, to software developers, for a better understanding of the requirements that their systems must meet to be successful, and the scientific community to improve the general body of knowledge in this area.

The research on how multidisciplinary team members first learn about assistive technology and where the best sources of information are will be of benefit to both the multidisciplinary teams involved and to learning institutions. Improving the sources of

assistive technology information has the potential to improve the quality of care provided by multidisciplinary teams.

1.6 Scope and Boundaries of this Research

This research is focused on the multidisciplinary team members of an intellectual disability service who were based in Dublin, Ireland. The data is collected from responses to an online survey completed by members of these teams. The survey set twenty three compulsory questions on the acceptance and use of ICT and five questions on the assistive technology knowledge. The compulsory questions are based on the UTAUT theory of user acceptance (Venkatesh, et al., 2003).

The questions on assistive technology examine how knowledge on these technologies was first discovered by multidisciplinary teams, what sources are currently used for information on assistive technology and seeks suggestions on how this knowledge can be improved for team members.

1.7 Structure of this Dissertation

The structure of this dissertation is as follows:

Chapter 1 - Introduction: This chapter sets the context for the dissertation, explains the aims of the research and sets out the research question to be answered. It explains why the research is important, who will benefit from the research, the scope and boundaries of the research and how the dissertation is structured.

Chapter 2 - Literature Review: This chapter reviews the literature on technology acceptance and use by multidisciplinary teams. The unified theory of acceptance and use is explained together with the models on which it was based.

Chapter 3 - Methodology: This chapter explains the research methodologies considered and the methodology choice is justified. The reasons for the model choice are given. The research model is detailed and the survey process is described. The hypotheses to be tested are set out and the research model's constructs are described.

Chapter 4 - Analysis and Findings: This chapter presents the analysis of the data collected from the research survey in two sections. Section 1 examines the acceptance

and use of technology and section 2 analyses the responses to the assistive technology questions. A summary reports the findings from both sections.

Chapter 5 - Conclusions and Future Work: This chapter describes the key research findings and answers the two research questions posed in section 1.2. The limitations of the research are explained and areas of possible future research are suggested.

CHAPTER 2: Literature Review

2.1 Introduction

This chapter examines the existing literature on ICT acceptance by both multidisciplinary teams and other workers in the healthcare sector then discusses the proposed research model for this study. The benefits of implementing healthcare ICT systems are well documented yet according to Maillet, Mathieu and Sicotte (2015) there is still a wide variance of satisfaction among health professionals with technology used in their work. The disruptive nature of ICT can require users to change their job routines and habits to adapt to new systems, as found by Liang et al. (2010), which may give rise to resistance and even system failure. On this basis, it is important to understand the reasons, documented in the literature, for the acceptance and use of technology by workers in the healthcare sector. The first section of this chapter is a literature review, which describes these reasons. These reasons should give context to the results of this research survey when the chosen model has been applied. The limitations of acceptance models are reviewed and the unified theory of acceptance and use of technology is explained. The chapter concludes with a short summary.

2.2 Technology Acceptance Literature

This section reviews the key findings from literature on the acceptance and use of technology in the healthcare sector. In particular, it discusses the constructs identified as most important in a number of different studies and suggested recommendations to increase the uptake of new technologies in this sector.

2.2.1 Literature on Multidisciplinary Teams

There is little research in the literature that specifically addresses the acceptance and use of ICT by multidisciplinary teams working in the community. However, there is some research on the acceptance and use of electronic health records (EHR) by multidisciplinary teams. There is an overlap in the methods of analysis used for general technology acceptance and the acceptance of EHR. For this reason, this section will review the literature on both general technology acceptance by multidisciplinary teams and acceptance of EHR by multidisciplinary teams.

Phichitchaisopa and Naenna (2013) carried out a study of the factors influencing the adoption of healthcare information technology services by multidisciplinary teams in Thailand. They applied the Unified Theory of Acceptance and Use of Technology

(UTAUT) to the 400 responses to a questionnaire, which surveyed physicians, nurses and other hospital staff members. The factors they identified as having a significant effect on behavioural intention were performance expectancy, effort expectancy and facilitating conditions. Their conclusion was that technology acceptance can be encouraged where the staff can perceive its usefulness, their examples were physicians using robotic surgery being able to increase the number of patients seen and speed up their recovery times with less exposure to complications. These results generate strong performance expectancy. Nurses and pharmacists were able to overcome poor legibility in written documents and reduce the number of medical errors which aided effort expectancy. Phichitchaisopa and Naenna (2013) found the greatest effects of facilitating conditions were in the provincial areas of the country.

The functioning of a multidisciplinary team can form part of the effective use of technology by the team as a whole. In a study of clinical team functioning, Gosling, Westbrook and Braithwaite (2003) looked at the acceptance of an online evidence system by clinical teams, both single disciplinary and multidisciplinary, in hospitals. They found that while clinical team functioning was not related to awareness or use of the online system, it was significantly related to the benefits derived from use of the evidence system and consequent impact of the improvements in patient care. The researchers suggest a more successful strategy for implementation of ICT would be to focus on clinical teams rather than organisations or professions.

By contrast, a study by Venkatesh, Zhang and Sykes (2011) showed the effect of a hierarchical team structure on the acceptance of technology by that team. They studied the implementation of an e-healthcare system in a hospital with data gathered from doctors, para-professionals, administrative personnel, patients and usage logs. They found that while use of the e-healthcare system made a positive contribution to patient care, ties to doctors had a negative effect on system use. This study highlights how central figures may impede the diffusion of technology.

In their study on health ICT acceptance factors in long-term care facilities Yu, Li and Gagnon (2008) found perceived usefulness as the most significant factor on behavioural intention. They found that perceived ease of use assisted caregivers in their belief about the usefulness of ICT applications. The positive influence of the subjective norm on both perceived usefulness and perceived ease of use was suggested by the researchers to be as a result of compliance with managerial wishes. This finding confirms empirical evidence that social influence is only effective in mandatory situations (Venkatesh, et al.,

2003). The study also found if a caregiver believed that using ICT would create a positive image of them then they would perceive the technology as easier to use. Computer skills were also found to have a significant positive perceived ease of use (Yu, Li and Gagnon 2008).

Oborn, Barrett and Davidson (2011) studied the use of electronic health record by a multidisciplinary team in a longitudinal study. This study highlighted the need to cater for different disciplines in designing the electronic health record as a means of encouraging acceptance of technology. The research found that allowing the various disciplines to tailor the system to their own specific needs while creating sufficient overlaps in the electronic health record encouraged use of the system. Examples of the different formats used were the preference of pathologists to use tick boxes while other disciplines produced text reports. The overlaps contained the data translations between disciplines gave the team members their required information in their desired format. Standardising electronic health record formats can result in mismatches with work practices and resistance to use among several disciplines. In common with earlier papers the researchers found compatibility with work practices an important determinant of system use.

2.2.2 Literature on Other Health Sector Workers

A number of research studies have been conducted on the acceptance and use of technology in general and of electronic health records by other discrete groups of workers in the healthcare sector. Research on acceptance and use of technology by occupational therapists and by nurses is helpful as these research subjects are similar to the workers on the multidisciplinary team that are surveyed in this study and similar methods of analysis are employed by the researchers. However, research on acceptance of technology by physicians was less useful as these workers exhibit more independence in their work practices than the subjects of this study, who work closely in a team. The literature on technology acceptance by these three groups of workers is discussed in the following sections.

Schaper and Pervan (2006), in a study on occupational therapists' acceptance and use of ICT, found that performance expectancy, computer attitude and compatibility to be the main influences on behavioural intention. Both effort expectancy and social influence were found to have the least significance on behavioural intention. Researchers noted in

the moderators that increasing age enlarged the effect of compatibility on performance expectancy and those with the least ICT experience experienced the greatest gains from using ICT.

Chedid, Dew and Veitch (2012) identified barriers to ICT acceptance and use. In their qualitative study of occupational therapists identified three categories of barriers to ICT use. Individual barriers included lack of training, ICT knowledge and preference for face-to-face meetings. Workplace barriers included poor ICT support, poor management understanding of technology. A community barrier was poor infrastructure, which made ICT difficult to use. It was also reported that while some older therapists reported “working out of their comfort zone” when using ICT, they could see the benefits of using ICT. As in the other studies, compatibility with existing discipline values and methods were important drivers in the acceptance or rejection of ICT.

While investigating the intention to use a health information system Hung, Tsai and Chuang (2013) found that compatibility with current work practices had the greatest influence on shaping a positive evaluation of the functionality, usefulness and trustworthiness of the system, as was seen in the study of occupational therapists by Schaper and Pervan described above. Perceived usefulness was not just influenced by the degree of system compatibility but also the confirmation of the system’s trustworthiness. They found that nurses adopted a positive attitude to technology systems if they felt a positive social influence in their use. Such positive influences included highlighting the reduction in medication errors and the trustworthiness of the system. When ICT system use is voluntary it is important that the system is regarded by the user as improving their performance and the quality of care provided, while being compatible with their existing work environment. The researchers also noted a greater co-worker influence for nurses in rural areas to those in urban areas.

Maillet, Mathieu and Sicotte (2014), in their study of the change management drivers for acceptance and actual use of an electronic health record (EHR) system by nurses, found the strongest effects were from performance expectancy and an improvement in the quality of care that the users could provide. As in the study of occupational therapists by Chedid, Dew and Veitch (2012) noted above, they also found that compatibility with professional work practices and discipline values were required to generate a favourable response. However, simple compatibility with existing work practices was not a sufficient reason to switch to the EHR system. As found by Hung, Tsai and Chuang (2013), the systems also need to be perceived as useful and easy to use.

Literature on technology acceptance by physicians shares some features with the research studies conducted with occupational therapists and nurses. As with the studies of those workers, perceived usefulness is the most significant determinant of acceptance. Yi, et al. (2005) in a study of IT acceptance by individual professionals, concluded that perceived usefulness and perceived behavioural control were significant determinants of behavioural intention. The researchers proposed that implementation strategies for new technologies should emphasise the advantage of the target technology. These results confirmed that technology acceptance is more successful if tangible results are readily apparent or if the technology enhances the image of the user.

Gagnon, et al. (2013) tested the acceptance by physicians of an electronic health record system, they found that physicians are likely to use electronic health record when it was considered easy to use and not involve changes in their work methods. They also found that if physicians perceived using electronic health record consistent with appropriate behaviour for physicians then acceptance of the technology increased (Gagnon et al., 2013).

Pynoo, et al. (2011) conducted three cross-sectional studies into the acceptance by physicians of a Picture Archiving and Communications System. The study began at T1, resumed four months later at T2 and concluded T3, 12 months later. At T1 effort expectancy was the main influence for using the system while at T2 social influence and performance expectancy became the main influences with effort expectancy as an indirect influence. Finally, at T3 performance expectancy and social influence became the main influences on behavioural intention. The researchers suggest that creating an environment that strongly supports the technology being introduced while focusing on the basic use initially to demonstrate ease of use, while later moving to more difficult tasks supports behavioural intention. This suggestion is made to highlight the usefulness of the technology while providing good supports and compatible systems to positively influence perceived usefulness of the system.

Generally, technology use and acceptance among physicians is low. For example, Shibl, Lawley and Debuse (2013) while conducting a qualitative survey on GPs about the acceptance of Decision Support Systems (DSS) found that only 7 out of 37 respondents used a DSS with 10 having never heard of DSS. This study identified four factors that influence acceptance: usefulness, facilitating conditions, ease of use and thrust in the knowledge base provider. In common with other studies, the researchers also found that

compatibility with existing work practices and existing systems were a requirement for acceptance.

The literature on acceptance and use of technology by physicians, apart from these common trends, has different characteristics to this research project. This study will assess the acceptance and use of technology by members of a multidisciplinary team. Members of these teams must work together to be effective in their work with clients. Physicians, however, exhibit a degree of independence in their work practices that is different to the subjects of this study. A study by Liang, et al. (2010) found that physicians were more likely to determine their IT use based on their own evaluation rather than pressure to comply with norms. This result differs from the finding in the study of single discipline and multidisciplinary clinical teams by Gosling, Westbrook and Braithwaite (2003), which found that team functioning related to effective use of technology. However, in common with the study by Gosling, Westbrook and Braithwaite (2003), the Liang, et al. (2010) research revealed that team climate has an indirect effect on system use. They recommended that sharing and promoting the benefits of technology use and encouraging interactions between peer groups are important for continued use.

Devaraj, et al. (2014) in their systematic review of barriers and facilitators to clinical DSS (CDSS) adoption found that the greatest barriers were time, finance, lack of knowledge, reluctance to use in front of clients, attitude towards CDSS, while the greatest facilitators were providing or collecting relevant information, improved quality of care, improved productivity, proper documentation of procedures, information retrieval/transfer - these are just the top five in each category. The researchers believe that the benefits of CDSS will only be realised when best practice is embedded in CDSS.

2.2.3 Key Findings from the Literature

One of the key findings from this review of the literature was the significance of perceived usefulness to the acceptance and use of technology by healthcare workers. The literature on multidisciplinary teams and other health sector workers clearly demonstrates that for technology to be accepted and used the individuals must perceive the technology to be either as useful as or more useful than their current methods.

Trustworthiness of ICT systems when used by nurses and doctors were leading factors for acceptance and use by nursing groups and doctors. For the nursing groups, reductions in medication errors and increased quality of care confirmed their view of a system's

trustworthiness. As nursing groups form an important component of the multidisciplinary teams in this study it is likely that quality of care and trustworthiness of ICT will be key considerations for the group.

Negativity from senior clinicians about ICT can radiate to the groups directly connected to them and have negative effects on a group's use of ICT. The same study showed that the further a group was removed from the senior clinician the less affected they were and those groups were recorded with making more positive connections with each other and recorded high ICT use.

Early design phase involvement of all user groups was also suggested in the literature for the successful implementation of ICT projects. Clinical systems should be built around the needs of different disciplines involved in the team rather than on organisation or profession based approaches. Identifying the overlaps between disciplines and translating that data into usable formats for other disciplines was suggested as the way to design hospital systems rather than designing a single system to try to fit all users. The multidisciplinary groups under study in this research project do use an electronic client record system which they were involved in design of at all stages.

2.3 The Unified Theory of Acceptance and Use of Technology

The unified theory of acceptance and use of technology (UTAUT) was introduced in 2003 following a review and synthesis of eight common information systems (IS) acceptance models in use at that time (Venkatesh, et al., 2003). Researchers instead of facing the choice of picking a favourite model that might be missing some important factors would be able to use a unified model containing all the components required.

UTAUT is a theory built on eight previous theories which were:

- The Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975).
- The Theory of Planned Behaviour (TPB) (Armitage and Conner, 2001).
- Technology Acceptance Model (TAM) (Davis, 1989).
- Combined TAM and TPB (C-TAM-TPBP) (Taylor and Todd, 1995).
- Motivational Model (MM) (Davis, et al., 1992).
- Innovation Diffusion Theory (IDT) (Rodgers, 1995; Agarwal, 2000).
- Model of PC Utilisation (MPCU) (Thompson, et al, 1991).
- Social Cognitive Theory (SCT) (Bandura, 1997).

The model contains four main constructs of performance expectancy, effort expectancy, social influence and facilitating conditions and four moderators of gender, age, voluntariness and experience.

2.3.1 Performance Expectancy

Performance expectancy (PE) is “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh, et al., 2003, p. 447). This construct is the strongest predictor of intention and is significant in both voluntary and mandatory settings. The influence of performance expectancy on behavioural intention will be moderated by gender and age in particular for younger men. This construct grew from perceived usefulness in TAM, extrinsic motivation in MM, job fit in MPCU, relative advantage in IDT and outcome expectations in SCT.

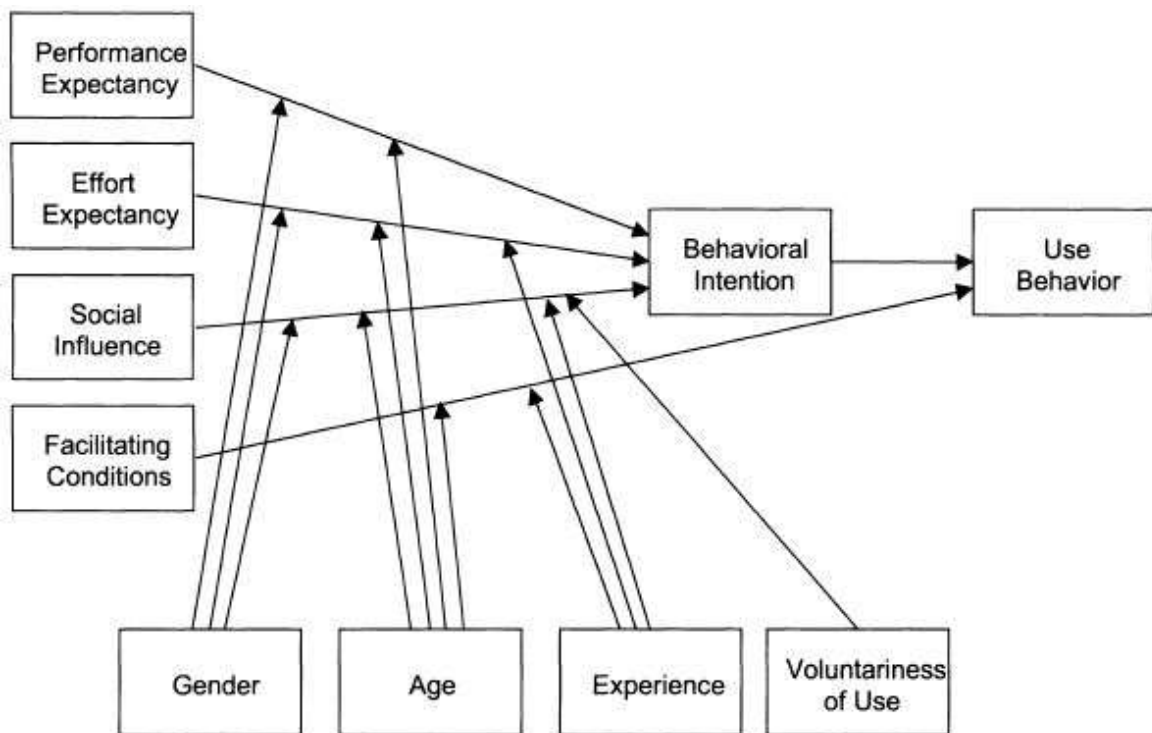


FIGURE 2.1 Original UTAUT Model (Venkatesh, et al., 2003, p. 447)

2.3.2 Effort Expectancy

Effort expectancy (EE) is “the degree of ease associated with the use of the system” (Venkatesh, et al., 2003, p. 450). This construct is the measure of difficulty entailed in use of a technology, which is an important predictor of behavioural intention. The construct is moderated by gender, age and experience. In general, the influence of effort expectancy

on behavioural intention is expected to be most relevant to females based on age and experience. This construct grew from perceived ease of use in TAM, complexity in MPCU and ease of use in IDT.

2.3.3 Social Influence

Social influence (SI) is “the degree to which an individual perceives that important others believe he or she should use the new system” (Venkatesh, et al., 2003, p. 451). This construct reflects the individual’s perception of how their peers and others whose opinions they value influences of their adoption of technology. General theory suggests that females are more sensitive to the opinions of others with the effect declining with experience (Morris and Venkatesh, 2000). The social influence construct is moderated by gender, age, voluntariness and experience. This construct grew from subjective norm in TRA, Social Factors in MPCU and image in IDT.

2.3.4 Facilitating Conditions

Facilitating conditions (FC) are “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh, et al., 2003 p. 453). This construct reflects the individual’s perception of the support that an organisation has in place for the use of technology. If performance and effort expectancies are present then the impact of facilitating conditions will not be significant in predicting intention. Empirical evidence shows that if individuals find support and assistance in the organisation this will increase behavioural intention (Venkatesh, et al., 2003). The moderators of facilitating conditions on behaviour are experience and age. This construct grew from perceived behavioural control in TRA, facilitating conditions in MPCU and compatibility in IDT.

2.3.5 Behavioural Intention

Behavioural intention is the willingness of an individual to pursue a particular behaviour. The relationship between behavioural intention and behavioural use is present in all eight models studied by Venkatesh, et al., (2003) and derives from models like the TRA where behavioural intention is the predictor of behavioural use.

2.4 Limitations of Acceptance Models

The most widely used acceptance model is TAM. However, the results obtained from TAM have been criticised for only revealing behavioural intention rather than the actual use of technology and predicting future use based on current beliefs, which are subject to

change (Johnson, et al., 2012). Turner, et al. (2009) in their systematic review of TAM's ability to predict actual use found that relatively few studies measured actual use and when they did sample sizes were small. Their research suggests that, while difficult, objective measures rather than subjective measures of use should be used (Turner, et al., 2009).

Inconsistent results were reported after examination of thirteen papers on behavioural intentions in the Middle East found inconsistencies in three of the major constructs (Al-Queisi, et al., 2015). Taiwo and Downe in their meta-analytic review of empirical findings on UTAUT found studies with inconsistent results (Taiwo and Downe, 2013). UTAUT studies have a low diversity of samples, with most participants being young technology users with technology professionals displaying high levels of technology acceptance (Nistor, et al., 2013). While investigating entrepreneurs' intentions towards IT, researchers found behavioural intention to be a weak predictor because of the time gap between behavioural intention and actual use, which may allow external factors, newer technology or unforeseen events to change actual use (Moghavvwemi and Salleh, 2014).

Inconsistent results can be explained by the use of a subset of the main factors or by dropping the moderators (Venkatesh, et al., 2012). The use of the UTAUT model without the moderators affects behavioural intention because of its known limitations to represent external factors, unforeseen events and predicting events beyond an individual's control (Venkatesh, et al., 2008). Taiwo and Downe (2013) concluded that while some researchers reported the use of UTAUT, they note only two of the articles used the actual original model.

Williams, et al., (2011) while reviewing studies citing the UTAUT model revealed that many of the UTAUT studies they reviewed made only partial use of the model's constructs, that most studies cited the theory on the basis of either supporting their argument or criticising the theory and that only 3.6% of their papers reviewed reported full use of the model.

2.5 Summary

This chapter has given an overview of the relevant literature on the acceptance and use of technology by both multidisciplinary teams and other discrete groups in the healthcare sector, including occupational therapists, nurses and physicians. A common feature across the literature was that performance expectancy and effort expectancy are the main

influences on behavioural intention to use the systems under investigation. The literature also showed that where new technology or new systems that are contrary to or do not fit in with existing work practices or are contrary to discipline values failure or low use is likely.

It also showed that where the benefits of ICT are observable systems are more readily accepted as performance gains are clear and the additional benefits of increased quality of care reinforce the value therein. Trustworthiness of new ICT systems is an important factor for nurses and doctors. The ability of systems to overcome current problems such as medication errors assisted in the acceptance of technology. Suggestions for improved adoption of new healthcare systems were the involvement in early design phases of all groups. Systems should ensure that there is compatibility and that the users perceive its usefulness. Having a one system fits all is likely to result in under use.

The chapter then explained the constructs of the UTAUT model, which combines eight previous models to explain acceptance and use of technology. The model has some limitations but these can be minimised with correct implementation (Venkatesh, et al., 2012).

CHAPTER 3: Methodology and Fieldwork

This chapter describes the research design for this study. In designing the research plan, general research philosophies, research approaches, methodologies, strategy and ethical issues were considered. This chapter will describe the data source used to gather information about the acceptance and use of technology by a multidisciplinary team, how the data was collected and analysed and limitations that applied are set out.

3.1 Research Philosophies Considered

The research philosophies that were considered were positivism, interpretivism, realism and pragmatism.

The philosophy of positivism allows the collection of data about an observable reality, search for regularities and casual relationships in the data to create law like generalisations (Gill and Johnston 2010; Saunders, Lewis and Thornhill (2012). The research philosophy for quantitative research is generally positivism, especially when used with structured questionnaires to uncover facts and compare to hypotheses (Gepart, 2004). Positivism is used both to create hypotheses and test hypotheses and would be a good approach for a single method research project. However, as this is mixed method research project positivism was unsuitable.

Interpretivism asserts that the researcher must understand the differences between humans in our role as social actors (Saunders, Lewis and Thornhill, 2012). The researcher should adopt an empathetic stance and see the world from their subjects' point of view. Interpretive research "describes how different meanings held by different persons or groups produce and sustain a sense of truth, particularly in the face of competing definitions" (Gephart, 2004, p 457). Interpretivism is not suitable for the testing of hypotheses. For this reason it cannot be used with section one of this study, however, section two requires qualitative analysis of the opinion answers in the survey. Interpretivism was not used in this research because the research does not seek to understand social roles.

Realism assumes a scientific approach to the development of knowledge, that objects have a reality independent of the human mind. Realism is a branch of epistemology similar to positivism in its scientific approach and can be defined in two types, direct realism and critical realism (Saunders, Lewis and Thornhill, 2012). Direct realism can be

defined as what you see is what you get. Critical realism can be defined as what you see is not the proper representation of what you will get. Realism, despite its scientific approach to the development of knowledge, was rejected for this research project. It was rejected for this project because this research does not seek to prove scientific facts independent of human thought and belief.

Pragmatism asserts that concepts are only relevant where they support action (Kelemen and Rumens, 2008; Saunders, Lewis and Thornhill, 2012). Pragmatism recognises that there can be many versions of reality and that it may require mixed or multi-methods in the analysis of data collected. Epistemology, that is the researcher's view of acceptable data, is provided by both observable phenomena and subjective meaning. Pragmatism is particularly suited as a research philosophy for projects involving the assessment of both quantitative and qualitative data.

The philosophy of pragmatism was chosen for this project as the research will have data that requires both quantitative and qualitative data. This research project requires a mixed method approach, which is discussed below, that will use both quantitative and qualitative data thus pragmatism was the chosen philosophy. The research approach will be interpretative and deductive.

3.2 Philosophy Terminology

In researching the philosophies it became clear that there are clear differences between terminology and meanings used between Europe and America. Research revealed the different standpoints that exist between the categorisation and terminologies in use.

Quantitative research dominates the IS academic literature in America while in Europe qualitative research is the norm (Silverman D, 2013). Figure 3.1 below sets out how the American view of research philosophies differs from European views. These differences can lead to confusion in the choice of definitions and the use of the appropriate framework. As Mkansi and Acheampong have noted "advocates of research methods (Srivastava and Rego, 2011; Saunders, Lewis and Thornhill, 2012; Khotari, 2006) have used different terminologies that are contradictory one to another, which leave students staggering as to which is which, and why there is no consensus in the scholarly fields" (Mkansi and Acheampong, 2012 p. 134).

For the avoidance of confusion, in this research project European definitions will be used.

Research Traditions^a

Tradition	Positivism and Postpositivism	Interpretive Research	Critical Postmodernism
Assumptions about reality	Realism: Objective reality that can be understood by mirror of science: definitive/probabilistic	Relativism: Local intersubjective realities composed from subjective and objective meanings: represented with concepts of actors	Historical realism: Material/symbolic reality shaped by values and crystallizes over time
Goal	Discover truth	Describe meanings, understanding	Uncover hidden interests and contradictions: critique, transformation, and emancipation
Tasks	Undertake explanation and control of variables: discern verified hypotheses or nonfalsified hypotheses	Produce descriptions of members' meanings and definitions of situation: understand reality construction	Develop structural or historical insights that reveal contradictions and allow emancipation, spaces for silenced voices
Unit of analysis	Variable	Verbal or nonverbal action	Contradictions, critical incidents, signs and symbols
Methods focus	Uncover facts, compare these to hypotheses or propositions	Recover and understand situated meanings, systematic divergences in meaning	Understand historical evolution of meanings, material practices, contradictions, inequalities

^a This table is based on Gephart (1999), Guba and Lincoln (1994), and Lincoln and Guba (2000).

FIGURE 3.1 Research Traditions (Gepart, 2004, p. 456).

3.3 Research Methodologies

The possible methodologies for this project are qualitative, quantitative or mixed research methods. A single method research methodology means selecting either a quantitative or qualitative approach whereas a mixed method is a combination of both methodologies.

“Quantitative research codes, counts, and quantifies phenomena in its effort to meaningfully represent concepts” (Gepart, 2004, p. 455). Quantitative research is an examination of the relationships between variables measured numerically and analysed using statistical procedures (Creswell, 2014). It is principally associated with experimental and survey strategies and the philosophy of positivism. It is usually associated with the deductive approach when testing a theory and the inductive approach when developing a theory.

Qualitative research, however, can be mono method using interpretive and naturalistic approaches and has an inherently linguistic and humanistic focus. As a research process grows it may become clear that pragmatism requires a mixed-method to be used with one portion using quantitative methods and the second qualitative using methods.

In this research project, section one tests several hypotheses requiring quantitative data to be gathered and analysed. Section two involves general data collection and requires answers to open questions that require the respondents to state views and suggestions.

The first research question will use quantitative methods to test a hypotheses and the second research question will use qualitative methods. A mixed method research methodology has been adopted for this project.

3.4 Research Strategy

The research strategies normally associated with quantitative research are those that require statistical data proof. Some of these strategies are listed below:

- Experiment
- Survey
- Case study
- Archival Research
- Ethnography
- Action Research
- Grounded Theory

Experiment can be used to study the possibility of change in an independent variable causing change in a dependant variable. Experiments use predictions rather than research questions to search for anticipated relationships between variables. These predications are called hypotheses. In a standard experiment two opposing hypothesis are tested, the null hypothesis (predicting no significant difference will be found) and an alternative hypothesis (predicting a significant difference will be found). The result of the experiment will be the rejection of one of the hypothesis. Experiment is an unsuitable strategy in the research project as the project aims are to determine behavioural intentions of ICT users (Saunders, Lewis and Thornhill, 2012).

Survey is a popular research tool and can be used in both quantitative and qualitative research. A survey gives a researcher control over the research process and when used with sampling allows the researcher to produce results that are representative of the general population. Questionnaires are the most popular type of survey but structured interviews and structured observation can also be used a survey methods. The greatest

drawback in using this research strategy is that the researcher is dependent on others to complete the survey and a low response rate may prevent generalised findings.

Hypothesis testing is required in this project and the quantitative data that can be generated from a questionnaire survey will be required to prove the hypothesis. For this reason a survey strategy is the most suitable.

Case study research explores a topic in depth to reveal the context and processes. The case study strategy is suited in particular to answer 'how?' and 'what?' questions. Yin defined case study research as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2003, p.13). Criticisms of case study strategy are that the researcher has not completed the work with sufficient rigor, has not followed systematic procedures or has allowed bias to influence both finding and conclusions (Yin, 2003). In the current research project the case study strategy is not suitable due to time constraints and the use of a single theory model.

3.5 Ethics Approval

As this research requires a questionnaire to be completed by individuals, ethics approval was required both from Trinity College Dublin and from the survey participants' workplace. Ethical issues that were considered were user identification, publication of information and whether the research questions proposed were of interest to health service provider.

The project was submitted to the survey participants' workplace for approval of the ethics committee on the 2nd of April 2015, which was granted on the 21st of May 2015. Approval was sought to allow the use of work e-mail addresses to contact potential participants and this approval was granted on 17th of May 2015. An application to the TCD ethics committee was made on the 13th of May and approval was granted on the 21st of May 2015.

In view of the possibility that participants may feel obliged to participate in the survey, a Gatekeeper role was established to separate direct communication between the survey participants and the researcher. All correspondence about the survey was issued to potential participants by the Gatekeeper.

To allow an informed decision about taking part in the survey to be made, a participation request was sent to potential participants by email, which was followed by a three day gap

to allow consideration of the participation request. The request also included an information leaflet, see Appendix D, and allowed potential participants to raise questions and receive replies. After this three day window expired, participants received an e-mail formally inviting participation in the survey which included an imbedded link to the survey website. If they clicked on the link, they would be taken to the survey website, where they are given two more reminders before beginning the survey that participation was voluntary. Additionally, each page in the survey reminded participants that they could exit the survey if they wish.

The raw research data was anonymised prior to download from the survey provider, website which was SurveyMonkey. All responses were examined to ensure that there were no items or statements to could lead to identifying particular individuals. Publication of research findings was agreed to by the participants.

3.6 Research Setting and Approach

The research setting is a healthcare provider specialising in intellectual disability services based in Dublin and the group of interest for this research project are the members of the multidisciplinary team that provides services to the healthcare provider's clients. The multidisciplinary team consist of physiotherapists, occupational therapists, speech and language therapists, psychologists, psychiatrists, behavioural specialists and social workers. In total the team has 102 members.

In the time frame for this dissertation it was not possible to conduct a longitudinal survey so a cross-sectional survey has been used. The survey questions, set out in Appendix A, were answered through an online survey. The survey tool used was the online service SurveyMonkey and survey information was downloaded in IBM's SPSS format and MS Excel.

The questionnaire was divided into two sections. The first section was about individual's acceptance and use of technology, with questions based on the UTAUT model. In section one there were 23 questions. Nineteen questions were based on the six proposed hypotheses rated by means of the Likert agreement scale 1-5 ranging from 'strongly disagree' to 'strongly agree' (Likert, 1932). There were 4 moderator questions, which are set out in Appendix A. The hypotheses are set out in section 3.8 below.

The second section of the questionnaire focused on the sources used by multidisciplinary teams for recommendations on assistive technology to be used by their clients. The 5 questions in this section focused on assistive technology information: where information on assistive technology was found, sources used to keep up-to-date, desired information and suggestions for improvements. See Appendix A for the full questionnaire.

This survey gathered both quantitative data and qualitative data and a mixed method is being used to assess the data from the survey using IBM's SPSS, Microsoft Excel, WarpPLS – student version 5.0 and SurveyMonkey analytics.

3.7 Model Choice

The literature review examined the limitations of some acceptance models, see section 2.5. The UTAUT model has been chosen for this research project because it allows greater focus on individual acceptance of technology in a mandatory use environment. In a comparison of four prominent theoretical models (TAM, TPB, UTAUT and PMT) while testing the understanding of acceptance of mobile health service it was found that UTAUT outperformed the other three models (Sun, et al., 2013). Additionally, "UTAUT is applicable in explaining online behaviour in non-western cultures under discretionary use limitations" (Al-Qeisi, et al., 2015, p. 214). The UTAUT model has explained up to 70% of variance in behavioural intentions (Venkatesh, et al., 2003; Shibl, Lawley and Debuse, 2013).

UTAUT has grown in popularity and use since its introduction. Williams, et al., (2015) found that UTAUT was cited just under five thousand times, articles were published across one hundred and thirty journals and conferences with a large number of authors contributing a small number of articles each. They also noted a wide diversity in universities contributing research two hundred and nineteen unique universities from thirty six distinct countries. This is in contrast to the use of TAM where 50% of the articles came from eleven authors and the TAM outputs were published in a small number of journals (Lee, Kozar and Larsen, 2003).

The UTAUT model was chosen for this project because it is rigorous, proven in its use, adaptable and widely used to examine the behavioural intentions of users. The model has some limitations but these can be minimised with correct implementation (Venkatesh, et al., 2012).

3.8 Research Model

In order to assess the individual's use of technology in line with the unified theory of acceptance and use of technology six hypotheses are tested in the survey, see figure 3.2. These hypotheses, H1 to H5, are set out below, where their relationship with the UTAUT is explained.

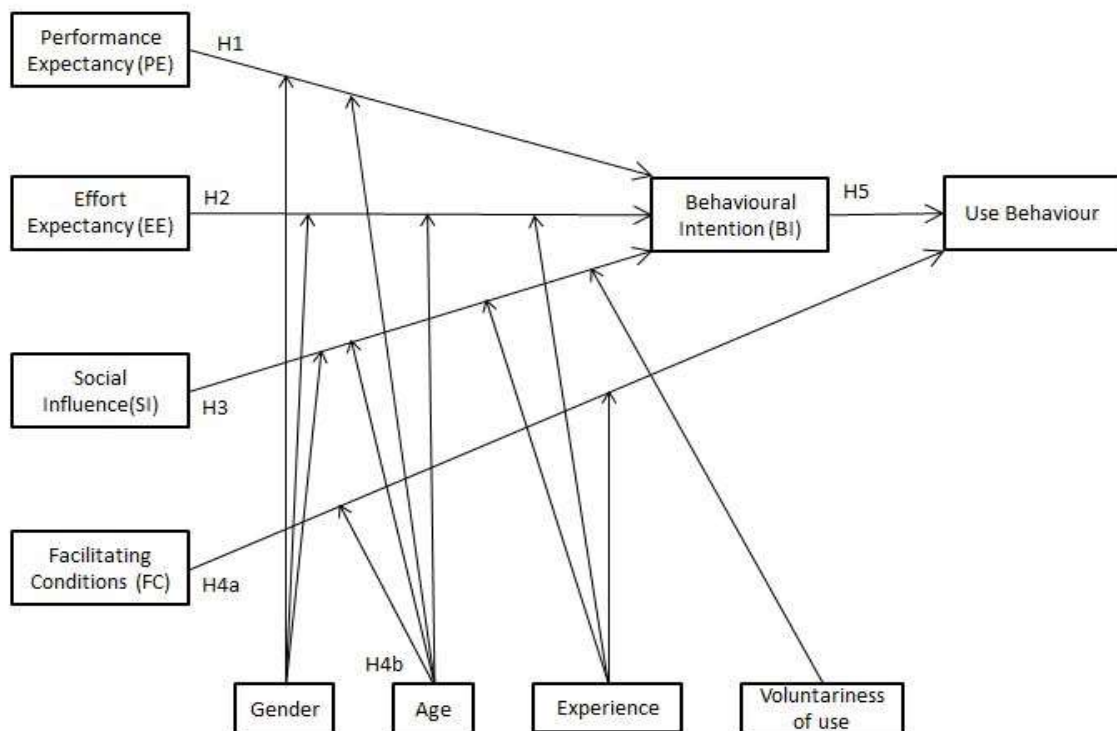


FIGURE 3.2 Research Model Including Hypotheses

3.8.1 Performance Expectancy

Performance expectancy is “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh, et al., 2003, p.447).

- Hypothesis1: The influence of performance expectancy will have a positive effect on multidisciplinary teams' behavioural intention to use ICT and the effect will be moderated by gender and age

3.8.2 Effort Expectancy

Effort expectancy is defined “as the degree of ease associated with the use of the system” (Venkatesh, et al., 2003, p.450).

- Hypothesis 2: The influence of effort expectancy will have a positive effect on multidisciplinary teams’ behavioural intention to use ICT and the effect will be moderated by gender, age and experience

3.8.3 Social Influence

Social influence is “as the degree to which an individual perceives that important others believe he or she should use the new system” (Venkatesh, et al., 2003, p.451).

- Hypothesis 3: The influence of social influence will have a positive effect on multidisciplinary teams’ behavioural intention to use ICT and the effect will be moderated by gender, age and experience, the effect will be stronger in women particularly older women and particularly in mandatory settings in early years of experience.

3.8.4 Facilitating Conditions

Facilitating conditions are defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh, et al., 2003, p.453). In this model self-efficacy, anxiety and attitude were not included. This is in line with the findings of the preliminary testing of UTAUT carried out by Venkatesh, et al., (2003).

- Hypothesis 4a: Facilitating conditions will not have significant effect on multidisciplinary teams’ behavioural intention.
- Hypothesis 4b: The influence of facilitating conditions on multidisciplinary teams’ behavioural intention to use ICT will be moderated by age and experience and the effect will be stronger on older workers, particularly with increasing experience.

3.8.5 Behavioural Intention

Behavioural intention is defined as the willingness of an individual to pursue a particular behaviour.

- Hypothesis 5: Behavioural intention to use ICT has a positive influence on multidisciplinary teams’ usage.

3.8.6 Moderating Factors

Moderating factors are a quantitative or qualitative variable that affects the hypothesis construct's strength or direction. In their preliminary testing of the UTAUT model Venkatesh et al tested self-efficacy, anxiety and attitude but found that they did not have any direct effect on intention and so removed them from their model (Venkatesh, et al., 2003). The moderators used in this theory are gender, age, experience and voluntariness of use. Gender is expected to moderate Performance Expectancy (PE), Effort Expectancy (EE) and Social Influence (SI). Age is expected to moderate PE, EE, SI and Facilitating Conditions (FC). Experience is expected to moderate EE, SI and FC. Voluntariness of Use (VOL) is expected to moderate SI.

3.9 Summary

This chapter has set out the research design of this project. The chosen research philosophy is pragmatism and the research methodology is a mixed method of qualitative and quantitative. The philosophy of pragmatism was selected because it is suited to mixed method research. The mixed method approach was chosen because the two sections of the survey require different approaches: the first section requiring quantitative methods and the second section requiring qualitative methods.

The UTAUT model was chosen for this project because it is rigorous, proven in its use, adaptable and widely used to examine the behavioural intentions of users. The design of the research model was explained setting out the hypotheses that form the basis for the questionnaire.

CHAPTER 4: Analysis and Findings

4.1 Introduction

This research aims to understand the reasons for technology acceptance and use by members of a multidisciplinary team in an intellectual disciplinary service. The data for this study was gathered through an online research survey. This chapter sets out the demographics of the survey respondents, the analysis used to test the unified theory of acceptance and use of technology (UTAUT) hypotheses in the first section of the survey and the analysis applied to the questions on assistive technology in the second section of the survey. The chapter concludes with a summary of findings from both sections of the survey.

4.2 Survey Demographics

The research survey was conducted for 21 days between the 27th of May and the 17th of June 2015. There were 102 potential respondents and 68 responses were received, a 66.6% response rate. The survey included a mandatory series of 23 questions testing UTAUT and five questions on assistive technology. The criterion for a valid response in the UTAUT section was the completion of all 23 UTAUT questions. One of the 68 responses did not meet this criterion and was discarded, leaving 67 valid responses (65.7% response rate). The response rate for each of the five questions in the second section of the survey on the assistive technology varied between 96% and 76% of respondents.

Many UTAUT studies, including the original, use partial least squares (PLS) as the statistical technique for analysis but the most popular statistical technique has been IBM's SPSS (Williams, Rana and Dwivedi, 2015). The analysis conducted here used IBM's SPSS, WarpPLS V5.0 student version by Ned Kock and Microsoft Excel 2010.

Gender

The gender balance of the valid responses was 88.1% Female and 11.9% Male (n = 67).

Age Profile

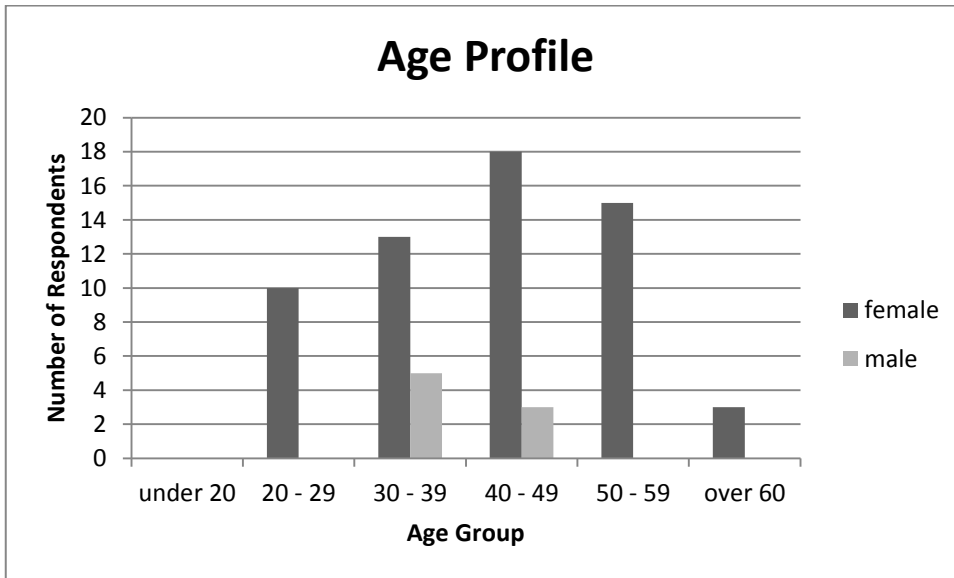


FIGURE 4.1 Age Profile of Multidisciplinary Teams

The age profile shown above is banded into 10 year groups. The absence of under 20's is likely to be related to the college course structure where work experience is in the later years when students are over twenty. The male age profile, which is concentrated between 30 and 49, is likely to affect moderation of some hypotheses.

Experience

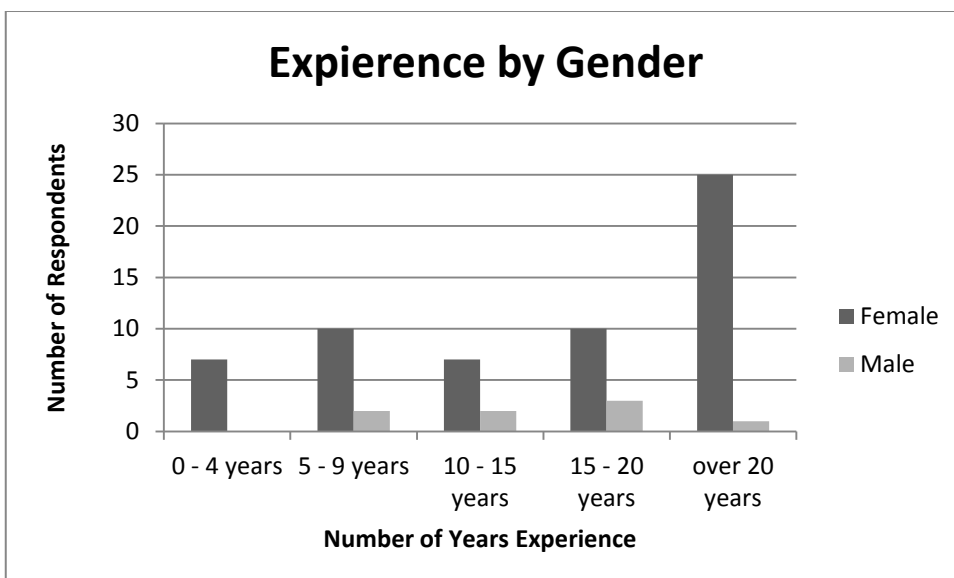


FIGURE 4.2 Multidisciplinary Team Members' Work Experience

The largest group of respondents is those with over 20 years' experience. UTAUT suggests that the moderating effects of age and experience should have a direct effect on the group's ICT usage.

Voluntariness

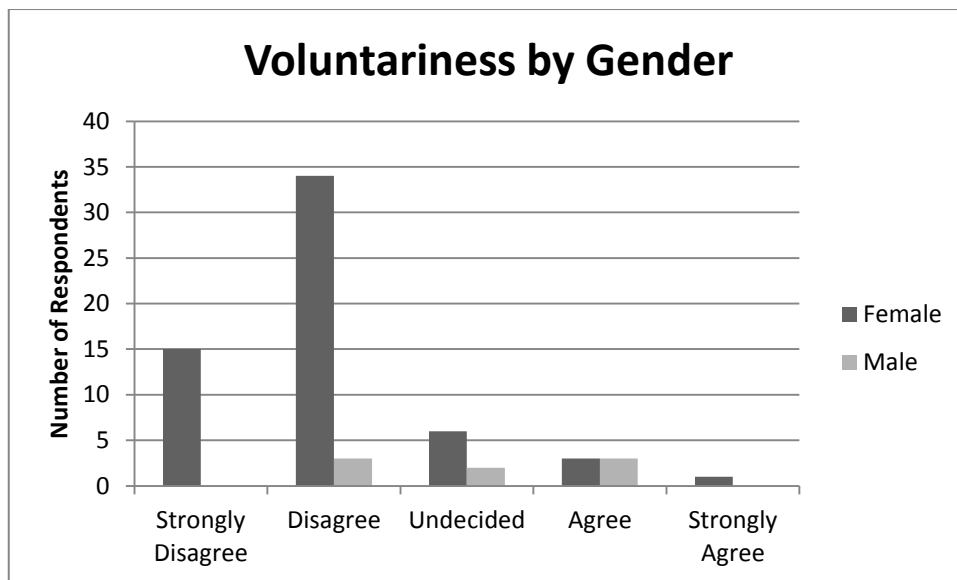


FIGURE 4.3 Voluntariness of ICT use

When respondents were asked about their voluntary use of ICT, 10% either agreed or strongly agreed that the use of ICT was voluntary while 77% either strongly disagreed or disagreed that ICT use was voluntary. There is a strong gender difference on this subject with 62.5% of males were either undecided or agreed that they could stop using ICT. The data displayed in figure 4.3 above are the numbers for both male and female respondents.

4.3 UTAUT Data Analysis

4.3.1 Data Screening

The raw data from the survey was first loaded to SPSS and the variables were renamed to follow the naming conventions of the original model. Before analysis took place all data values were checked for errors and missing values. This was done by using the frequencies function in SPSS to check for minimum and maximum values. However, all scale values were correct and there were no missing values. Simple bar chart analysis in Microsoft Excel revealed the data to be negatively skewed, an example of which can be seen in the summary bar chart for performance expectancy below.

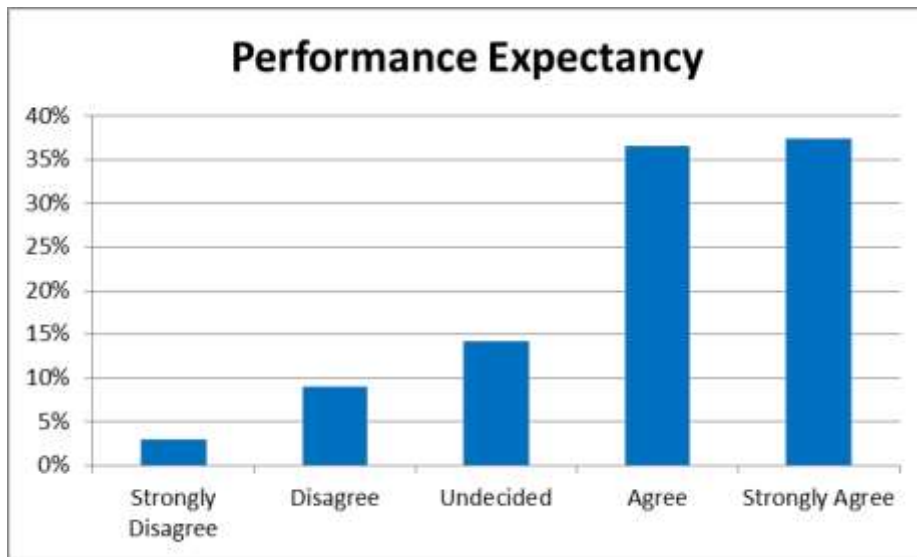


FIGURE 4.4 View of Skewed Data

Skewness in relatively large samples will not make a great difference in analysis. Kurtosis, meaning a high peak of data near the mean, can result in an under estimate of variance in small samples, (Tabachnick and Fidell, 2013) which is the case in this survey.

An initial scale analysis using Cronbach's alpha revealed the presence of some negative scores and negatively worded questions are suspected as the cause. While the majority of survey questions were positively worded, questions 15 and 20 were negatively worded. Using the transform method both of the two variables for 15 and 20 were recoded to reverse the values (the letter R was added to the variable names). This action removed the negative scores and improved the Cronbach alpha score.

The data was then exported in excel .xlsx format for final analysis in WarpPLS v 5.0. The data file loaded to WarpPLS contained the recode variables for questions 15 and 20 labelled as FC3R and VOLR. Pre-processing on the data was carried out, checking for missing data, for zero variance problems, identical column names and proceeds to standardise it. The model created used the constructs of performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), the moderators of gender (GEN), age (AGE), experience (EXP) and voluntariness (VOL) as formative latent variable and behavioural intention (BI) as a reflective variable.

Initial model testing began with 4 variables in each of the constructs PE, EE, SI and FC with BI containing 3 variables and the single variable moderators of GEN, AGE, EXP and

VOL. The optimal model was found when the variables PE4, EE1, SI1, SI2 and FC3R were removed from their respective constructs.

4.3.2 Assessment of the Model Validity

The model was tested with ten model fit and quality indices. The first three average path co-efficient APC, adjusted R squared (ARS) and average adjusted R squared (AARS) should return P values significant equal or lower than 0.05 or at a minimum of ARS and AARS less than or equal to 0.05. APC, ARS and AARS p values met the criteria for p values and AARS was lower than ARS which is normal (Kock, 2014). Variance inflation factors (VIFs) are generated for all latent variables in the model testing for full collinearity and are checked both vertically and horizontally as set out by Knock and Lynn (2012). The average block variance inflation factor (AVIF) value returned was 2.428. The AFVIF test is not sensitive to variations in collinearity as it uses nonlinear algorithms and it returned a value of 2.887. The AVIF and AFVIF maximum values should not exceed 5 and ideally be less than 3.30. Both values for AVIF and AFVIF were in the ideal range below 3.3.

The goodness of fit (GoF) value of 0.755 for the model exceeds 0.36 on the Wetzels, Odekerken-Schroder and van Oppen, (2009) scale and is classified as large. GoF is defined as the square root of the product between the average of the communality index and the ARS (Tenenhaus, Cathelin and Lauro, 2005). The Simpsons paradox test checks for a path coefficient and a correlation associated with a pair of linked variables having different signs. The minimum value should be 0.70, the value returned was 0.778.

The R squared contribution ratio (RSCR) checks for negative R values and values should be equal or greater than 0.90 the value returned was 0.988. The statistical suppression ratio (SSR) looks for instances of statistical suppression as defined by MacKinnon, Krull and Lockwood, (2000). Values for this test should be greater or equal to 0.70 the value returned was 1.00. Nonlinear bivariate causality directions ratio is a measure of the support provided by bivariate nonlinear co-efficient of association for the hypothesised directions of the causal links. The acceptable value is greater of equal to 0.07 the returned value was 0.667.

TABLE 4.1 Quality Indices

Quality Indices	Standard	Result
Average path co-efficient (APC)	P<0.001, P<0.05	0.150
Average R squared (ARS)	P<0.001	0.662
Average adjusted R squared (AARS)	P<0.001	0.608
Average block VIF AVIF (AVIF)	ideally <= 3.3	2.428
Average full collinearity VIF (AFVIF)	ideally <= 3.3	2.887
Tenenhaus GoF (GoF)	large if >= 0.36	0.755
Sympson's paradox ratio (SPR)	acceptable if >= 0.7	0.778
R-squared contribution (RSCR)	acceptable if >= 0.9	0.988
Statistical suppression ratio (SSR)	acceptable if >= 0.7	1.00
Nonlinear bivariate causality direction ratio	acceptable if >= 0.7	0.667

The correlation table, Table 4.2 below, is extracted from the full table and this extract confirms discriminate validity as the diagonal values of AVEs (in bold) are significantly higher than the off diagonal correlation values (Fornell and Larcker, 1981).

TABLE 4.2 Correlation among Latent Variables

Correlations among latent variables with sq. rt. of AVEs					
	PE	EE	SI	FC	BI
PE	(0.877)	0.356	0.232	0.321	0.572
EE	0.356	(0.919)	0.159	0.607	0.505
SI	0.232	0.159	(0.931)	0.420	0.335
FC	0.321	0.607	0.477	(0.765)	0.440
BI	0.572	0.505	0.335	0.440	(0.988)

Note: Square roots of average variances extracted (AVEs) shown on diagonal.

Cohen suggests a scale for determining the strength of the correlation relationships, where $r = 0.10$ to 0.29 small, $r = 0.30$ to 0.49 medium and $r = 0.50$ to 1.00 large (Cohen, 1988).

TABLE 4.3 Partial Latent Variable Coefficients

TESTS	Scores				
	PE	EE	SI	FC	BI
Composite Reliability	0.908	0.942	0.929	0.808	0.992
Cronbach's Alpha	0.845	0.908	0.847	0.644	0.987
AVEs	0.769	0.844	0.867	0.585	0.975

4.3.3 Structural Model Results

Figure 4.6 overleaf depicts the model showing the path coefficients and the R squared value of the dependant variable BI. The model explained 66% of the variance for BI while the original model explained up to 70% of the variance. PE with $\beta=0.41$ $p>0.01$ was the strongest influence on BI but the model returned a non-significant value for moderators of gender and age. Analysis in Microsoft Excel does show the greatest effect is on males, as was posited in the original theory by Venkatesh, et al. (2003). A possible explanation of the low values returned in the model are the demographics of the population surveyed and the lack of males in the lower age categories. The findings here are in line with model expectations.

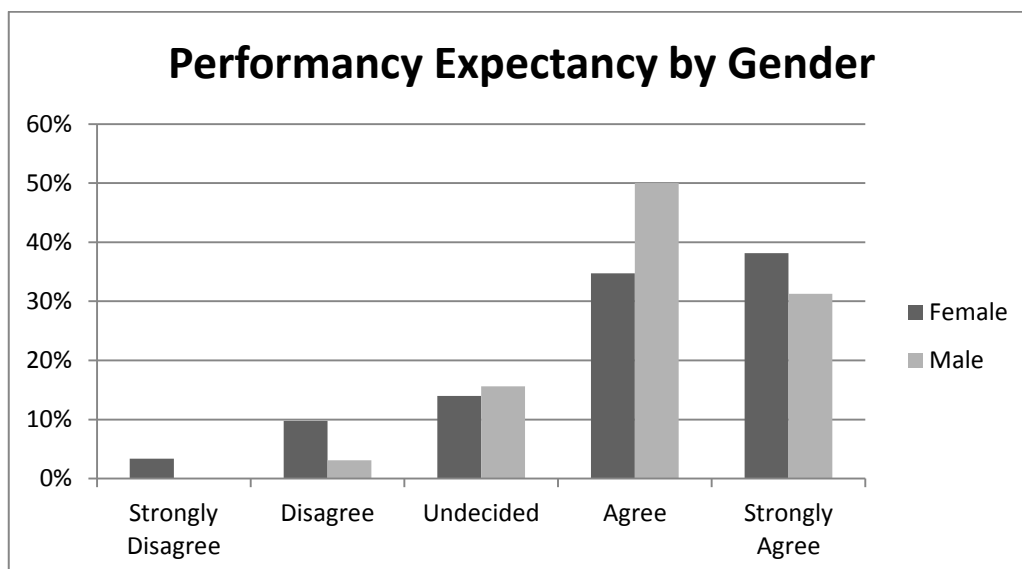


FIGURE 4.5 Performance Expectancy by Gender

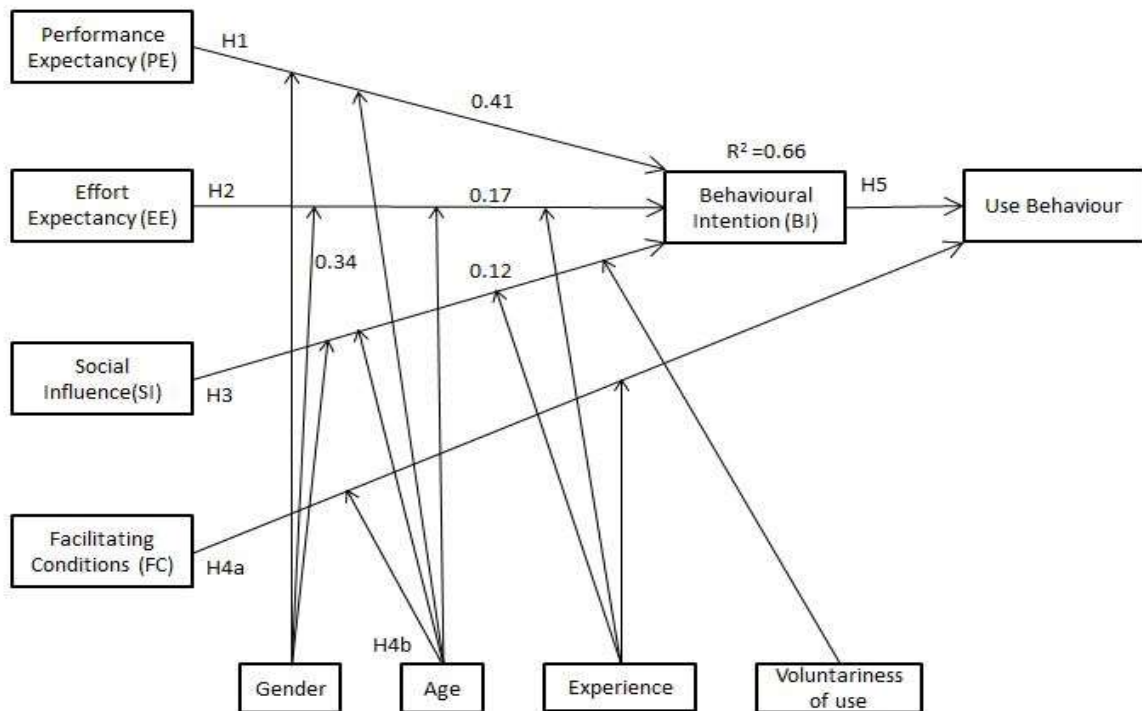


FIGURE 4.6 Research Model with Values

EE was the next greatest influence on BI with a value of $\beta=0.17$ $p>0.08$ a non-significant value but the correlation value for EE a value of 0.505 significant at $p<0.001$ indicating a large strength relationship which was positively moderated by GEN with a value of $\beta=0.34$ $p>0.01$, AGE and EXP returned values with high p values. The moderation effect of gender is in line with the original model. The effects of AGE and EXP were not present which may be an affect of the small survey population and the presence of managers in the older female population who would have more years of experinece in technology use in contract to the low, older and inexperienced group suggested in the original model (Venkatesh, et al., 2003). The findings here are in line with model expectations.

SI returned a $\beta=0.12$ $p>0.15$ non significant value but correlation analysis returned a value of 0.335 a medium relationship value. GEN, AGE and EXP moderators returned non-significant values with high p values. Further examinations of the data were carried out in Microsoft Excel based on the SI variables SI1, 2, 3 and 4. The excel analysis shown in Bar chart 3 below confirms that SI in mandatory settings is more important among older women. An unexpected finding was the absence of influence on younger women for the social influence construct. A gender comparison in this age group was not possible due to gender make up of the respondent population. This may be due to the beginning of a career and lack of experience in the workplace, or could it be an affect of a generation

with widespread access to and use of technology. More research would be necessary to clarify this.

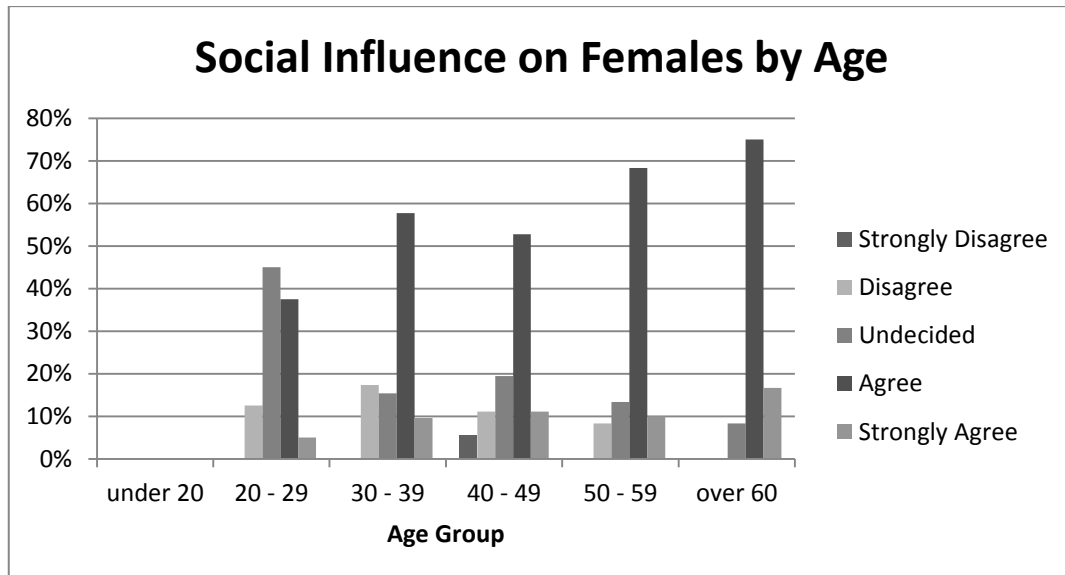


FIGURE 4.7 Social Influence on Females by Age

The findings here differ from the general findings for SI but this may be due the small number of respondents. Correlation analysis did find a medium strength relationship value which was expected in the original model.

FC were non-significant values, as posited by Venkatesh, et al. (2003), on BI. FC is an indicator of use behaviour which was not tested in this model. The survey data was also examined in Microsoft Excel and is displayed in the figures 4.8 and 4.9 below.

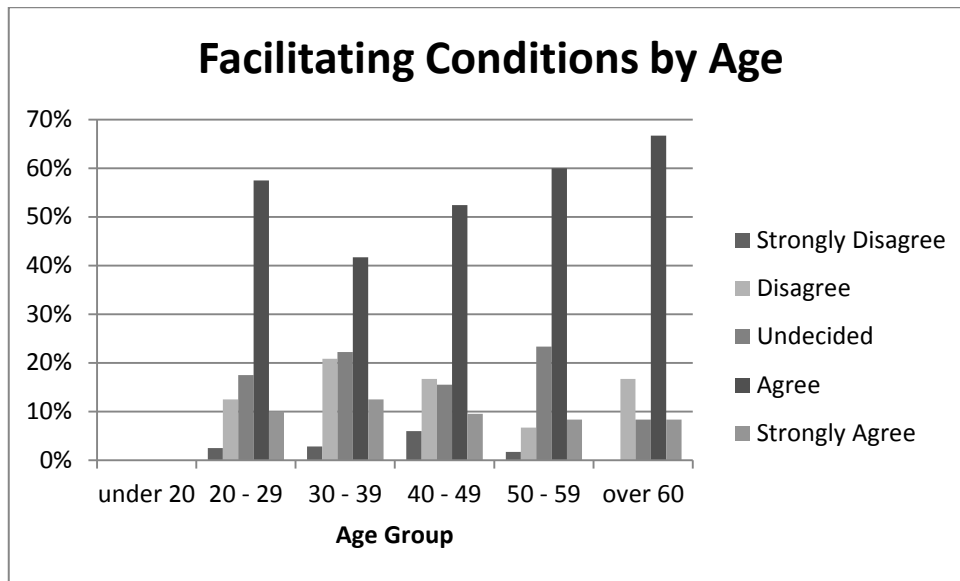


FIGURE 4.8 Facilitating Conditions by Age

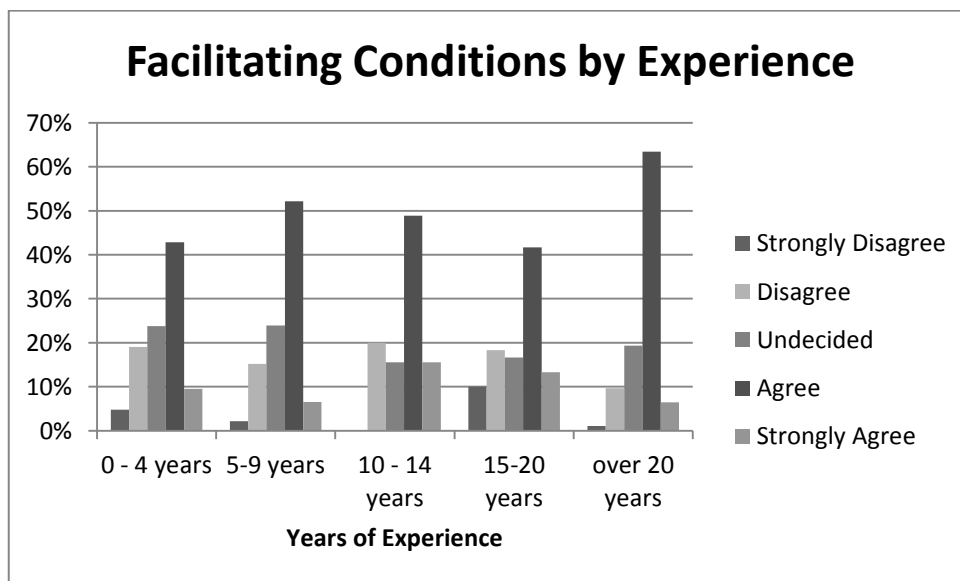


FIGURE 4.9 Facilitating Conditions by Experience

Both figures 4.8 and 4.9 above show that age and experience are strongest in the oldest age group for the FC variables. The findings here are in line with model expectations.

The results of this model are generally in line with the model proposed by Venkatesh, et al. (2003) and confirm the model and its constructs. Due to respondent demographics and the size of the survey itself some the affects of the moderators could not be tested.

The proposed hypotheses were tested in the model and the results were:

- Hypothesis 1 The influence of performance expectancy will have a positive effect on multidisciplinary teams' behavioural intention to use ICT and the effect will be moderated by gender and age.

The model does prove that PE has a positive effect on BI $\beta=0.41$ $p>0.01$, and while the model returned non-significant values for AGE and GEN excel analysis did show a greater effect on males as proposed in the original theory. H1 is confirmed.

- Hypothesis 2 The influence of effort expectancy will have a positive effect on multidisciplinary teams' behavioural intention to use ICT and the effect will be moderated by gender, age and experience.

The model returned a $\beta=0.17$ $p>0.08$ value for EE however correlation analysis did return a value of 0.505 significant at $p<0.001$ indicating a large strength relationship, gender did return a positive value of $\beta=0.34$ $p>0.01$ but age and experience returned non-significant values. H2 is confirmed.

- Hypothesis 3 The influence of social influence will have a positive effect on multidisciplinary teams' behavioural intention to use ICT and the effect will be moderated by gender, age and experience, the effect will be stronger in women particularly older women and particularly in mandatory settings in early years of experience.

The model returned a $\beta=0.12$ $p>0.15$ value for social influence. However correlation analysis did return a value of 0.335 a medium relationship value, gender, age and experience moderators returned non-significant values. H3 is partially confirmed.

- Hypothesis 4a Facilitating conditions will not have significant effect on multidisciplinary teams' behavioural intention.

The model has no direct link to behavioural intention as it is linked to use behaviour. H4a is confirmed.

- Hypothesis 4b The influence of facilitating conditions on multidisciplinary teams' behavioural intention to use ICT will be moderated by age and experience, the effect will be stronger on older workers particularly with increasing experience.

The correlation analysis revealed a medium strength relationship of 0.440, significant at $p > 0.001$, but the model moderators of gender, age and experience returned non-significant values. However further analysis has shown that age and experience are strongest in the oldest age group (see p 36). H4b is confirmed.

- Hypothesis 5 Behavioural intention to use has a positive influence on multidisciplinary teams' usage.

The model used in this research did not measure the teams' ICT use. H5 is not confirmed.

The findings from this model are similar to the findings of Taiwo and Downe, (2013). In their meta-analytic review of empirical findings, they found that performance expectancy followed by effort expectancy and social influence were the top three predictors of behavioural intention among the 37 papers that met their criteria for inclusion (Taiwo and Downe, 2013).

4.4 Assistive Technology Analysis

The assistive technology section of this survey had five questions: Q24 to Q28 which required a mixture of check-box answers, ranked answers and opinions. There were 4 less responses than in the UTAUT section and the answer rates to each of these questions varied from highest at 100% to lowest at 81% of total respondents (n = 64).

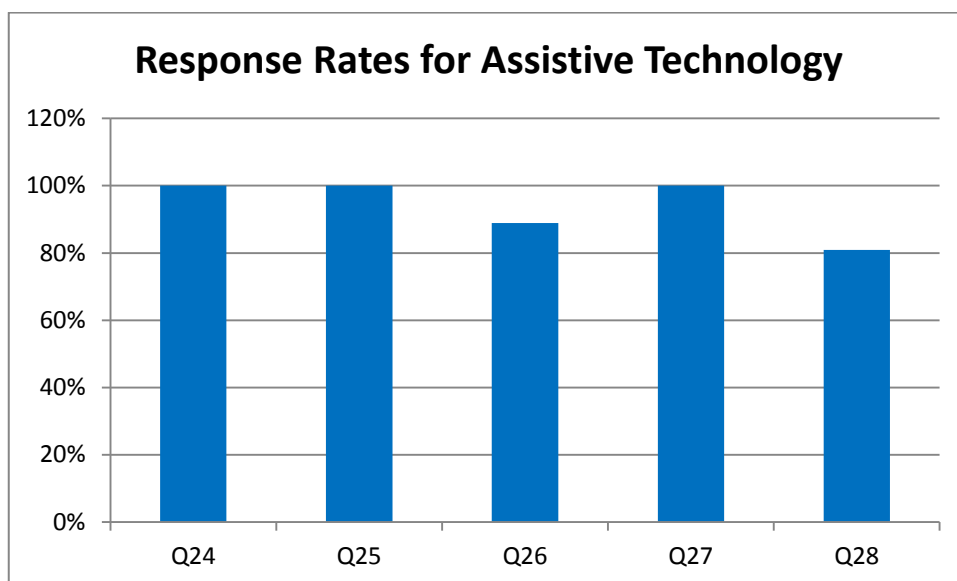


FIGURE 4.10 Assistive Technology Responses for Each Question (n=64)

Figure 4.10 shows the 100% response rate to questions Q24, Q25 and Q27. It is likely that the question structure where respondents could either select a radio button or check a tick box made these questions easier to answer. Conversely the requirement for the user to input data in response to a question may explain the lower response rates for questions 26 and 28.

4.4.1 Initial Sources for Assistive Technology Information

Q24 *Where did you first learn about assistive technology? Note only one selection can be made.*

This question sought to find out where team members first learned about assistive technology. Figure 4.11 below shows that College at 35.9% was the biggest original source of information on assistive technology closely followed by Work at 32.9%. This indicates that the majority (64.1%) of multidisciplinary team members leave College with no knowledge of assistive technologies.

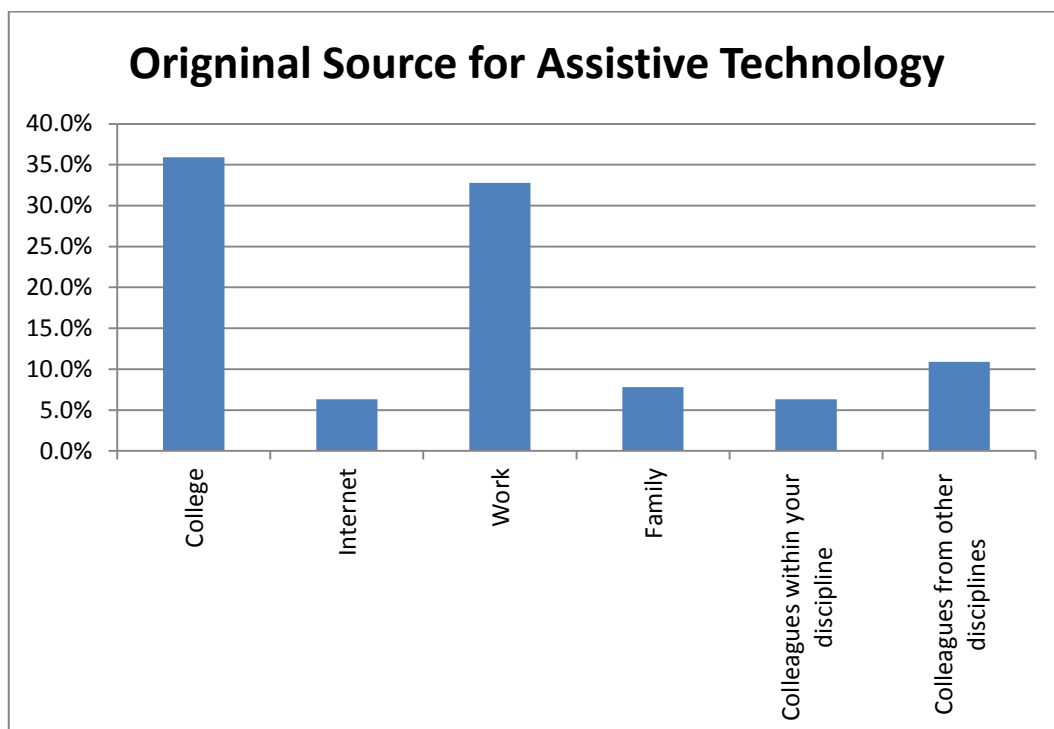


FIGURE 4.11 Where did you first learn about assistive technology?

It should also be noted that almost twice the number of multidisciplinary team members learn about assistive technology from other disciplines than their own. This is not surprising as some disciplines do not recommend such technologies.

4.4.2 Current Sources for Assistive Technology Information

Q 25 What sources do you use to find information on assistive technology? Select as many as are appropriate to you.

Respondents were advised in answering this question to select as many options as appropriate in order to give a better picture of sources where this information is available. The results show that most team members will ask colleagues from other disciplines before they asked colleagues from their own discipline or to search external sources. This finding was unexpected. It may reflect circumstances where a decision requires a team approach for maximum benefit. Another explanation could be that the inter-discipline knowledge available may be well known and easily available so asking a colleague may not reveal new knowledge. This is also an indication of good inter-discipline information sharing and communication.

The options for answering this question included a number of different website and internet related options. If all the internet options are taken together then the internet is the single most significant source of information. The professional/discipline specific and professional journals in-office shared resources were the next most important sources followed by in-office shared resources and brochures.

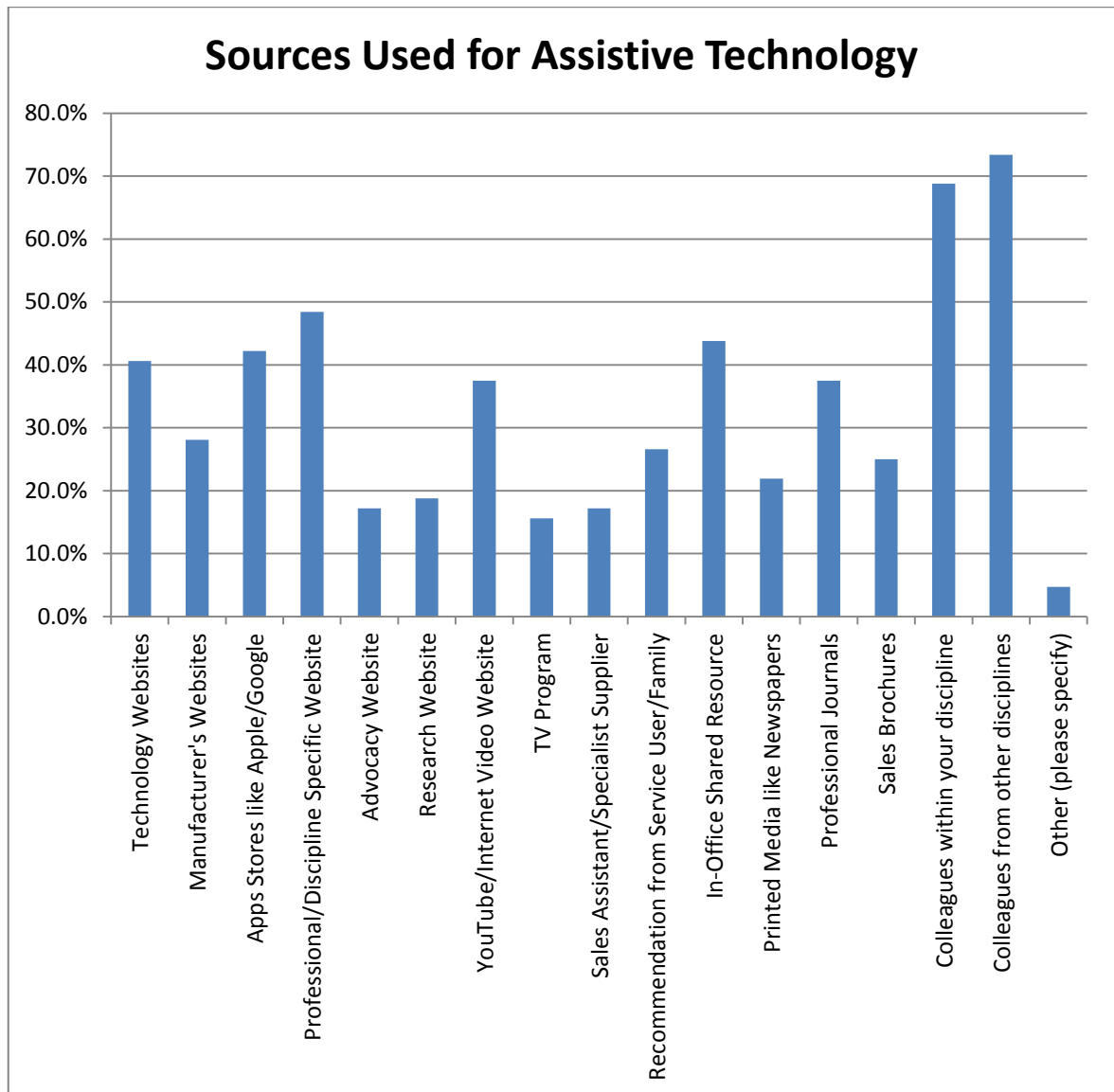


FIGURE 4.12 Sources used for assistive technology (n=64)

The wide range of sources in use indicates the scale of effort required to keep abreast of new knowledge. The sources that were included under the 'other' option were conferences, CPD events and training days.

The use of sales brochures and sales assistants at 25% and 17% respectively to gain additional knowledge is perhaps a resource that is under used. Vendor management can be a good source of new information on devices and software that is in or coming to market and should have the best knowledge on how their products work.

4.4.3 Ranked Sources of Assistive Technology Information

Q26 *What are your top three sources for assistive technology information?*

In responding to this question, survey participants could give a maximum of three different sources. The open answers to this question require qualitative analysis and after initial inspection the number of responses were small and the answers were short. The methodology being used in the research project is a mixed method and the research approach is interpretative and deductive. Categorisation of the answers was not required for the analysis of this question. After reviewing the responses counting techniques were used to reveal the choices made by respondents.

The answers given here required some data cleansing to allow meaningful term counting in Microsoft Excel. Spelling errors, phrase reductions and categorisation was carried out on the data. The responses to the first choice option respondents gave a total of 16 different sources. The respondents' answers to the second choice option revealed a total of 17 different sources many of which were repeats of the first choice sources. The responses to the third choice revealed 24 distinct choices.

TABLE 4.4 Ranked Sources for Assistive Technology Information

Responses for Assistive Technology Rankings			
	First Choice	Second Choice	Third Choice
First	Colleagues	Colleagues	Colleagues
Second	Technology Websites	Internet Searches	Internet Searches
Third	Internet Searches	Technology Websites	Printed Media

The answers for first choice were 'a colleague', followed by technology web sites and general internet searches. The answers contained a total of 18 categories and the question was answered by 56 respondents. The top second choice answer was also 'a colleague' followed by technology web sites and internet searches and contained a total of 24 categories and was answered by 51 respondents. The top third choice was printed media followed by 'a colleague' and internet searches and was answered by 46 respondents.

The answers given to this question did follow the pattern from the previous question where availing of the existing expertise was the first choice. The responses show colleagues as the top choice in each choice level. This was examined further to see if

asking colleagues from other disciplines still held true here as it did in question 25. The analysis shows that of those that a slim majority of 7 to 6 asked colleagues from within their own disciplines with a further 8 just stating colleague, the second choice group for colleagues had 5 asking colleagues within their disciplines, 3 without and 4 not stating a preference and the third choice group for colleagues had 1 within and 2 without their disciplines and 2 not stating. The volume of responses did drop off with each answer possibly indicating time pressures or survey fatigue.

4.4.4 Satisfaction with Current Sources of assistive technology Information

Q27 *Are you happy with the level of information on assistive technology you currently have access to?*

The question was answered by 64 respondents with exactly 32 saying no and 32 saying yes. This question was set to understand the current level of general knowledge among multidisciplinary team members about assistive technology. The even balance between yes and no responses was unexpected.

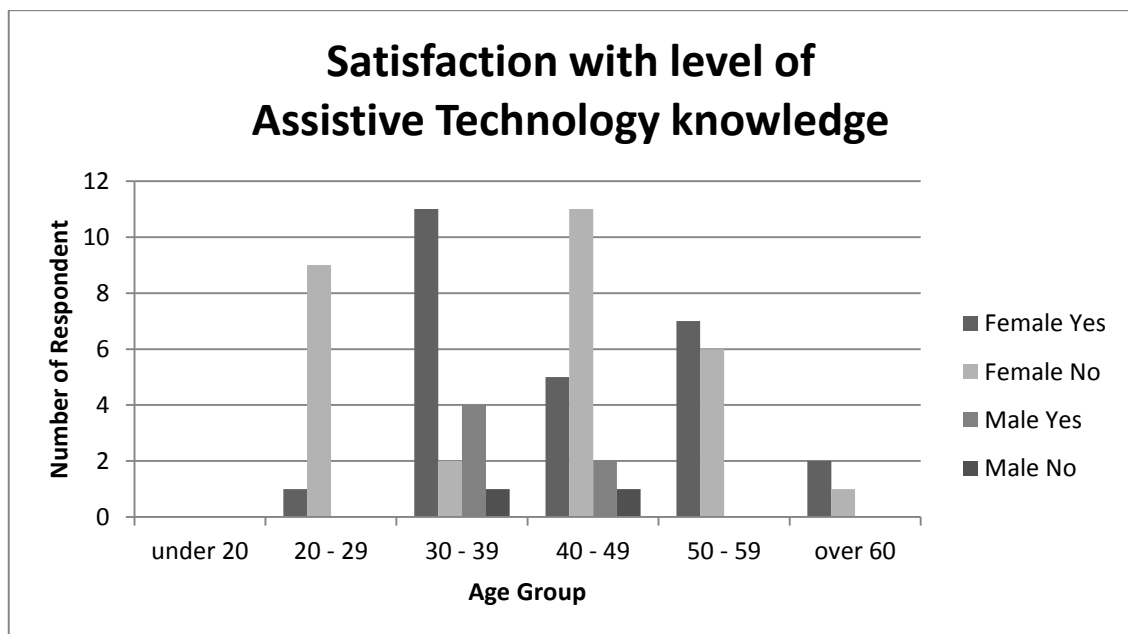


FIGURE 4.13 Satisfaction Levels

Further analysis was undertaken to understand the even split between satisfaction with the level of knowledge on assistive technology and is seen in figure 4.13. The data was sorted by gender and age groups. This revealed the majority of male respondents (75%)

were not happy with their level of knowledge. The majority of females (56%) were happy with their levels of knowledge. Greatest satisfaction was in the oldest age group followed by the youngest age group.

4.4.5 Improvements to Sources on assistive technology Information

Q28 *What would most help you to improve your information on assistive technology for Service Users?*

The open answers to this question required qualitative analysis. An initial inspection revealed that the length of responses to the answers were short. The methodology being used in the research project is a mixed method and the research approach is interpretative and deductive. While categorisation was used, data driven categories 'in vivo' are used without the need for a full coding structure. The category titles used to sort the data were drawn from the participants own responses to this question.

This question was answered by 51 respondents and using the analytics feature in SurveyMonkey the frequency of the top terms used was the first analysis carried out, as seen in figure 4.14 below.

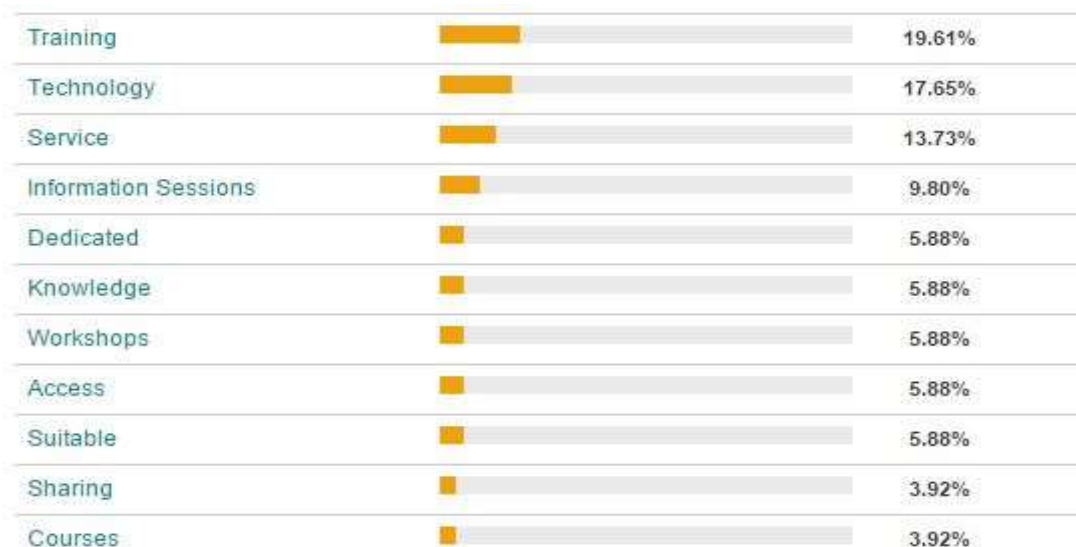


FIGURE 4.14 Frequency of Terms used in Responses

The 'in vivo' category titles were decided from the table 4.4 on page 42 above after many re-examinations of the answers given. All responses were examined for multiple

suggestions and, where the respondent specified more than one improvement, the vote was divided among the relevant categories.

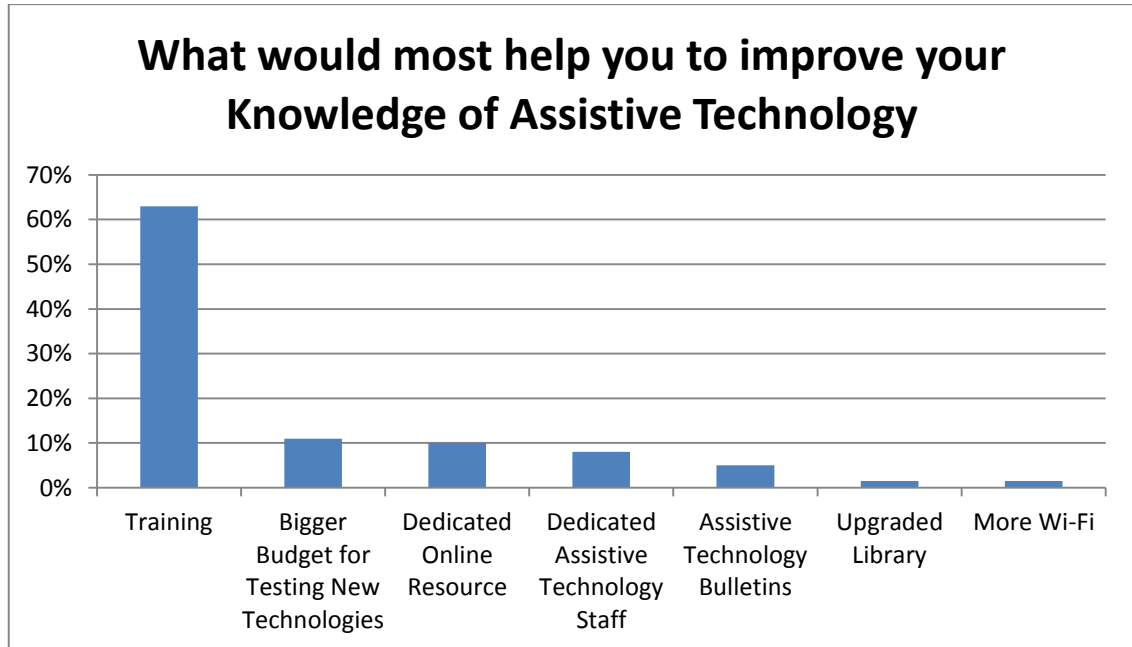


FIGURE 4.15 How to Improve you knowledge of Assistive Technology (n=51)

Training was the largest category in which 32 respondents suggested the following:

- general assistive technology training 16.5 respondents,
- targeted workshops 4 respondents,
- demonstrations given by suppliers / manufacturers 3.5 respondents,
- discussions / information sessions given by different disciplines on technologies relevant to their work area 3 respondents,
- in-service days 2 respondents,
- journal clubs 1.5 respondents,
- CPD / Conferences 1.5 respondents.

A bigger experimental budget for technology to trail and test was suggested by 5.5 respondents.

A dedicated online resource library of technologies and sources was proposed by 5 respondents. This library should contain the different categories of assistive technologies available.

Dedicated assistive technology staff or a technician was proposed by 4 respondents. This group should provide real examples of what has worked 'in real life' situations and training in specialist software. Dedicated staff would also host information sessions.

Bi-monthly / Bi-annual / Annual Bulletin reviewing assistive technologies outlining new and developing technologies of particular relevance to the Irish circumstances was proposed by 2.5 respondents.

Better access to an upgraded library and increased Wi-Fi also were proposed by single respondents.

63% of respondents suggested that training was required to improve their knowledge of assistive technology. This was broken down into the 'in vivo' categories and is listed above. The low rating for using suppliers as a source of information seems to underestimate the potential of this source both in training and general assistive technology information.

A bigger budget for experimental testing of devices and software could be 'self-financing' by avoiding the expense of technologies that are later shown not to function. Better Vendor and supplier management could see manufacturers' supporting new products and technologies.

Dedicated shared resources where all disciplines share their knowledge together with bulletins a few times a year are worthy suggestions. Keeping such resources up-to-date should be a shared task for all participants.

4.4.6 Findings on Sources of Information for Assistive Technology

From the data on initial sources of information for assistive technology, the survey revealed that while College is the largest single original source for information on assistive technology at 35.9% the majority, 64.1%, of multidisciplinary team members leave College with no experience or knowledge of assistive technology.

The greatest general source of assistive technology information is the internet but the greatest single source used for information is colleagues from other disciplines, followed by colleagues from within their own discipline. This was unexpected but could be explained by decisions on assistive technology requiring inter-discipline co-ordination for the best outcome. The volume of sources available is also an indication of the scale of

effort required to keep knowledge current. An underused source of information appears to be sales persons and suppliers. Greater vendor management could encourage the sharing of their current and prospective product information between interested groups.

The top sources that multidisciplinary team member use when investigating assistive technology are asking a colleague within their own discipline, then going to an assistive technology specific website and in third place doing a general Google search. Searching the internet is the most popular way to find information so it is important that team members use the correct search structure to conduct effective searches and avoid wasting time by searching with incorrect criteria.

Satisfaction or dis-satisfaction with levels of knowledge on assistive technology was evenly spread. The majority of male respondents, 75%, were unhappy with their knowledge of assistive technology and the majority of females, 56%, were happy. Greatest satisfaction was found in the oldest and youngest age groups (both female groups).

Improving current knowledge on assistive technology is, based on responses to question 27, important to 50% of the respondents. When asked how to improve their knowledge 63% suggested more training and the majority wanted general assistive technology training. Some disciplines use assistive technologies more than others, which might explain both the satisfaction levels with knowledge and at the same time suggestions for more training.

Experimenting with new technologies as they emerge would give team members fresh insights on new solutions to existing or unresolved cases. Vendor management could assist in providing both training and new knowledge on products and services. Expanding the internal shared resources would improve general knowledge but requires internal commitment to manage the resource and keep it current.

4.5 Summary

This chapter has set out the findings and analysis of both sections of the research survey of multidisciplinary team members.

From the data collected in the first section of the survey, the UTAUT analysis confirmed that the greatest influence on a multidisciplinary team member's behavioural intention is performance expectancy, meaning that the use of ICT is predicated on the expectation of

performance gains. Correlation analysis showed that effort expectancy, or how easy the technology is to use, was next in importance followed by social influence. The greatest effect of social influence was on older females. Facilitating conditions had the strongest effects in the oldest age group. These findings confirm the original findings of Venkatesh, et al. (2003), of the hypotheses proposed H1, H2, H3 and H4a are confirmed, H4b is partially confirmed and H5 was not confirmed.

An unexpected finding was that younger females were not affected by social influence in their acceptance and use of technology. Sackmann and Winkler (2013) found that the internet generation are more likely to use online application than earlier technology generations, which is a possible explanation for this finding.

From the data collected in the second section of the survey, on assistive technology, it revealed the significance of colleagues as a source of assistive technology information. The number of potential sources given by respondents also indicated the significant effort involved in keeping assistive technology information current.

One source of information that appeared to be underused was vendor sales people and suppliers, which could be encouraged through improved vendor management. More dissatisfaction with current levels of knowledge was reported by males than females. A majority of respondents reported further training as their first choice for improving current levels of information on assistive technology.

CHAPTER 5: Conclusions and Future Work

5.1 Introduction

This research project has examined the factors that influence the acceptance and use of information communication technology (ICT) in multidisciplinary teams in a healthcare provider in a community setting. The team members surveyed are employed by a healthcare provider in the intellectual disability sector in Dublin, Ireland.

This research project also examined how multidisciplinary teams access and update their knowledge on assistive technologies, which can prove important to most of their clients and life-changing to others. This chapter sets out the research findings of the online survey, draws conclusions from the research and literature reviewed, reveals unexpected findings, makes recommendations, acknowledges the research limitations and makes suggestions for future research.

5.2 Research Findings

The research model used in this project, set out in chapter 3, was the original unified theory of acceptance and use of technology (UTAUT) model (Venkatesh, et al., 2003). This model consists of five constructs: performance expectancy, effort expectancy, social influence, facilitating conditions and behavioural intention. The model's original moderators were also used. They are gender, age, experience and voluntariness.

The research analysis has shown that performance expectancy has the most influence on behavioural intention. This finding corresponds with the original theory findings (Venkatesh, et al., 2003) and is also confirmed in literature by Phichitchaisopa and Naenna (2013); Yu, Li and Gagnon (2008); Maillet, Mathieu and Sicotte (2014); Liang et al., (2010); Schaper and Pervan, (2006); Vanneste, Vermeulen and Declercq (2013); Sun et al., (2013); Taiwo and Downe, (2013). The effect of performance expectancy has been shown to be more significant for males than females as suggested by Venkatesh, et al., (2003).

The literature research revealed that use of technology is enhanced when users not only see an increase in productivity but also a resulting increase in quality of care for their clients. Systems like robotic surgery or internal online pharmacy reduce exposure to germs and reduce medication errors while improve patient outcomes Phichitchaisopa and Naenna (2013).

As presented in section 4.2.3, effort expectancy was the second greatest influence on behavioural intention. This finding matches the original theory of Venkatesh, et al. (2003) and findings in the literature reviewed in Chapter 2, in particular Phichitchaisopa and Naenna (2013); Yu, Li and Gagnon (2008); Vanneste, Vermeulen and Declercq (2013); Sun, et al. (2013). Effort expectancy was moderated positively by gender but this did not show stronger effects in older female groups. This is likely to have been affected by the presents of managers with greater ICT experience in the older female groups as moderation decreases with experience (Venkatesh, et al., 2003).

The original theory suggested that the effect of effort expectancy is most likely among older women with little experience in ICT. However, the survey revealed that this was the group of greatest experience so the moderation effects were non-significant. Research in the literature has shown that for some users this can be the deciding factor as complex systems can lead to frustration and non-use. The literature has also suggested that promoting the benefits and displaying how tasks are simpler in ICT systems can increase system usage and will impact positively on effort expectancy.

The results as presented in section 4.2.3 show social influence as the third greatest influence on behavioural intention. This supports the original theory findings and is also supported in literature Phichitchaisopa and Naenna (2013); Yu, Li and Gagnon (2008) Taiwo and Downe (2013). The effect of social influence is contingent on the presence of the four moderators, which was the case in this study and was shown to be strongest among the oldest age group as posited in the original model (Venkatesh, et al., 2003). However, an unexpected finding was the absence of social influence on the youngest female group. This finding is discussed below in section 5.4.

Social influence has been found to be relevant in only in mandatory settings, which was the case in the work environment of the survey participants. The model showed social influence as the third most important influence on behavioural intention to use ICT. The literature has shown that for some groups, such as GPs, this may have no relevance as their compliance with social norms has been absent. However, the literature shows that in team environments, such as the environment for the multidisciplinary teams in this study, groups using systems support each other, which results in increased ICT usage.

Facilitating conditions are an important influence on actual ICT use and this was confirmed in the data. The results in section 4.2.3 show that facilitating conditions influence use behaviour and, as suggested in the original theory, are strongest in the

oldest age and experience groups. These findings match the original theory and are confirmed in the literature, Venkatesh, et al. (2003); Taiwo and Downe, (2013). In the literature reviewed in Chapter 2, the importance of training, ICT helpdesks and support in the use of new systems was noted as particularly important to older age groups.

Survey demographics show the population gender percentages as 88.1% female and 11.9% male. Age was broken into 10 year groups however male ages were present only in between 30 to 49 years. Experience was broken into 5 year groups with the largest single group occurring in the over 20 years. Voluntariness showed a strong gender difference with 62.5% of males either undecided or agreeing that ICT use was voluntary compared to 17% of females.

The assistive technology section of this research project had a slightly lower general response rate, down 4% when compared to section one. The survey revealed that the majority of multidisciplinary team members leave college or university with no experience of assistive technology (64.1%). The most common single source for information on assistive technology used by multidisciplinary team members was colleagues from other disciplines. It was unexpected that the colleagues from whom information would be sought would be those from other disciplines. This finding is discussed in section 5.4 below. The volume of sources on assistive technology in use is a clear indication of the challenge of keeping the information up to date and relevant.

The questionnaire looked for team members' top three sources for information on assistive technology. The first place choice was to first ask a colleague in their own discipline, second choice was to go to an assistive technology website and the third choice was to conduct a Google search.

Satisfaction with the level of knowledge on assistive technology was evenly spread. When satisfaction was looked at from the gender perspective 75% of males were unhappy compared to 44% of females. The suggestions to improve knowledge mainly focused on training initiatives. Training could be augmented by vendor engagement in product display and demonstrations. Increased budget to experiment with new and untried technologies is a suggestion that merits consideration. Other suggestions included expanding internal shared resources, improving library facilities and bi-annual bulletins on assistive technology.

5.3 Value of the research

This research project investigates the acceptance and use of technology by multidisciplinary teams in a healthcare setting, an area that has not yet been extensively researched. The literature review noted the factors that many researchers have found to cause frustration and low or non-use of ICT among discrete groups of healthcare workers and has also suggested methods to avoid wasted expenditure on system that will not be used. This research confirms that many of the factors relevant to discrete groups of healthcare workers, such as occupational therapists and nurses, are equally applicable to the acceptance and use of technology by teams whose members are drawn from different disciplines. This finding shows the common nature some of the issues facing non-engagement with ICT systems by workers in the healthcare sector.

This information will be of benefit to all those that are designing or implementing ICT systems for the healthcare area. Investments in new ICT systems can go catastrophically wrong, resulting in user frustration and wasted money. This was the case in 2011 when the UK government cancelled a £12 billion IT system for the NHS, which at the time was reported as the largest IT project in the world. The system was replaced with regional systems chosen by local hospitals and GPs (Martin, 2011). This redesign is in line with findings in the literature, which suggests that local input into the system design is more likely to succeed than a one-size-fits-all method.

The findings in this study, that performance expectancy and effort expectancy are the two most significant influences on behavioural intention to use ICT across healthcare workers from different disciplines, is also significant for any company or public service planning a significant investment in healthcare technology and hoping to design a successful plan for its implementation.

The assistive technology research in this project reveals the challenges facing and interest displayed by members of the multidisciplinary team in keeping knowledge current and relevant. The impact of assistive technologies on individuals with intellectual disability can be life-changing. Technologies can in many cases allow the individual achieve maximum independence, increased participation in society and increase self-esteem. However, the volume of assistive technology choices can make the right decision difficult to make.

The rapid rate of growth in general assistive technology plus the new interest from companies like Google and Apple in smart home technologies and medical monitors are

increasing the possibilities for intellectual disability individuals. Research on how to best to personalise these new products to clients' needs is an area of research that many groups could benefit from.

5.4 Unexpected findings

The first unexpected finding was that young females in the 20 - 29 age group were not affected by social influence, unlike all other female age groups. Initially, consideration was given to the recent start of careers for this age group and the possibility that organisational influence had not yet taken effect. However, further research has suggested that this finding may be the effect of the 'internet generation' as posited by Sackmann and Winkler (2013). This effect means that younger groups, who have grown up with technology as part of their daily lives, have greater familiarity with technology and so the behaviour of their older colleagues has less, or no, influence on their use of technology.

The second unexpected finding was that when asked about where multidisciplinary team members sourced their knowledge on assistive technology the biggest response was asking a colleague from another discipline. An explanation for this finding may be in the collaborative nature of the work of multidisciplinary teams and the need for inter-discipline agreement on the choice of device or technology especially as several interventions may proceed together.

5.5 Recommendations

Based on the finding of this survey and in the literature review the following recommendations are made:

- ICT systems should be based on the compatibility of the technology with the work practices and values of the system users and be perceived by the users as easy to use.
- For users to perceive ICT systems as easy to use, the benefits of the system and improvements in patient care must be explained and demonstrated.
- Greater vendor engagement could significantly boost knowledge and assist in the process of being current, with new products and upgrades to older products.

- Training could be augmented by vendor engagement in product display and demonstrations.
- Searching for assistive technology information can be time-consuming so it is important that the correct search techniques are used. A separate guide, detailing good search techniques and frequently used resources, should be compiled to assist all team members.

5.6 Generalisability of Findings

The maximum possible survey population for this survey was 102 and at a 95% confidence level with 3% margin for error 94 respondents would have been required. The survey had 67 valid respondents and is not generalisable.

The research questionnaire design is reusable as it is easy to adjust. The focus of this project was limited to one geographical area of a single intellectual disability service provider but this could easily be expanded to include a number of intellectual disability service providers.

The assistive technology portion of the online survey could also be expanded to examine a greater range of sources of assistive technology information. Expanding the survey population would give a clearer indication of the technologies, work well and those that have proved disappointing or failed and the area of greatest challenge.

5.7 Limitations of this study

The small survey size is a major limitation of this research study. This study is a cross-sectional study and does not examine ICT acceptance and use over time. For this reason the research findings can only be viewed as a snapshot of the multidisciplinary teams' behavioural intention at one particular point in time.

5.8 Future Research

This study sought to understand ICT acceptance among multidisciplinary teams in a healthcare provider who work in the community. The time constraints of a 10 month project mean that the research focus had to be specific and, to a degree, narrow. This research study could be further developed to encompass all multidisciplinary teams in the

country by including team members in other intellectual disability service providers in the survey population.

Future research should also examine the urban / rural divide. Studies in the literature review showed a marked difference between those working in rural areas and the urban users and their acceptance and use of ICT (Hung, Tsai and Chuang, 2014). However, the survey population for this research study were all urban based workers so this divide could not be examined.

Research into the individual disciplines that make up a multidisciplinary team, their approach to the acceptance and use of technology, would be a fruitful area to examine. The only discipline specific research, excluding nurses and physicians whose work can encompass a number of different disciplines, found was on occupational therapists and all studies on these workers were completed in Australia.

The assistive technology portion of the survey could also be expanded to examine the difficulties faced by staff in locating relevant information on assistive technologies. Additionally the opinions of team on issues not currently addressed by available assistive technologies could be gathered. These could then be put forward as formal research projects.

5.9 Summary

This study confirmed that findings in the literature on the acceptance and use of technology in the healthcare environment are applicable to members of a multidisciplinary team in a provider of intellectual disability services. The factors found to affect behavioural intention are performance expectancy, effort expectancy, social influence and facilitating conditions. Of these factors, performance expectancy had the greatest affect.

The study also found that college was the most common place for members of multidisciplinary teams to first learn about assistive technologies. The primary sources used by current team members are colleagues from other disciplines and internet searches. Training for staff was the most popular suggestion for improving knowledge about assistive technologies.

This study could form the basis for further research on the acceptance and use of technology by multidisciplinary teams, in which the sample size could be increased to produce generalised findings.

The findings in this study and in the literature reviewed highlight the significance of performance expectancy in affecting behavioural intention. Demonstrating to team members the improvements technology can bring to quality of care can be a crucial part of the success of implementing a technology system.

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Appendix A: Online Survey

[Exit this survey](#)

The Acceptance and Use of Technology by Multidisciplinary teams

Introduction page incorporating informed consent page

This is a research project being conducted by Thomas Mac Ardle, IT Administrator, Daughters of Charity Disability Support Services, in part fulfilment of the taught master's course in Management of Information Systems in the School of Computer Science and Statistics, Trinity College Dublin.

The research project aims to understand the reasons for technology use by multidisciplinary teams and to improve data on information sources currently used by multidisciplinary teams to find Assistive Technology.

You have been invited to participate in this research project because you are a member of the multidisciplinary teams in the Dublin based service of the Daughters of Charity Disability Support Services.

Your participation in this research study is voluntary.

The survey asks 23 compulsory questions and 5 voluntary questions that will take less than 10 minutes to complete. Your responses will be confidential, anonymised and no information is retained that would identify an individual. If you have any questions about the research study, please contact Thomas Mac Ardle at macardlt@tcd.ie or phone 0876537406.

INFORMED CONSENT

DECLARATION:

I am 18 years or older and am competent to provide consent.

I have read, or had read to me, this consent form.

I have had the opportunity to ask questions and all my questions have been answered to my satisfaction and understand the description of the research that is being provided to me.

I agree that my data is used for scientific purposes and I have no objection that my data is published in scientific publications in a way that does not reveal my identity.

I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.

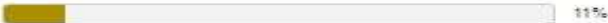
I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.

I understand that my participation is fully anonymous and that no personal details about me will be recorded.

To proceed with the survey select the 'Next' button below.

If you do not wish to complete the survey then click on the 'Exit this survey' button in the top right hand corner of this page.

I have read and understand the above consent form and by clicking the "Next" button I indicate my willingness voluntarily to take part in the study.

 11%

[Next](#)

[Exit this survey](#)

The Acceptance and Use of Technology by Multidisciplinary teams

Welcome to my survey on the acceptance and use of technology by multidisciplinary teams.

Thank you for agreeing to participate in my survey. I appreciate your willingness to give up your valuable time to this research project. Multidisciplinary teams use Information and Communication Technologies (ICT) in their own work but will also in some cases recommend Assistive Technologies to their Service Users.

The use of ICT by multidisciplinary teams is essential to the provision of efficient and effective services. The dual role that some team members fulfil may lead to the impression that they all like technology and must be good at it. It is therefore important to understand their reasons for technology use and any barriers that may prevent or restrict its use.

This survey tests the Unified Theory of Acceptance and Use of Technology (UTAUT) to better understand the reasons for technology acceptance and use and gathers data on information sources currently used by multidisciplinary teams to find Assistive Technology for Service Users.

Definitions:

Information and Communications Technology (ICT) for this survey is defined as the combination of information systems, communication systems that allow the manipulation, storage, transmission and access to data, examples of this are e-mail, Skype, smartphones, social networks and computer networks.

Assistive Technology is defined as "any item piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Technology-Related Assistance Act, 1988, USA).

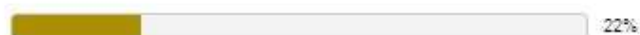
Questionnaire:

The completed questionnaire responses will be anonymised and results will not be traceable to any individual.

Information compiled from the Assistive Technology section will be made available to all multidisciplinary team members when the research project is completed.

Note questions with an asterisk symbol (*) in front of them are compulsory, however, should you decide not to complete the survey you may click on the 'Exit this survey' button located in the top right hand corner of every page.

Please click on the 'Next' button to begin the survey.

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The Acceptance and Use of Technology by Multidisciplinary teams

Performance Expectancy

Performance Expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance". There are four statements below please select the phrase that most closely resembles your opinion.

- * 1. I find Information Communication Technology (ICT) useful in my job.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 2. Using ICT helps me to complete my work quicker.

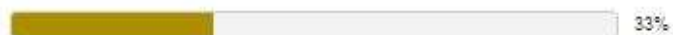
Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 3. Using ICT increases my productivity.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 4. If I use ICT, I will increase my chances of promotion.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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The Acceptance and Use of Technology by Multidisciplinary teams

Effort Expectancy

Effort Expectancy is defined "as the degree of ease associated with the use of the system". There are four statements below please select the phrase that most closely resembles your opinion.

- * 5. My interaction with Information Communication Technology (ICT) is clear and understandable.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 6. It would be easy for me to become skilful at using ICT.

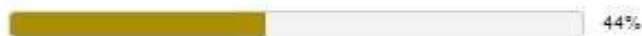
Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 7. I find ICT easy to use.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 8. Learning to use ICT is easy for me.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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The Acceptance and Use of Technology by Multidisciplinary teams

Social Influence

Social Influence is defined "as the degree to which an individual perceives that important others believe he or she should use technology". There are four statements below please select the phrase that most closely resembles your opinion.

- * **9. People who influence my behaviour in the workplace think I should use Information Communication Technology (ICT).**

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * **10. People who are important to me think I should use ICT.**

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * **11. Senior management of this organisation has been helpful in facilitating the use of ICT.**

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * **12. In general, the organisation has supported ICT use.**

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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The Acceptance and Use of Technology by Multidisciplinary teams

Facilitating Conditions

Facilitating Conditions are defined as “the degree to which an individual believes that an organisational and technical infrastructure exists to support use of technology”. There are four statements below please select the phrase that most closely resembles your opinion.

*** 13. I have the resources necessary to use Information Communication Technology (ICT).**

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 14. I have the knowledge necessary to use ICT.**


Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 15. ICT is not compatible with the other resources that I use in work.**

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


*** 16. A specific person (or group) is available for assistance with ICT difficulties.**

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


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The Acceptance and Use of Technology by Multidisciplinary teams

Behavioural Intention

Behavioural Intention is defined as "the willingness of an individual to pursue a particular behaviour". There are three statements below please select the phrase that most closely resembles your opinion.

* 17. I intend to use Information Communication Technology (ICT) in the next three months.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 18. I predict I will use ICT in the next three months.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 19. I plan to use ICT in the next three months.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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The Acceptance and Use of Technology by Multidisciplinary teams

Moderators

Moderators either weaken or strengthen the intended behaviour.

* 20. I can stop using Information Communication Technology (ICT) if I want to.

Strongly Disagree Disagree Undecided Agree Strongly Agree

* 21. Age

Under 20 years 20 to 29 years 30 to 39 years 40 to 49 years 50 to 59 years over 60 years

* 22. What is your gender?

 SurveyMonkey Certified

Female

Male

* 23. Work Experience

0 to 4 years 5 to 9 years 10 to 14 years 15 to 19 years over 20 years


This completes section one of the questionnaire. Section two gathers information on the sources used by multidisciplinary teams to find Assistive Technology for Service Users.



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The Acceptance and Use of Technology by Multidisciplinary teams

Assistive Technology Information Sources

Assistive Technology is defined as "any item piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Technology-Related Assistance Act, 1988, USA).

These last five questions will compile the current information sources used by multidisciplinary teams when the various disciplines look for information on Assistive Technology. Suggestions on how information sources can be improved are also sought. When this research project is completed the sources will be compiled and made available to all multidisciplinary team members.

24. Where did you first learn about Assistive Technology? Note only one selection can be made.

- College
- Internet
- Work
- Other (please specify) Please Note: do not enter names of individuals or addresses in response to this question.
- Family
- Friends
- Printed Media like Newspapers
- Colleagues within your discipline
- Colleagues from other disciplines

25. What sources do you use to find information on Assistive Technology? Select as many as are appropriate to you.

- Technology Websites
- Manufacturer's Websites
- Apps Stores like Apple/Google
- Professional/ Discipline Specific Website
- Advocacy Website
- Research Website
- Other (please specify) Please Note: do not enter names of individuals or addresses in response to this question.
- YouTube/Internet Video Website
- TV Program
- Sales Assistant/Specialist Supplier
- Recommendation from Service User Family
- In-Office Shared Resource
- Printed Media like Newspapers
- Professional Journals
- Sales Brochures
- Colleagues within your discipline
- Colleagues from other disciplines

26. What are your top three sources for Assistive Technology information?

First Choice

Second Choice

Third Choice

27. Are you happy with the level of information on Assistive Technologies you currently have access to?

- No
- Yes

28. What would most help you to improve your information on Assistive Technologies for Service Users?



Appendix B: UTAUT Combined Loadings and Cross Loadings

Table 1 UTAUT Combined Loadings and Cross Loadings

Combines loadings and cross loadings					
	PE	EE	SI	FC	BI
PE1	(0.759)	0.251	0.031	-0.180	0.244
PE2	(0.928)	-0.057	-0.049	0.105	-0.163
PE3	(0.932)	-0.148	0.024	0.042	-0.036
EE2	-0.062	(0.904)	0.135	-0.130	0.077
EE3	0.161	(0.919)	-0.055	0.182	-0.112
EE4	-0.099	(0.933)	-0.076	-0.054	0.035
SI3	-0.066	0.093	(0.931)	0.120	-0.130
SI4	0.066	-0.093	(0.931)	-0.120	0.130
FC1	-0.166	0.004	0.272	(0.819)	-0.078
FC2	0.100	0.679	-0.250	(0.726)	-0.231
FC4	0.085	-0.664	-0.055	(0.747)	0.311
BI1	0.022	0.048	0.015	-0.025	(0.994)
BI2	-0.062	-0.102	-0.028	0.054	(0.980)
BI3	0.039	0.053	0.013	-0.029	(0.989)

Appendix C: Ethics Application and Approval

**School of Computer Science and Statistics
Research Ethical Application Form**

Part A

Project Title: The Acceptance and Use of ICT by Multidisciplinary Teams in an Intellectual Disability Service

Name of Lead Researcher (student in case of project work): Tom Mac Ardle

Name of Supervisor: Assoc. Prof. Denise Leahy

TCD E-mail: macardle@tcd.ie Contact Tel No.: 0876537406

Course Name and Code (if applicable): MANAGEMENT OF INFORMATION SYSTEMS (MSc)

Estimated start date of survey/research: May 2015

I confirm that I will (where relevant):

- Familiarize myself with the Data Protection Act and the College Good Research Practice guidelines http://www.tcd.ie/info_compliance/dp/legislation.php
- Tell participants that any recordings, e.g. audio/video/photographs, will not be identifiable unless prior written permission has been given. I will obtain permission for specific reuse (in papers, talks, etc.)
- Provide participants with an information sheet (or web-page for web-based experiments) that describes the main procedures (a copy of the information sheet must be included with this application)
- Obtain informed consent for participation (a copy of the informed consent form must be included with this application)
- Should the research be observational, ask participants for their consent to be observed
- Tell participants that their participation is voluntary
- Tell participants that they may withdraw at any time and for any reason without penalty
- Give participants the option of omitting questions they do not wish to answer if a questionnaire is used
- Tell participants that their data will be treated with full confidentiality and that, if published, it will not be identified as theirs
- On request, debrief participants at the end of their participation (i.e. give them a brief explanation of the study)
- Verify that participants are 18 years or older and competent to supply consent.
- If the study involves participants viewing video displays then I will verify that they understand that if they or anyone in their family has a history of epilepsy then the participant is proceeding at their own risk
- Declare any potential conflict of interest to participants.
- Inform participants that in the extremely unlikely event that illicit activity is reported to me during the study I will be obliged to report it to appropriate authorities.
- Act in accordance with the information provided (i.e. if I tell participants I will not do something, then I will not do it).

Signed: Tom Mac Ardle Date: 5/5/2015
Lead Researcher/student in case of project work

Part B

<i>Please answer the following questions.</i>	Yes/No						
Has this research application or any application of a similar nature connected to this research project been refused ethical approval by another review committee of the College (or at the institutions of any collaborators)?	NO						
Will your project involve photographing participants or electronic audio or video recordings?	NO						
Will your project deliberately involve misleading participants in any way?	NO						
Is there a risk of participants experiencing either physical or psychological distress or discomfort? If yes, give details on a separate sheet and state what you will tell them to do if they should experience any such problems (e.g. who they can contact for help).	NO						
Does your study involve any of the following?	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Children (under 18 years of age)</td> <td style="text-align: center; padding: 2px;">NO</td> </tr> <tr> <td style="padding: 2px;">People with intellectual or communication difficulties</td> <td style="text-align: center; padding: 2px;">NO</td> </tr> <tr> <td style="padding: 2px;">Patients</td> <td style="text-align: center; padding: 2px;">NO</td> </tr> </table>	Children (under 18 years of age)	NO	People with intellectual or communication difficulties	NO	Patients	NO
Children (under 18 years of age)	NO						
People with intellectual or communication difficulties	NO						
Patients	NO						

SCSS Research Ethics Application Form September 2011

**School of Computer Science and Statistics
Research Ethical Application Form**

Details of the Research Project Proposal must be submitted as a separate document to include the following information:

1. Title of project
2. Purpose of project including academic rationale
3. Brief description of methods and measurements to be used
4. Participants - recruitment methods, number, age, gender, exclusion/inclusion criteria, including statistical justification for numbers of participants
5. Debriefing arrangements
6. A clear concise statement of the ethical considerations raised by the project and how you intend to deal with them
7. Cite any relevant legislation relevant to the project with the method of compliance e.g. Data Protection Act etc.

Part C

I confirm that the materials I have submitted provided a complete and accurate account of the research I propose to conduct in this context, including my assessment of the ethical ramifications.

Signed: *Tom Mac Ardlo* Date: *10/5/2015*
Lead Researcher/student in case of project work

There is an obligation on the lead researcher to bring to the attention of the SCSS Research Ethics Committee any issues with ethical implications not clearly covered above.

Part D

If external ethical approval has been received, please complete below.

External ethical approval has been received and no further ethical approval is required from the School's Research Ethical Committee. I have attached a copy of the external ethical approval for the School's Research Unit.

Signed: *Tom Mac Ardlo* Date: *10/5/2015*
Lead Researcher/student in case of project work

Part E

If the research is proposed by an undergraduate or postgraduate student, please have the below section completed.

I confirm, as an academic supervisor of this proposed research that the documents at hand are complete (i.e. each item on the submission checklist is accounted for) and are in a form that is adequate for review by the SCSS Research Ethics Committee

Signed: *Dea Leary* Date: *10/5/2015*
Supervisor

Completed application forms together with supporting documentation should be submitted electronically to research-ethics@scss.tcd.ie Please use TCD e-mail addresses only. When your application has been reviewed and approved by the Ethics committee hardcopies with original signatures should be submitted to the School of Computer Science & Statistics, Room F37, O'Reilly Institute, Trinity College, Dublin 2.



DAUGHTERS OF CHARITY
Disability Support Services

Central Management Office

St. Vincent's Centre

Navan Road, Dublin 7

Tel: 01-824 5400

Email: info@docservice.ie

Mr. Tom McArdle,
Daughters of Charity Disability Support Services,
Central Management Office

20th May 2015

**Re: Application for Ethical Approval for Research Project
No. 004/2015**

Dear Tom,

I am writing to inform you that the Research Approvals Subcommittee of the Daughters of Charity Service Ethics Committee has approved your proposal to undertake a research project in the Service.

I appreciate that you are conscious of the need for sensitivity and confidentiality but I would like to emphasise it and, in addition, to highlight the requirement to ensure that service users or staff members are not in any way identified in your research submissions.

Please be aware that the prior permission of the Manager of the centre(s) in which you propose conducting the research is also required.

Please note that any outcomes or evaluation results remain the property of the Daughters of Charity Service and any use that they might be put to outside the Service, other than the project for which they are produced, would require prior approval by the Chief Executive Officer. On completion of your research project, please forward an electronic copy of same together with an abstract, to Joana.Murphy@docservice.ie.

Some issues may arise in the course of your research, knowledge of which can benefit the Service and in that regard I request that you bring any such matters to my attention.

I wish you every success with your project.

Yours sincerely,

Denis Cronin
Chief Executive Officer

c.c. Ms. Mary Reynolds
Sr. Mary O'Toole DC

Appendix D: Information Leaflet

The Acceptance and Use of Technology by Multidisciplinary Teams

Introduction

Multidisciplinary teams in intellectual disability healthcare are a major element of service provision to the community. These teams comprise many disciplines including Physiotherapists, Occupational therapists, Speech and Language therapists, Psychologists, Psychiatrists, Behavioural Specialists and Social Workers. The use of Information and Communication Technologies (ICT) by multidisciplinary teams is essential to the provision of efficient and effective services.

They use ICT in their own work but will also in some cases recommend Assistive Technologies to their Service Users. The dual role that some team members fulfil may lead to the impression that they willingly embrace technology. This may not be the case. It is therefore important to understand their reasons for technology use and any barriers that may prevent or restrict its use.

Aims

This research project aims to understand the reasons for technology use by multidisciplinary teams by testing their behavioural intentions using the Unified Theory of Acceptance and Use of Technology (UTAUT). The research project will also seek to improve the current sources used by multidisciplinary teams to find Assistive Technology for Service Users.

This is a research project being conducted by Thomas Mac Ardle, IT Administrator, Daughters of Charity Disability Support Services, in part fulfilment of the taught master's course in Management of Information Systems in the School of Computer Science and Statistics, Trinity College Dublin.

Survey

The survey is in the form of a questionnaire composed of twenty three compulsory questions and five voluntary questions which will take less than 10 minutes to complete. The compulsory section tests a theory of user acceptance of technology examining the behavioural intention to use technology. The results of these questions should help understand why multidisciplinary team members use technology and highlight barriers to its use.

The five voluntary questions on Assistive Technology query where multidisciplinary team member sources information on Assistive Technologies and seeks suggestions on how this can be improved. Information compiled in this section will be made available to all multidisciplinary teams.

Your responses will be confidential, anonymised and no information is retained that would identify an individual. Data will be securely stored at all times and will never leave an encrypted environment.

Importance of This Research

Most of the technology acceptance research has been conducted in the areas of commercial systems. This study examines the factors that affect the behavioural intention to use ICT by individuals, who act as a team, to use ICT in the workplace. Research into multidisciplinary team's acceptance of ICT is very limited. Venkatesh *et al* posit that moderators like gender, age and experience influence behavioural intentions to accept and use ICT.

Beneficiaries of This Research

This research will be of interest to all healthcare bodies that are planning ICT investments, to software developers for a better understanding of the requirements that their systems must meet to be successful and the scientific community to improve the general body of knowledge in this area. How multidisciplinary team members first learn about Assistive Technology may influence their future abilities to understand where the best sources are for this information. This research will provide lists of current sources for Assistive Technology information to all multidisciplinary team members.

Definitions Used in Survey

Information and Communications Technology (ICT) for this survey is defined as the combination of information systems, communication systems that allow the manipulation, storage, transmission and access to data, examples of this are e-mail, Skype, smartphones, social networks and computer networks.

Assistive Technology is defined as "any item piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Technology-Related Assistance Act, 1988, USA).

Performance Expectancy is defines as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance". There are four statements below please select the phrase that most closely resembles your opinion.

Effort Expectancy is defined "as the degree of ease associated with the use of the system". There are four statements below please select the phrase that most closely resembles your opinion.

Social Influence is defined "as the degree to which an individual perceives that important others believe he or she should use technology". There are four statements below please select the phrase that most closely resembles your opinion.

Facilitating Conditions are defined as "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of technology". There are four statements below please select the phrase that most closely resembles your opinion.

Behavioural Intention is defined as "the willingness of an individual to pursue a particular behaviour". There are three statements below please select the phrase that most closely resembles your opinion.

Moderators either weaken or strengthen the intended behaviour.

If you have any questions about the research study, please contact Thomas Mac Ardle at macardlt@tcd.ie or on 0876537406. Please do give careful consideration to completing the survey, it will take less than 10 minutes to complete.