

**Exploring the acceptance and barriers to usage of information  
and communication technology by Irish occupational therapists**

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fulfilment of the requirements for the degree of Master of  
Science in Health Informatics**

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## **Declaration**

**I declare that the work described in this 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.**

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## **Abstract**

Information and communication technology, such as client information system, telemedicine, electronic health record, etc are increasingly used in health care globally (Luo et al., 2009). These technologies have enhanced the communication between the service user and health professional. These technologies will help to deliver safe, effective and efficient service to clients which will improve the quality and efficiency of health services (HISI 2009). One of the most important factors for the successful implementation of information technology is users' acceptance and use of that technology.

The aim of the current study was to identify the extent to which information communication technology is used by occupational therapists in Ireland and to explore the factors which may affect its adoption.

Data about the usage and the factors influencing the acceptance of ICT by Irish occupational therapists were collected through a web based questionnaire. The convenient sampling method was used to get the maximum response. The survey was e-mailed to 350 occupational therapists working in Ireland. The response rate was 165 or 47.14% excluding the 14 incomplete surveys. A pilot study was conducted on 6 occupational therapists to improve the reliability and clarity of the questionnaire.

The data showed that the occupational therapists working in Ireland exhibited a high degree of ICT acceptance and use. The result indicated that the Irish occupational therapists used information and communication technology more for administrative and communication purpose compared to specific client related use.

The fact that there is no specific, unanimous/ centralised system in use across OTs in Ireland nor any OT specific client information system, this could lead to further research and study to find the most appropriate and most accepted one to get into the country's national health system and facilitating training and use in future.

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## Abbreviations

AOTI	Association of Occupational Therapists of Ireland
AIHW	Australian Institute of Health and Welfare
AU	Administrative Use
CDSS	Clinical Decision Support System
CIS	Client Information System
CPCD	Cocharne Pregnancy Childbirth Database
CPD	Continuous Professional Development
CPOE	Computerised Practitioner Order Entry
CRU	Care and Report Use
CU	Communication Use
DoH	Department of Health
EE	Effort Expectancy
EMOHO	Electronic Model of Human Occupation
EPR	Electronic patient record
FC	Facilitating Conditions
GP	General Practitioner
HISI:	Healthcare Informatics Society of Ireland
HSE:	Health Service Executive
ICT	Information and Communication Technology
IDT	Innovation Diffusion Theory
IS	Information Systems
IT	Information Technology
MHIS	Mental Health Information System
MHS	Mobile Healthcare System
MPCU	Model of PC Utilization
MS	Microsoft
NBCOT	National Board for Certification in Occupational Therapy

NHIS	National Health Information Strategy
OT	Occupational Therapy
OTIS	Occupational Therapy Information System
OTs	Occupational Therapists
PAS	Patient Administration System
PCB	Perceived Behavioural Control
PDA	Personal Digital Assistant
PDU	Professional Development Units
PE	Performance Expectancy
PEOU	Perceived Ease of Use
PIM	Personal Information management
PITT	Personal Innovativeness in IT
PU	Perceived Usefulness
SI	Social Influence
SPSS	Statistical Package for the Social Sciences
TAM	Technology Acceptance Model
TAM2	Technology Acceptance Model 2
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UK	United Kingdom
USA	United States of America
UTAUT	Unified Theory of Acceptance and Use of Technology
WFOT	World Federation of Occupational Therapy

# Chapter 1: Introduction

“Occupational therapists are allied health professionals who provide support to a wide range of people with physical, psychological or developmental injuries or disabilities. They work with clients across the lifespan, from infancy to old age and have the common aim to promote, develop, restore and maintain abilities needed to cope with the daily activities to prevent dysfunction and promote health” (World Federation of Occupational Therapists, 2003). Occupational therapists have a broad education that gives them the skills and knowledge to work together with the individuals or groups of people having physical, developmental and psychosocial disabilities. They provide support, restore, maintain functions and abilities which are required to do daily activities and work activities and prevent dysfunction and promote health. Occupational therapists work in a wide variety of settings including private practice, hospitals, government services, community centres, schools, rehabilitation centres, nursing home and private industry (AIHW, 1998).

Many of occupational therapists work in hospital and community service throughout the world including Ireland. Assessing and recording a client’s activities and progress is an important part of an occupational therapist’s work (Brayman et al., 2005). Hence this chapter will discuss how Occupational Therapy (OT) benefits from Information and communication technologies in various countries introduce the idea of using information and communication technology (ICT) for various developments in the field of OT and finally present to the aims and objective of current study.

## 1.1 OT AND ICT

IT and ICT are used nearly synonymously and in a somewhat broad sense (Adeya, 2002). Information Technology (IT) is defined as “the group of technologies that is revolutionizing the handling of information and embody a convergence of interest between electronics, computing and communication” (Drew et al., 1994). Duncombe and Heeks (1999) have simplified the definition by describing ICTs as an “electronic means of capturing, processing, storing and disseminating information”. In health care this includes the clinical information systems, the Internet, eHealth, electronic health records, telehealth and personal digital assistants.

As we move into the 21st century, the field of information and communication technology (ICT) has undergone rapid evolution which affects our life significantly. The health care system all over the world is undergoing substantial change, and access, adoption,

acceptance and use of ICT is gaining increasing importance with advances in information systems and e-health technologies (Schaper and Pervan, 2007). According to Dr. Breines & Schaper (2006) these technologies and others will inevitably become common-place in health and will change the way health care is delivered. "This will change the practice of occupational therapy and will alter the nature and practice of therapeutic relationships presenting new challenges for the profession." Occupational therapists will need to be prepared to utilise existing and emerging ICTs. Also there are a number of political, economic and technological forces acting on the health professions, including occupational therapy, encouraging them to explore the potential of computer based tools to assist in the complex processes of clinical reasoning (Taylor et al., 2007).

Information and communication technology (ICT) has been advocated in the delivery of education and the development of OT professional networks between rural and city based practitioners (Mitchell et al., 2001, Kenny, 2000, Armstrong et al., 2000). Also according to Armstrong *et al.* (2000) professional isolation can be circumvented and educational opportunities can be provided through the use of ICT. Hence this could be useful in developing the young profession of OT through widening educational and training opportunities, using ICT. A WFOT congress held in Sydney, Australia in 2006 identified some of the ICT specifically for OTs as follows: Parallel development of programs such as client records, using technology for assessment of clients developing OT specific reports/notes and evidence based information including best practice guidelines (Dr Breines and Schaper, 2006).

There is a large variety of usage of Information and communication technology in the field of occupational therapy all over the world. Information and communication technology has been used to deliver training and create a professional development network for health professionals in Coober Pedy and Roxby Downs in South Australia (Mitchell et al., 2001). They have been using various ICT for developing professional training and competencies in therapists from remote places.

The National Board for Certification in Occupational Therapy (NBCOT) in the United States of America has launched new online Professional Development Log Portal to help OTs to log and track their Professional Development Units (PDU) needed to maintain certification status with NBCOT. This new online tool has enabled OTs to enter and maintain an electronic log that can be accessed 24 hours a day (NBCOT, 2010).

The usefulness has been emphasized by Canadian occupational therapists as well who conclude that the greatest value of ICT would be the increased access to education regardless of learners' residence, physical limitations, family or social circumstances or ability to travel (Stanton, 2001). The introduction of advanced communication technologies has the tendency to change the fate of occupational therapy education at all levels and bring the different OT learners together across the world (Mugridge, 1995, Bates, 1999). Also using the web to link entry-level and continuing professional education can achieve economies of scale.

The use of electronic care records and having single set of notes is gaining popularity in the USA and the UK and worldwide (Brewin, 2002) This is particularly helpful considering the nature and experience of other, multi-professional and multi-agency, services in the health sector. Hence there is growing evidence and work put towards selecting, developing and implementing OT's own systems and software, especially in the USA (Garner and Rugg, 2005, Brewin, 2002).

While having access to the technology may benefit isolated therapists and play an important role in recruiting and retaining health professionals to rural and remote areas, the technology needs to be used by therapists for any benefit to occur (Taylor and Lee, 2005). Hence a broader view on the use of ICT would be helpful to understand how the OTs in Ireland feel about using this in the profession and what is stopping them using it.

## **1.2 TECHNOLOGY ACCEPTANCE IN HEALTH**

The use of technology in the health sector has increased rapidly throughout the world. Clinical information systems, internet, telemedicine, electronic patient record and other applications are used commonly in hospital and health care services. User acceptance issues will be considered for the successful implementation of the information technology into the health sector (Schaper and Pervan, 2007). As usage intention, i.e. the determination to use an IT application, is the key determinant of use behaviour, it is a good indicator of a person's acceptance and use of information system (Yu et al., 2009). Models and theories of acceptance that have been applied to the health sector such as Davis' Technology acceptance model (TAM), and various version of this; theory of planned behaviour (TPB), Unified theory of acceptance and use of technology (UTAUT), etc (Schaper and Pervan, 2007) These theories and models will be discussed in the following chapter.

### **1.3 CONTEXT OF THE STUDY**

The National Health Service Executive (HSE) is the main employer of occupational therapists in Ireland, followed by voluntary agencies. Occupational therapists in the HSE work in a variety of settings including the community (e.g. conducting home visits and facilitating discharge from hospital), paediatrics (in the acute setting and in the community), rehabilitation, acute hospital setting and mental health.

In light of the development in the field of OT world wide around the use of ICT the researcher, a Health Service Executive senior occupational therapist in the community care setting in Ireland would be interested in knowing how the Irish OTs use ICT in their routine practice and factors which may affect its acceptance. The researcher assumes that the current therapists use ICT extensively in accessing information and guidelines pertaining to specific fields of OT, searching for evidence base and updating their professional knowledge. Hence the current study was undertaken to with the following aims and objectives.

### **1.4 AIMS AND OBJECTIVES**

The aim of the study is to determine the extent to which information communication technology is used by occupational therapists in Ireland and to explore the factors which may affect its adoption. Information thus acquired by the study will then be analysed to find out the ways to expand the use of ICT by OT in Ireland. Hence the specific objectives of the study would be as follows:

1. To conduct a literature search to find out the existing use of ICT within allied health professionals and any acceptance model in particular.
2. To identify possible use of ICT within OT professionals and factors affecting their acceptance of ICT across the world.
3. To explore the factors which may be influencing acceptance of ICT by OTs in Ireland?
4. To quantify use of ICT by Irish OTs using a survey.



## **1.5 OVERVIEW OF THE RESEARCH**

Literature was reviewed to support the aims of the study. This includes various theories and models related to technology acceptance, its use within healthcare professions including OT. A web based survey questionnaire was e-mailed to the occupational therapists working in different context to collect the quantative data. Prior to that a small pilot study was conducted on 6 occupational therapist working in different areas to improve the reliability and clarity of the questionnaire. The questionnaire consisted of set of questions related to use of ICT and factors influencing its adoption by Irish OTs. The data was analysed using the SPSS and MS Excel.

## **1.6 OVERVIEW OF THE DISSERTATION**

This chapter has introduced the idea of ICT and its use within the profession of OT. The next chapter is a literature review to support the objectives of the study. This includes various technology acceptance models and theories, and the detailed evidence around its use within healthcare professions, including OT. Chapter 3 would explain the methodology for the study. This includes research design used in this study as well as the sample and population, the data gathering instruments and the procedures used to collect the data. Chapter 4 would analyse the information and findings. Chapter 5 would discuss the findings from the result analysis and linked it to the literature review, methodology and objectives of the study. Chapter 6 would conclude the study by drawing inferences from the results and analysis of the survey.

# Chapter 2: Literature Review

## 2.1 TECHNOLOGY ACCEPTANCE: OVERVIEW

User acceptance of technology has been an important area of study for over two decades now. With growing technology needs in the 1970s and increasing failures of system adoption in organisations, predicting system use became an area of interest for many researchers. However, most of the studies carried out failed to produce reliable measures that could explain system acceptance or rejection (Davis, 1989). A wide variety of theoretical perspectives has been developed in order to understand how users make decisions to use technology applications. Probably the most dominant theories in IT research are Innovation Diffusion Theory (IDT) (Rogers 1995), Theory of Planned Behaviour (TPB) (Fishbein & Ajzen 1975), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003) and the Technology Acceptance Model (TAM) (Davis 1989, Davis et al. 1989). These theories provide tools to understand success or failure in implementation processes of new IT applications (Koivunen, 2009).

## 2.2 THEORIES OF BEHAVIOR

**2.2.1 Innovation Diffusion Theory (IDT)** explains the event of the innovation decision process that determines the rate of adoption in various categories of adopters. The theory is concerned with the manner in which a new technological idea or technique migrates from the stage of creation to widespread use. The theory suggests that individuals can be classified according to degree of innovativeness which is defined as relative speed of adoption of the innovation. There are five categories of adopter based on the degree of innovativeness which are innovators, early adopters, early majority, late majority and laggards. IDT also presume five innovation characteristics that affect the diffusion: relative advantage, compatibility, complexity, trialability and observability (Rogers, 1995).

**2.2.2 Theory of Reasoned Action (TRA)** was introduced by Fishbein and Ajzen (1975) in order to understand behavioral intention. In TRA, the behavior intention of performing a particular behavior is determined by a personal factor and a social factor (Fishbein and Ajzen, 1975). The personal factor is represented by *attitude* towards the behavior, which is “an individual’s positive or negative feelings about performing the target behaviour”.

The social factor is represented by *subjective norm*, which describes “the person’s perception that most people who are important to him think he should or should not perform the behaviour in question”. Furthermore, according to the expectancy value model of attitude (Fishbein and Ajzen, 1975) an individual’s attitude towards performing the target behaviour is itself determined by his / her beliefs regarding the consequences of performing the target behaviour, as well as the evaluation of these consequences. Likewise, an individual’s subjective norm is the by-product of his / her normative beliefs and motivation to comply. Figure 2.1 depicts a graphical representation of TRA, which illustrates that external variables i.e. personality, demographics, etc. do not have a direct influence on target behaviour, but, rather, are mediated by the TRA model.

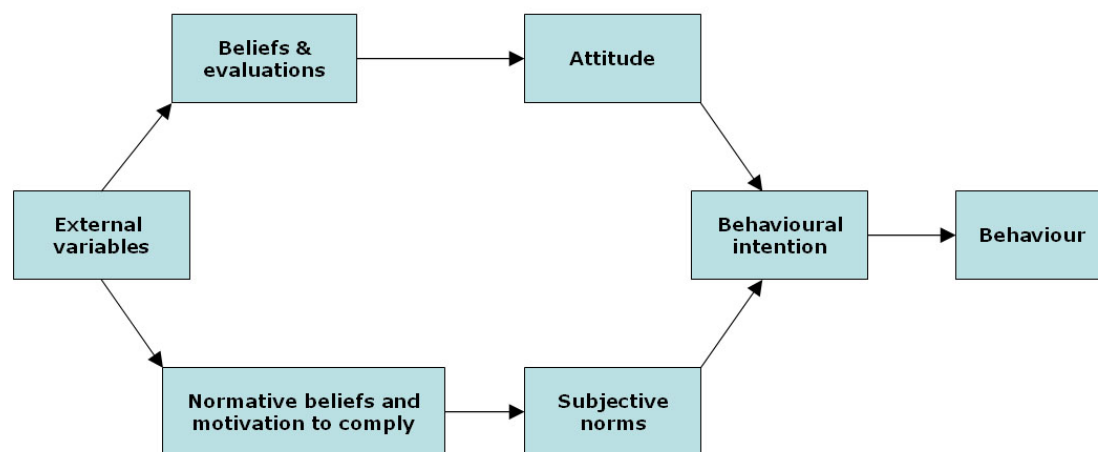


Figure 2.1: Theory of reasoned action (from Fishbein & Ajzen, 1975)

**2.2.3 Theory of Planned Behaviour (TPB)** is an extension of TRA by adding the construct of *perceived behavioural control (PCB)* which is defined as “perceived ease or difficulty of performing the behaviour”. PCB is a product of individual’s control belief and perceived facilitation. Perceived availability of skills, resources and opportunities will make control belief. Perceived facilitation is the individual’s assessment of available elements that will assist the performance of such behaviour. TPB holds that attitudes, subjective norms and perceived behavioural control are direct determinants which in turn influence behaviour (Ajzen, 1991). Figure 2.2 shows a graphical representation of TPAB.

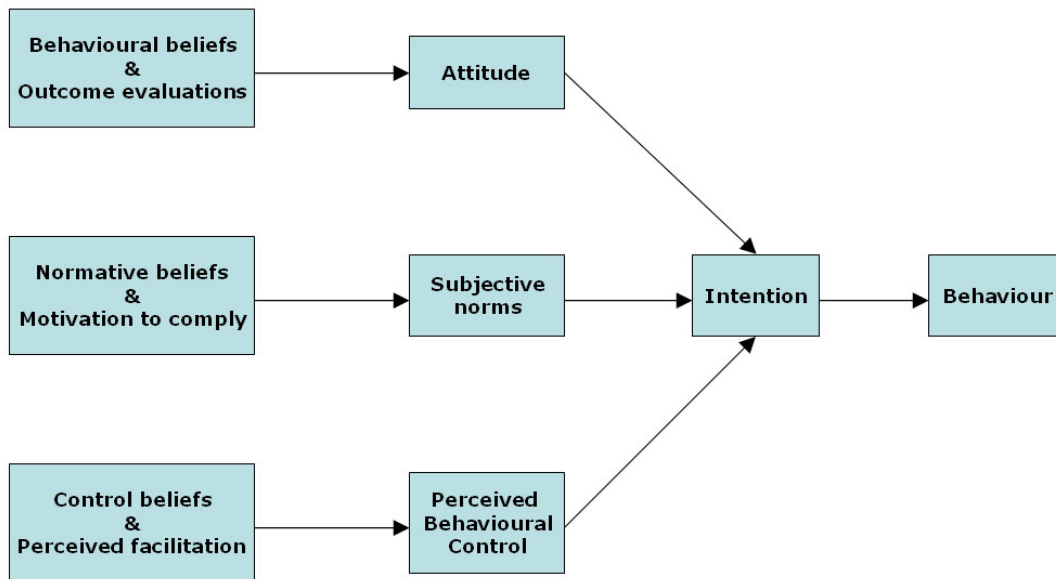


Figure 2.2: Theory of Planned Behavior (Ajzen,1991)

## 2.3 IT ACCEPTANCE MODELS

These are general theories of behaviour. In the late 1980s such theories were studied and adapted to Technology Acceptance Model (TAM) (Davis, 1989, Davis et al., 1989) which is possibly the most frequently used theory (Yarbrough and Smith, 2007, Ma and Liu, 2004, Kim and Chang, 2007). Many models have been proposed to explain and predict concepts of IT system and its use, but the technology acceptance model has been the only one which has captured the most attention of the information system community (Chuttur, 2009).

**2.3.1 Technology Acceptance Model (TAM)** was developed by Davis et al in 1989 as figure 2.3 (Davis, 1989, Davis et al., 1989, Davis, 1993) It explained the acceptance of information technology in performing tasks and identified two fundamental beliefs that influence the usage of information systems (IS): perceived usefulness (PU) and perceived ease of use (PEOU). *Perceived usefulness* is defined as “the degree to which an individual believes that using a particular system will enhance his or her job performance.” It relates to job effectiveness, productivity (time saving) and the relative importance of the system to one’s job. On the other hand, *perceived ease of use (PEOU)* is defined as “the degree to which an individual believes that using a particular system is free of effort.” in terms of physical and mental effort as well as ease of

learning. Perceived usefulness and perceived ease of use may be influenced by various external variables, possibly user features such as level of education (Burton-Jones & Hubona 2005), gender (Venkatesh & Morris 2000), or organisational features such as training in computer use (Venkatesh 1999). It has been found that all external variables influence the intention to use the IT system (Lee et al. 2006, Yarbrough & Smith 2007).

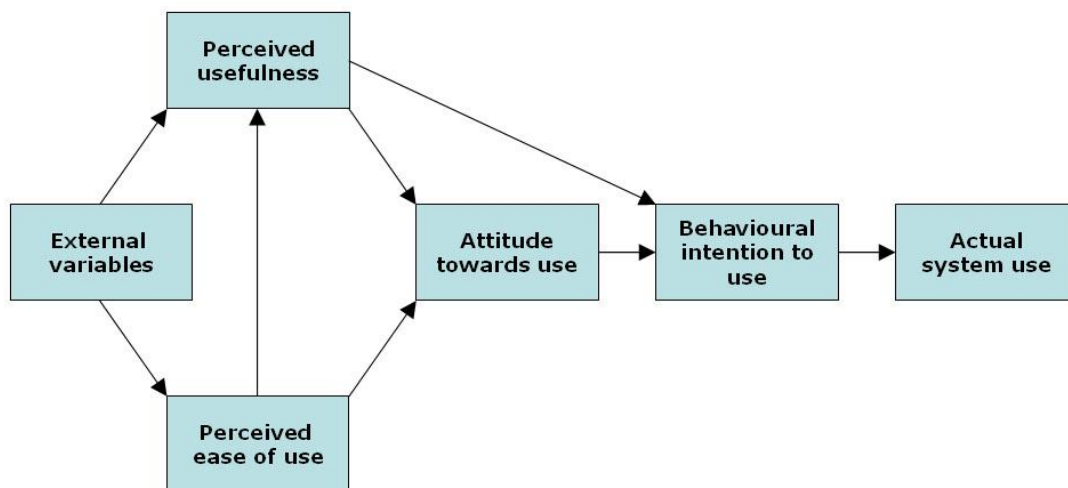


Figure 2.3: Technology Acceptance Model (Davis *et al.*, 1989)

TAM model is based on Theory of Reasoned Action (TRA) (Fishbein and Ajzen 1975) and its main goal is to provide an explanation of the determinants of computer acceptance that is general. It can also explain user behaviour across a broad range of end-user computing technologies and user populations (Davis et al., 1989).

The original model of TAM, Davis' research (Davis 1989) has been adapted and extended in many ways and has been cited more than 700 times. TAM theory has been widely tested in several research contexts as well as with several types of IT applications (Yarbrough and Smith, 2007, Raitoharju, Lee et al., 2006, Chau and Hu, 2007). TAM tries to produce explanations for the factors of IT acceptance that are transferable to different user populations and different kinds of technologies. The TAM theory has also been used for identifying functional factors in designing health information websites for customers (King and He, 2006). The study done by Chau and Hu, 2002b shows that the model explains both the variation in behavioural intention and actual IT use (Venkatesh and Morris, 2000). TAM has proven to be a reliable model through frequent empirical testing (Yarbrough and Smith, 2007). The validity of the model has been confirmed in

many different contexts and research constructions (Ma and Liu, 2004, King and He, 2006), including in health care settings (Chismar and Wiley-Patton, 2003, Chau and Hu, 2002b, Chau and Hu, 2002a). Most of these studies proved significant statistical result for the high influence of perceived usefulness on behavioural intention to use a specific system.

Perceived usefulness is a fundamental driver of usage intentions, it is essential to understand the factors of this construct and how their influence changes over time with increasing experience using the system. Perceived ease of use, TAM's other direct determinant of intention, have exhibited a less consistent effect on intention across studies. Whereas only research modelled the determinants of perceived ease of use (Venkatesh and Davis, 1996) and the determinants of perceived usefulness had been relatively overlooked until 2000. Venkatesh and Davis felt that a better understanding of the determinants of perceived usefulness would enable us to design organizational interventions that would increase user acceptance and usage of new systems. Therefore, in 2000, they extended TAM and called it TAM2 (Venkatesh and Davis, 2000).

**2.3.2 Technology Acceptance Model 2 (TAM2)** was proposed by Venkatesh and Davis (2000) which tries to explain the factors which affect perceived usefulness. They considered social influences (subjective norms, voluntariness and image) and cognitive processes (job relevance, output quality, result demonstrability, and perceived ease of use) affect technology acceptance.

In TAM2 (figure 2.4) Social influence process reflects the impacts of three inter-related social forces striking on an individual facing the opportunity to adopt or reject a new system: subjective norm, voluntariness, and image. *Subjective norm* is defined as a "person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein and Ajzen 1975). The rationale for a direct effect of subjective norm on intention is that an individual may choose to perform the target behaviour because he believes that the reference group think that he should perform it, even if the consequences are not favourable (Venkatesh and Davis, 2000).

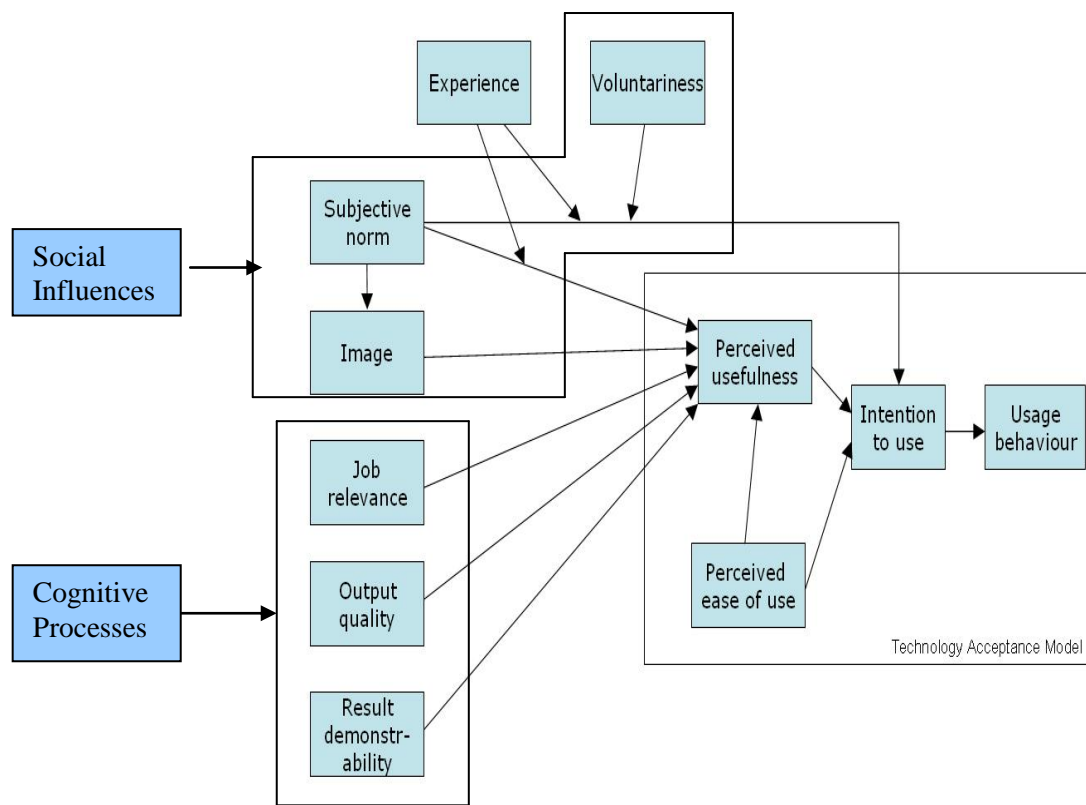


Figure 2.4: Technology Acceptance Model 2 (Venkatesh & Davis, 2000)

In TAM2 social influence process reflect the impacts of three inter-related social forces striking on an individual facing the opportunity to adopt or reject a new system: subjective norm, voluntariness, and image. *Subjective norm* is defined as a "person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein and Ajzen 1975). The rationale for a direct effect of subjective norm on intention is that an individual may choose to perform the target behaviour because he believes that the reference group think that he should perform it, even if the consequences are not favourable (Venkatesh and Davis, 2000). *Voluntariness* is defined as "the extent to which potential adopters perceive the adoption decision to be non-mandatory. *Image* is defined as "the degree to which use of an innovation is perceived to enhance one's status in one's social system" (Moore and Benbasat, 1991). In TAM 2, there are four cognitive instrumental processes of perceived usefulness: job relevance, output quality, result demonstrability, and perceived ease of use. *Job relevance* is defined as "Individual's perception regarding the degree to which the target system is relevant to his or her job". In other words, it is our own knowledge about the job situation which forms the basis for finding out the set of tasks the system is capable of performing. Job relevance is a function of the importance within one's job of the set of tasks the system is capable of supporting (Venkatesh and Davis, 2000). *Output quality* is defined as "the degree to which an individual believes that the system performs his or her job tasks well". *Result demonstrability* is defined as "tangibility of the results of using the innovation"(Moore and Benbasat, 1991). This implies that an

individual is more likely to use the system if he sees the benefit clearly, but if benefits are there but not clear the user is unlikely to use it. *Perceived ease of use (PEOU)* is same as defined in TAM.

Subjective norms and experience have a direct effect on the intention to use the system. Hartwick et.al 1994, found that subjective norm had a significant effect on intentions prior to the system development as user knowledge about the system is ambiguous and he has to rely on the opinion of others for his intentions. Once the system is implemented the user can find out the pros and cons through direct experience which decreases the normative influence (Hartwick and Barki, 1994).

The use of computer and information technologies in today's world has increased dramatically; estimates indicate that about 50% of capital of a new organisation has been invested in information technology (Westland and Clark, 2000). To improve productivity by using technology, the employees of the organisation have to use and accept technology. Explaining user acceptance of technology is often described as one of the most mature area of research on information technology. Several theoretical models were formed on the basis of information systems, psychology and sociology, none of them shows more than 40 percent of variance in individual intention to use technology (Venkatesh and Davis, 2000, Taylor and Todd, 1995, Davis et al., 1989). Thus, there was a need to develop a new model which has a unified view of user acceptance. The new model was formed either by using the constructs of different models or choose one model among a multitude of models.

**2.3.3 Unified Theory of Acceptance and Use of Technology (UTAUT):** The UTAUT model was developed by Venkatesh et.al in 2003 which aimed to integrate eight prominent competing IT acceptance and use models. The new model successfully incorporates all constructs of old models and explains 69 percent of variance in intention to use IT compared to 40 percent shown by the previous models.



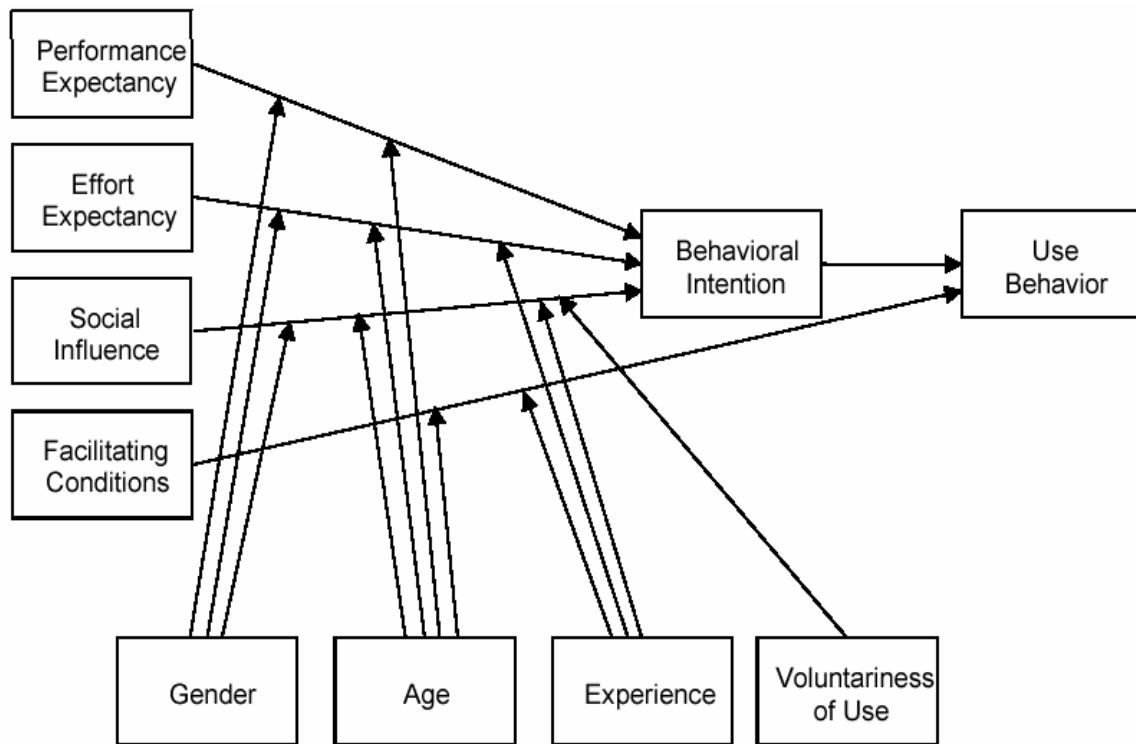


Figure 2.5: UTAUT Model (Venkatesh et. al, 2003)

The UTAUT model (figure 2.5) consists of four constructs which act as direct determinants of user acceptance and usage behaviour: *Performance Expectancy (PE)* 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” (Venkatesh et al., 2003). Similar concepts from different models that relate to performance expectancy are perceived usefulness, extrinsic motivation, relative advantage, job fit and outcome expectation (Kijisanayotin et al., 2009). PE is the strongest predictor of intention to use IT in both voluntary and mandatory settings (Venkatesh and Davis, 2000, Davis, 1989, Chang et al., 2007). It was also found that gender and age influenced the relationship between the performance expectancy and behavioural intention and such influence will be stronger for men and especially younger men (Venkatesh et al., 2003, Venkatesh and Davis, 2000, Davis, 1989). *Effort Expectancy (EE)* is defined as “the degree of ease associated with the use of system” (Venkatesh et al., 2003). The concept is similar to perceived ease of use from TAM and IDT model and the complexity from model of PC utilization (MPCU) (Kijisanayotin et al., 2009). Many previous studies have shown that the EE was a significant influence on intention to use behaviour (Thompson et al., 1991, Schaper and Pervan, 2007, Davis, 1989, Chang et al., 2007, Agarwal and Prasad, 2000). The effect of effort expectancy on behaviour intention will be influenced by gender, age and

experience. The younger women with initial stage of experience will have a strong impact on it (Venkatesh et al., 2003). The third construct of the UTAUT model is *Social influence* (SI) which is defined as “the degree to which an individual perceives that important others believe he or she should use the system” (Schaper and Pervan, 2007). Social norms in TRA, TAM2 and TPB, social factor in MPCU and image in IDT are the corresponding terms which were integrated by Venkatesh et al. into this construct. The effect of social influence on intention to use technology was significant and it has been mentioned in previous studies (Karahanna et al., 1999, Chang et al., 2007). The impact of social influence on behaviour intention is controlled by age, gender, voluntariness and experience and such impact will be stronger in older women particularly in mandatory settings in the early stages of experience (Venkatesh et al., 2003). *Facilitating conditions* (FC) is the fourth construct of UTAUT model and it is defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system” (Hennington and Janz, 2007). The concepts from different models such as perceived behavioural control from TPB, facilitating conditions from MPCU and compatibility concept from the IDT model are incorporated to form this construct (Kijisanayotin et al., 2009). Facilitating conditions have a significant effect on technology use. It was found that FC can significantly predict technology use but it becomes insignificant in predicting intention to use IT when both performance expectancy and effort expectancy constructs are present (Venkatesh et al., 2003). The influence of facilitating conditions on technology usage will be affected by age and experience. Older worker with increasing experience shows greater impact on it (Venkatesh et al., 2003) From all above discussed models it is expected that behavioral intention will have a positive influence on technology usage.

## **2.4 INFORMATION TECHNOLOGY RESEARCH IN HEALTHCARE**

Earlier studies on the topic of study were searched for both systematically and manually. Various databases were searched to gain a profound understanding of the acceptance and use of information technology in health care. Additional searches were conducted through the Google, web addresses of various organisations and European Union. The titles of the articles were reviewed and abstract of relevant articles were read. The entire article was read only if the abstract contained the relevant information related to the research. References of the related articles were reviewed for the extensive literature search on the topic.

IT in health is regularly defined as health informatics and nursing informatics (Thede, 2003, Hunt et al., 2004). Health informatics is defined as an evolving scientific discipline which deals with the resources, skills and tools required to store, retrieval, disseminate and use of health related information to deliver healthcare and promote health. The discipline utilises the methods and technologies of the information science that include computers, information and communication systems for providing best quality healthcare in the basic as well as in applied biomedical sciences (Hovenga and KIDD, 1996).

According to Schuring and Spil (2004) “Developing, implementing and using information technology in an organisation is a complex social activity. It is often characterised by ill-defined problems or vague goals, conflicts and disruptions that result from organisational change. Successfully implementing information system in healthcare organisation appears to be a difficult task.”

The use of technology in the health sector has increased rapidly throughout the world. Clinical information systems, clinical decision support system, telemedicine, electronic patient record and other applications are used commonly in hospital and health care services. User acceptance issues will be considered for the successful implementation of the information technology into the health sector (Schaper and Pervan, 2007).

## **2.5 USE OF ICT IN HEALTH**

Scott (2007) stated that the use of information technology in the healthcare sector especially in hospitals would improve the quality of services provided, efficiency and effectiveness of the personnel and also decreasing the organisational expenses. Hospital will become inefficient and lose patients trust if they do not use these new technological achievements. A significantly modified version of TAM (Technology acceptance model) was used to evaluate the IT adoption in hospital (Aggelidis and Chatzoglou, 2009). The study showed that perceived usefulness, ease of use, social influence, attitude, facilitating condition and self efficacy have a great and significant influence on hospital personnel usage intention whereas the direct impact of training on the behaviour intention is not supported by results. The positive effects between facilitating conditions and social influence, perceived usefulness and anxiety and social influence and self efficacy is also supported.

Yu et al. (2009) used modified version of Technology acceptance model 2(TAM 2) to test the health IT acceptance by 350 caregivers in long-term care facility. The survey results

clearly showed that the caregivers show high levels of acceptance of health IT applications. Perceived usefulness, perceived ease of use and computer skills influenced caregivers' intention to use health IT application whereas image had significant negative effect on it. Computer skill has a direct impact on the perceived ease of use and intention to use an application, support and training should be provided to caregivers by resource managers. Ease of use, subjective norm and job level also showed perceived usefulness. The demographic factors did not have significant influence on adoption of health IT.

Kijsanayotin et al (2009) investigated the acceptance of information technology amongst 1607 community health centres in Thailand using UTAUT model. The result of the study showed there was a high degree of acceptance and use of IT in community health centres in Thailand. The acceptance of IT in Health was influenced by performance expectancy, effort expectancy, social influence and voluntariness. Among these factors performance expectancy emerged as the strongest factor. The use of health IT was also influenced by the previous IT experience, individual's choice to accept and use system in his work and the technical support from the organisation.

In 2006 Yi et al., conducted a study about the PDA acceptance by healthcare professionals. The study included the 222 residents and faculty physician in seven family practice residency programs located in an eastern state of the US. He developed a research model to test the PDA acceptance by integrating the key variables of three previously acceptance model namely TAM (perceived usefulness, perceived ease of use),TPB (subjective norm and perceived behavioural control) and IDT(result demonstrability, image and personal innovativeness in IT(PIIT) “which describes the extent to which the individual has an innate propensity toward adopting a new IT” (Agarwal and Prasad, 1998). The model explains high degree of acceptance and use of an innovation such as PDA. Perceived usefulness, perceived ease of use, subjective norm and perceived behavioural control showed significant influence on behavioural intention directly whereas PITT showed indirect influence through mediators such as result demonstrability, perceived ease of use, subjective norm and perceived behavioural control.

Wu et.al (2007) did a survey to find out the acceptance to Mobile healthcare systems by health care professionals in the hospitals which have implemented MHS partially or fully. 291 survey questionnaires were sent out to the health professionals that included physicians, nurses and medical technicians. Technology acceptance model with added

variables namely technical support and training, compatibility and MHS self efficacy was used to form the research model. In the study , MHS is referred to the healthcare information processing system that use new information technology to deliver and exchange healthcare services and information using mobile devices by the participants. The results revealed that perceived usefulness, perceived ease of use, compatibility, and MHS self-efficacy are important determinants to users' behavioral intent. Amongst these factors, compatibility showed the strongest effect on the intention to use the technology. Technical support and training has indirect impact on intention behaviour. Physical size, weight, screen, or electrical power and speed should be considered when choosing the mobile devices for MHS. Asserted screens and keyboard size are also important factors for use of mobile applications. Mobile IT/IS designers should develop useful and easy health care systems keeping in mind the user requirements and their expectations.

Gagnon et al in 2003 investigated physicians' acceptance of telemedicine in their clinical practice. Interpersonal behaviour theory was used in the study to predict the physician intention to use telemedicine. The research model was formed on the basis of theory of interpersonal behaviour. 60 physicians were invited in the study. In the study, Telemedicine refers to any medical service provided at distance via an electronic communication. The results indicated that normative factors including both social and personal were the strongest predictor of intention. The effect of self identity on the physicians' intention to use telemedicine was negative. The overall results showed high degree of physicians' acceptance to use telemedicine in their practice.

A number of studies examined the use and importance of electronic health record and PDA in the modern primary care practice (Menachemi et al., 2006). The study conducted by Meade in 2009 on the use of electronic patients record (EPR) by Irish GPs showed that there is substantial increase in the use of EPR system for clinical and administrative task. The EPR system was frequently used by the male GPs in their practice than compare to their female colleagues. The use was also affected by the age of the GP, type of practice and practice location. GPs located in rural areas showed greater use than urban colleagues. Lack of time appears to be the most significant barriers perceived by Irish GPs.

Garde et al in 2006 conducted a study on the health informatics skill on health work force in Australia. A survey included 3000 Australian health professionals consisting of 9 domains namely doctors ,radiologist, dentists, nurses, pharmacists, podiatrists,

physiotherapists, dieticians and complimentary medicine professionals. It is important for health professional to have basic informatics skills as they use information technology in their day to day practice. The survey was conducted through paper based questionnaire and web based questionnaire. The results suggested that many Australian health professionals are not aware of their needs from health informatics and they lack subsequent core competency to efficiently use computers in their routine practice. Some of the respondents who completed the paper based questionnaire had limited computer literacy and knowledge of health informatics whereas the respondents from internet reported required higher degree of competence for health informatics. The results of the study will provide support and guidance to the universities and the other education institutions in the development delivery and promotion of the relevant education about health informatics suited for the individual professional needs.

Medication error were recognised as a significant cause of morbidity and mortality (Pirmohamed et al., 2004, Edwards and Aronson, 2000). Revised UTAUT model was used by Chang et al (2007) to examine the acceptance of pharmacokinetics based clinical decision support system among 140 physicians in Taiwan. The result of the study indicated that there was a high degree of acceptance and use of CDSS among physicians. The acceptance of clinical decision support system was significantly affected by performance expectancy and effort expectancy whereas social influence and facilitating condition did not show significant impact on adoption of health IT.

In the literature there is certainly more implementing an information technology system in an organization involves a change process. The organisation has to provide resources and support to make that change process successful. In a study conducted by Lee et al (2008) on evaluation of nursing information system in a hospital in Taiwan at two stages, found that nurses showed negative evaluation toward using the nursing information system. Age and pressure to use the system were critical factors found in the study. Older nurses with limited computer skills took more time to adopt the nursing information system. The hospital-wide policy required on-line documentation involving interdisciplinary care providers, put extra workload and stress level on nurses as they had to fulfil their patient care responsibilities and to incorporate the technology into their daily practice. Other factors include insufficient training to use NIS and technical support from the information system department.

Information and computer technology (ICT) is changing the way the health professionals deliver patient care (Smedley 2005). It helped to provide quality and effective care which

leads to achieve good outcome results. The study was done by Robert Eley et al (2009) on 10000 Australian nurses to determine the possible barriers to use ICT in their practice. The results of the study showed that work demands, access to computer and lack of technical support were the main hindrance to adopt and use of ICT. Age of the nurses, lack of interest and health and safety are few other factors that do not have substantial impact on use of ICT.

Hence from both these studies it is concluded that work demand, accessibility and lack of technical support were some of the factors which restricted the nurse to adopt and use ICT.

The willingness and attitude to use ICT is an important factor in the healthcare practice (Yusof et al., 2008, Suomi et al., 2007). Ward et al (2008) reviewed the available published literature on 12 databases from 2000 to 2005 all related to information technology, health professional and health attitudes to find out the attitude and the factors which influence health care staff to use information technology in their practice. He concluded that there are various issues that should be kept in mind by the organisation while implementing IT based system into work practice. These issues are flexibility and usability, sufficient education and training and appropriate software application. Attitude of healthcare professional plays an important role in accepting and using ICT in their work practice.

Hillan et al, (1998) surveyed 850 midwives in 22 consultant maternity hospital in Scotland to examine the use of Cocharne Pregnancy Childbirth Database (CPCD) and any impact made by the database on the labour ward policies and procedures. 37% of midwives stated that they have use the Cochrane database only once whereas 27% has used it for regular basis. One of the major reasons for lack of use was that labour ward computer was meant for medical staff and midwives had no knowledge to access the database. The midwives were using patient database application and they showed interest in using other software application like word processor, spread sheets or graphic packages, but lack of opportunity, time and support and limited computer skills restricted their use.

## 2.6 ICT AND HEALTHCARE IN IRELAND

In Ireland, the health care system is a mixture of public and private institution and financiers. The government provides approximately 80% of funding via taxation, with the remaining 20% coming from voluntary health insurance premiums. The primary goal of the government in relation to the health sector are two fold- efficiency and effectiveness- with improved quality of care at the same, or reduced cost (Grimson et al., 2000).

The national health information strategy (NHIS) sets out the agenda for the development of ICT within the Irish health sector. The development of NHIS was announced in 2000. The primary goal of the NHIS is to promote the use of information to support improvements in health and the delivery of healthcare. This was to be achieved by the development of a strategic approach toward a co-ordinated and integrated national health information system that recognises the central importance of accurate, timely and relevant information for assessing population health, guiding service planning, measuring effectiveness and informing health policy (DoH 2001). The following objectives are set out by the NHIS:

- To ensure people have the relevant information required to make informed health decision.
- To ensure that the relevant information is available at national, regional and local level to promote decisions for improving the health of the populations.
- Quality information is available to the relevant authorities for the monitoring of health status and population screening.
- To make available appropriate and quality information to underpin quality assurance and accountability in the health system.
- To ensure that appropriate legislation, policies and standards with respect to security and confidentiality in health care in place.
- To optimise communication in integrated health systems and for sharing of health information.
- To make sure that the appropriate organisational infrastructure is in place to support the vision and aims of the NHIS.

According to the report of healthcare informatics society of Ireland (2009) there was a continued progress in critical elements of Ireland's healthcare service, including patient safety, quality and financial effectiveness. These elements were crucially dependent on a radical improvement in the use of Healthcare ICT. The HSE transformation programme that refer to easily accessible integrated health services, centred on the patient. National



health ICT infrastructure was the essential requirement to achieve this transformation, enabling clinical information to be passed securely and quickly between practitioners, medical instructions communicated clearly and quickly using electronic means for increased patient safety. It was no longer acceptable for Irish healthcare providers to put patient safety at risk through poor or non-existent Health ICT systems, a practice which could be deemed to be negligent when compared with current international norms. According to the Euro Health Consumer Index report issued in September 2009, the area where Ireland performed poorest in was e-health, such as electronic transfer of medical data between professionals, e-prescriptions and lab tests electronically communicated to patients (HISI 2009).

In Ireland, approximately 0.75% of the total HSE budget was spent on ICT as compared to 2.5% of their peer countries. As a consequence of this underinvestment Ireland has failed to achieve the potential of tried and trusted technologies to reduce costs, enhance operations, and improve clinical outcomes. For example Ireland had failed to implement systems such as Computerised Practitioner Order Entry (CPOE), also known as Order Communications, and a Unique Health Identifier, systems that had delivered well-documented results in other jurisdictions through eradicating human errors that can lead to dire clinical consequences (Healthcare Informatics Society of Ireland, 2009). The Health Stat reporting system was an important first step and demonstrates what can be achieved by better monitoring and reporting of output and outcomes. This system also illustrates how much more could be achieved at a local and national level if the IT systems better supported that work. The lack of standardised systems restricted the ability to deliver information where it's needed, and to collect information to support public health initiatives and facilitate research. Consultants and clinicians across the country were frustrated by this lack of technology and its impact on day to day operations. Leading clinicians had stated that from our current position, investment in Healthcare ICT is more important than additional clinical facilities. The HSE Transformation Programme 2007-2010 defined a vision for the Irish healthcare system in 2010: Everybody would have easy access to high quality care and services that they have confidence in and staffs were proud to provide a modern reformed healthcare system that should be able to meet and exceed these demands, delivering a better patient experience, fewer unplanned demands on clinical resources, and a more satisfying work environment for the staff. Such a system should fully exploit the benefits of information and communications technology (ICT for Health or 'eHealth') to help to deliver the safe, effective, efficient patient centred care (HISI 2009).

## **2.7 USE OF ICT IN OT**

Technology acceptance research in health is limited to nurses and physicians and is yet to be extended to allied health professional (Schaper and Pervan, 2007). There is a need to ensure that technology acceptance research is inclusive of all health professions across sectors and setting within health. Schaper and Pervan (2007) conducted a study to examine the acceptance and utilisation of information and communication technology by Australian occupational therapists. The research model was developed and tested to achieve the aims of the study. The research model was primarily based on the UTAUT model. Compatibility, attitude and self efficacy showed stronger influence on the intention behaviour compared to effort expectancy and social influence. Performance expectancy is a core construct of various technology acceptance models did not show any significance with user intention. The effect of moderating variables like age, job position, computer experience and computer skills on intention to use provides further evidence of the robustness of the model.

Unsworth and Townsend (1997) surveyed 250 occupational therapists examining the skills and attitudes regarding the use of computer. The result of the study revealed the majority of respondents received inadequate computer training at the undergraduate level which means they did not have much experience to use it. There was a significant difference between the frequency of computer use and experience with computers both at work and home. It was also found that respondents, who had more experienced in computer use, had more software expertise and had more positive attitude to use it.

OT seeker is an occupational therapy evidence base database was designed for use by occupational therapist to improve access to research about the effectiveness of occupational therapy interventions. The usefulness and functionality of the database were tested by online survey on the database website. Users of OTseeker report that the database is a valuable resource. It was also felt by the respondents that it improved their ability to locate research related to occupational therapy and that lead to contribute to change in practice (Bennett et al., 2007).

## **2.8 SUMMARY**

It can be concluded that there are various theories and models used in the technology acceptance research. The most commonly used model in technology acceptance was TAM. The model had been adapted and extended in many ways and had been cited more than 700 times. The UTAUT model integrated eight prominent competing IT acceptance and use models. The new model successfully incorporates all constructs of old models and explains 69 percent of variance in intention to use IT compared to 40 percent shown by the previous models. The acceptance of technology and use of IT in healthcare were related to the individual, technological and organisational factors.

A number of individual factors are related to technology acceptance and use. These factors include attitude towards IT, experience benefit of IT use, computer skills and knowledge, user age and gender. The IT application should be user friendly and of beneficial use to the user in their routine practice. The required training, infrastructure and teamwork and support play an important role in IT acceptance in different organisation.

## Chapter 3: Methodology

This chapter would explain, the methods used in conducting the research and justify the research design. This then would describe the research design used in this study as well as the sample and population, the data gathering instruments and the procedures used to collect the data.

### 3.1 RESEARCH DESIGN

According to Singh (Singh, 2006) research design is a mapping strategy which is based on sampling technique. It essentially includes objectives, sampling, research strategy, tools and techniques for collecting the evidences, analysing the data and reporting the findings.

Quantitative approach is used in this study because this quantitative research is appropriate for situations where there is pre-existing knowledge about the phenomenon of interest which permits the use of standardized methods of data collection, such as the survey found in literature review chapter (Bowling and Ebrahim, 2005). Most of the studies to identify the use of ICT in health profession employed the survey methodology (Bowling and Ebrahim, 2005). Hence the survey questionnaire is found appropriate for the current study.

Surveys aim to collect information as accurately and precisely as possible, and try to do this in such a way that if they were repeated at another time or in another area the results would be comparable (Bowling and Ebrahim, 2005). Hence the study employs the survey methodology and quantitative research design to achieve the aims and objective as described in previous chapter.

Survey method is more appropriate than interviews as it will cover broader occupational therapist population in Ireland. It can target a large sample for a relatively low cost and effort, it ensures that the same questions are asked of each respondent and it is easy for the participants to remain anonymous (McMillian and Schumacher, 2005). The other advantage of the survey is that it is carried out in natural settings. This allows statistical inferences to be made in relation to the broader population of interest and thus allows generalizations to be made. This increases the external validity of the study (Bowling and Ebrahim, 2005). Hence the survey questionnaire was found to be appropriate for the current study.

### **3.2 POPULATION AND SAMPLING**

The population for the current study consisted of all occupational therapists currently working in Ireland. To include total population in the current study is not possible due to limited time and money. So, sampling has been introduced with a view to make the research findings economical and accurate. Due to time constraints and wanting to ensure a good response rate, a convenience sampling method was used whereby the nearest and most convenient people were chosen to be respondents (Robson, 2002). The researcher approached to the research group of Association of Occupational Therapists of Ireland (AOTI), occupational therapy managers in the Health Service Executive (HSE) and heads of organisations funded by HSE to forward the research questionnaire to their occupational therapists. It was felt that by approaching to the AOTI, occupational therapy managers and heads of organisation the maximum number of participants working in variety of context and geographical location from all over Ireland were included in the study. The only inclusion criteria used for the sample for this part of the study was that the participants had to be qualified occupational therapists currently working in Ireland.

Although convenience sampling could reduce the ability of the research and reader to generalise the results and has the potential to introduce biases in terms of who gets chosen to participate in the study, it was felt that by approaching to the AOTI, occupational therapy managers in HSE and heads of organisations funded by HSE, one would increase the response rate and therefore have more data to work with (Robson 2002).

Out of 400 OTs who are registered with AOTI in 2010, 200 gave their consent or willing to participate in any research and survey, the other half of those who did not consent, were thought to approach personally through their managers. Hence approximately 350 OTs were invited to participate in the survey. All of these members were send invitation by email to participate in a web based survey using Survey Monkey tool. 179 surveys were returned showing a response rate of 51.14 %. A number of incomplete surveys were returned. The incomplete surveys were excluded from the study, leaving a final sample of 165 (47.14%). The majority of respondents were female occupational therapist. The respondents ranged in age between 20 (lowest) and over 60 years (highest), with most of them being between the ages of 30 and 39 (43.03%).

### 3.3 DATA COLLECTION INSTRUMENT

The research uses a web based questionnaire as research tool for data collection. The survey or questionnaire is one of the most widely used tools for data collection (McMillian and Schumacher, 2005). It was chosen because it allows wide coverage at a minimum expense of both money and effort. It affords wider geographical coverage, it makes for greater validity in the results through promoting the selection of a large and more representative sample (Singh, 2006). It also ensures that the same questions are asked of each respondent and it is easy for the participants to remain anonymous (McMillian and Schumacher, 2005). The web based questionnaire reduces the implementation time and it is cost effective (Dillman Don, 2000). The other advantage of web based survey is response available with the completion of survey and data can be easily imported to data analysis program (Dillman Don, 2000, Denscombe, 2007)

For the purpose of the questionnaire, client information system was defined as any computer application which is used to record and retrieve the previously recorded information for providing care to the client.

ICT was defined as a generalised term used to describe technologies that help to produce, store, communicate, and/or disseminate information. These technologies include, but are not limited to, a personal computer, various software programs, laptop computers, email and the internet.

The survey was developed and constructed to determine the use of ICT by Irish occupational therapists in their daily clinical or non-clinical areas of practice. It was designed to gather information about the factors affecting acceptance of ICT by Irish occupational therapist. The questions were largely closed ended using Likert scales. According to McMillan & Schumacher (2005) closed questions are beneficial where there are large numbers of participants as it makes analysis easier. Closed questions are also easier and quicker for the respondent to complete and this is likely to increase the response rate (McMillan & Schumacher 2005).

The survey was piloted on a sample of 6 occupational therapists using purposive sampling technique. Purposive sampling allows the researcher to focus on people that will be critical to research (Denscombe, 2007). Using this technique, all grade of occupational therapists from various work settings and geographical locations were included.

The pilot sample involved the following 6 occupational therapists:

- 4 senior occupational therapists ( 1 urban based in adult community service / 1 rural in primary care / 1 in specialised seating service / 1 rural based in early intervention community) 3 were working with HSE and one with HSE funded Organisation.
- 2 junior therapists (1 rural based in adult community service / 1 urban based in paediatrics centre based service).

This was done in order to obtain feedback as to whether the questions were clear and were eliciting the information required to answer the research question (McMillan & Schumacher, 2005). Verbal feedback was obtained from the pilot and the necessary adjustments were made to the survey.

The final survey consisted of three sections (see Appendix 3). The first part was used to get information about the use of ICT by Irish occupational therapists for providing care, administration and communication and which application is being used currently for the same. The information was obtained through the use of closed ended Likert scale questions. Types of questions asked were:

**Part 1 Please indicate the extent to which you use information technology for the following activities and where applicable indicate what applications you use.**

**Applications**, E.g. Ms word/ Excel,/MS PowerPoint/Internet explorer/ Fire fox/ Safari/ Heath Stat / Others.

1. I use information technology for recording client information

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

2. I use information technology for retrieving previously recorded individual information for providing care

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

5. I use information technology in writing official letters, reports, etc

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

8. I use information technology to search information for service development and planning, continuing professional development(CPD), etc

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

The second part was used to obtain the information about the acceptance factors of client information system for the occupational therapists based on Unified Theory of Acceptance and Use of Technology (UTAUT model). The information was obtained through the use of Likert scale questions. Likert scale was used to ascertain the extent to which respondents agree or disagree to accept the client information system in their practice. Types of question asked were:

**Part 2 This section measures acceptance of client information system for occupational therapists. For this section “Client Information System” refers to whatever computer system is used in your practice to record and retrieve the previously information about clients and their care.**

Please tick the appropriate box (✓)



**Effort expectancy:** The degree of ease associated with the use of the client information system

	Strongly Disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Not applicable
a) My interaction with the client information system is clear and understandable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) It would be easy for me to become skilful at using the client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I find the client information system easy to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Learning to operate the client information is easy for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Social influence:** The degree to which an individual perceives that important others believe he or she should use the client information system

	Strongly Disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Not applicable
a) People who influence my behaviour think that I should use the client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) People who are important to me think that I should use the client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) The senior management of this organisation has been helpful in the use of client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) In general, the organisation has supported the use of client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The third part was used to obtain background information regarding the participants age, gender, qualifications, level of clinical experience and practise area in which they work through the use of closed, multiple choice questions. The closed ended questions provided a uniformity of response and they were easily processed.

1. **Gender:** Please indicate your gender.

- Male
- Female

4. Please indicate the highest level qualification you currently hold in occupational Therapy

- Diploma/ Certificate in occupational therapy
- Bachelor's degree in occupational therapy
- Entry level masters degree in occupational therapy
- Taught masters or research masters
- Doctorate in occupational therapy
- PhD

### **3.4 PROCEDURE**

The survey had a covering letter inviting occupational therapists to take part in the study. It also introduced the researcher and clearly outlined the purpose of the survey. Participants were informed that their response will remain anonymous and that they can withdraw from the study at any point prior to submitting the survey if they so wished. Given the anonymous nature of the survey it was not possible to withdraw after this point.

The researcher e-mailed the survey questionnaire to:

1. The research group of AOTI (Association of Occupational Therapist of Ireland) who forwarded the request to approximately 200 registered members who were willing to participate in the study.
2. Occupational therapy managers in the Health Service Executive (HSE) who forwarded the request to their occupational therapists. The total number of participants is approximately 300. Out of these there was an overlap with the first group and this was around 150-170.

3. Heads of organisations funded by HSE which employ occupational therapists who e-mailed it to their occupational therapists. The number of participants in this group is approximately 30. Out of these there was an overlap with the first group and this was around 10.

A period of approximately 5 weeks was given to complete the survey questionnaire. A reminder e-mail was sent after three weeks of initial e-mail.

### **3.5 ETHICAL CONSIDERATIONS**

In this study ethical decisions followed general ethical guidelines and the legislation of research. The basic principles of the research ethics were followed at every stage of the study. Ethical approval for the study was obtained through the research ethics committee of the school of computer science and statistics, Trinity College Dublin.

Throughout the study, the researcher showed respect for the participants involved. Integrity and honesty was maintained throughout the research process and in the dissemination of the results. Voluntary informed consent was obtained and the researcher allowed the participants to withdraw from the study at any stage in the process. An information sheet was emailed to the participants outlining the purpose and the aims of the study as well as explaining that all information obtained would remain anonymous. The data was stored securely at the researcher house. On completion of the dissertation the researcher undertakes to destroy it.

### **3.6 SUMMARY**

Hence to summarise, a quantitative approach and a survey methodology was employed for the current study. The data about the usage and the factors influencing acceptance of ICT by Irish occupational therapists was collected through a web based questionnaire and distributed through e-mails. The convenient sampling method was used to get the maximum response. The next chapter would elaborate on how the data collected was analysed statistically to get results and discuss in the following chapter what these results would mean to the context of the study.

## Chapter 4: Data Analysis

The aim of this chapter is to analyse the outcome of the survey questionnaire, look at the response and analyse the findings and information gathered. This would lead to the analysis of the data in line with the objectives of the study to draw conclusions in the following chapter.

### 4.1 PROGRAMMES FOR MANIPULATING THE DATA

Out of approximately 350 occupational therapists who were invited for the survey, 179 surveys were returned. A computer based programme *Statistical Package for the Social Sciences* (SPSS) was used to analyse the data. SPSS is the most commonly used computer software for survey analysis which includes two main components (Fielding and Gilbert, 2006):

- a. Statistical routines, to do the numerical calculations and produce tabulations and summary measures of various kinds.
- b. Data management facilities.

The following statistical analysis of the data was performed using SPSS

1. Descriptive analysis of factors and variables: This calculated some simple descriptives like mean, median, range and standard deviation that enabled the researcher to make comparisons.
2. Correlation between different factors for technology acceptance based on UTAUT model (as described in Chapter 2) and its use in providing care and routine reporting (Care and report use / CRU) by Irish occupational therapists. Correlation is the degree of association between two variables and is important in attempting to describe how close the link between the two is (Hosker, 2002). The above data was manipulated statistically to find out any significant correlation between the technology acceptance factors and care and report use in Irish Occupational therapists.

Pearson's correlation is a standardized measure of the strength of relationship between two variables. It can take any value from -1, to +1. The Pearson correlation is +1 in the case of a perfect positive (increasing) linear relationship, -1 in the case of a perfect decreasing (negative) linear relationship and some value between -1 and 1 in all other cases, indicating the degree of linear dependence between the variables. As it approaches to zero there is less of a

relationship. The closer the coefficient is to either -1 or 1, the stronger the correlation between the variables.

As well as SPSS, Microsoft Excel was used for data manipulation and numerical calculations. This was then converted to Microsoft Word for reporting.

## 4.2 ANALYSIS OF RESULTS

The first stage in the analysis of the data set after completing the data entry stage is to generate a list of responses to each variable in the data base using 'marginal frequency distribution' (Fielding and Gilbert, 2006). Hence the each variable was looked individually using univariate analysis. This was useful

- To identify valid values (excluding missing values) and outliers (excluding dilemmas).
- To look at the general distribution of the data to assess its spread.
- To calculate simple statistical descriptive that enables to make some comparisons.

This was done while analysing each of the variable and is shown in all the tables including frequency distribution. Firstly the responses were looked at. The number of returned surveys when compared to the number of invitation sent, showed a response rate of 51.14 % (shown in Table 4.1). A number of incomplete surveys were returned which were excluded from the study. This left a final sample of 165 (47.14%). The demographic results indicated that 86.67% (n =143) of the respondents were female occupational therapists with 13.33% male (n=22). Full distribution is shown in Table 4.1.

Table 4.1: Respondent characteristics

	n	%
Total number invited	350	100%
Number of returned survey	179	51.14%
Incomplete returned survey	14	4%
Final Sample	165	47.14%
Male Respondent	22	13.33%
Female Respondent	143	86.67%

Frequency tables were also plotted for other variables like age and experience, where frequency showed the number of cases of a given category of response, percentage

was the frequency as compared to the total responses and cumulative percentage was the add up of valid percentage. Valid percentage as in table 4.3 represented the percentage of valid cases only, excluding the missing values.

Age was a continuous variable and there were no missing values. Hence the frequency and percentage shown in Table 4.2 represents only the valid ones. Table 4.2 shows all the respondents were ranged between age 20 (lowest) and 60 years with only one exception of over 60s. The majority of respondent were found to be in between the age bracket of 20-40 years, *n* being 124 and percentage being 75.2%.

TABLE 4.2 Frequency distribution of Age

Age	Frequency	Percentage	Cumulative Frequency	Cumulative percentage
Under 20 years	0	0.0%	0	0.0%
20-29 years	53	32.1%	53	32.1%
30-39 years	71	43.0%	124	75.1%
40-49 years	31	18.8%	155	93.9%
50-59 years	9	5.5%	164	99.4%
Over 60 years	1	0.6%	165	100.0%

Experience in the field of OT and the level of education in OT were ordinal scale variables. Table 4.3 shows the frequency distribution of the respondents experience in the field of OT.

Table 4.3: Frequency distribution for Experience

Experience in No. of years	Frequency	%	Valid Percentage	Cumulative Frequency	Cumulative %
Less than 5yrs	41	24.85%	25.62%	41	25.62%
Between 5-9 years	42	25.45%	26.25%	83	51.87%
10-14 years	32	19.39%	20.00%	115	71.87%
15-19 years	24	14.55%	15.00%	139	86.87%
20-24 Years	10	6.06%	6.25%	149	93.12%
More than 24 yrs	11	6.67%	6.88%	160	100.00%
Total	160	96.97%	100%		
Missing	5	3.03%			
Total	165	100.00%			

The mean clinical experience of respondents was 10.66 years, with a standard deviation of 7.68, which suggests a very broad range. The range of clinical experience lies between 0.5 year to 40 years.

Overall 69.1% (n = 114) of participants had a bachelor's degree in occupational therapy as their highest qualification in the field with a further 12.7% (n = 21) having a research master's degree. 17 participants had diploma in occupational therapy and 13 participants had entry level master degree which constitutes 10.3% and 7.9% respectively of the total participant population as shown in the figure 4.1.

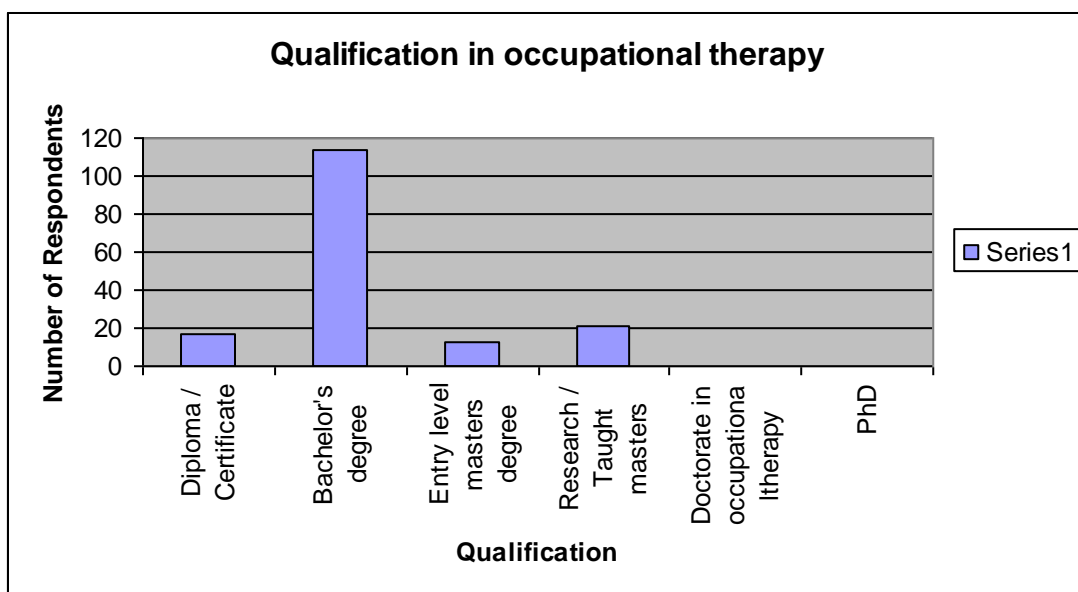


Figure 4.1 Respondents qualification

#### 4.3 RELIABILITY OF CONSTRUCTS

The reliability of construct measurement was already established as most of the questions included in the survey were adopted from previous studies on acceptance and application of the UTAUT model (Kijasanayotin et al., 2009). This was re-evaluated by examining the composite reliability and internal consistency reliability using Cronbach's alpha for constructs. (Appendix 6). Mean and standard deviation of each item in part I and part II of the questionnaire are shown in detail in Table 4.4. 4.5.1 and 4.5.2 respectively.

Table 4.4 Mean scores and Standard deviations (SD) of each item in part I of the questionnaire

\* Four point scale: 1= never use, 2=sometime use, 3=frequent use, 4= always use

<b>Variable</b>	<b>Mean</b>	<b>SD</b>	<b>Construct definition / Item in questionnaire</b>
Care and Report Use (CRU)* = Use for providing care and routine reporting			
CRU1	2.95	1.00	Recording clients information
CRU2	2.66	1.07	Retrieving previously recorded individual information
CRU3	3.10	1.02	Generating mandatory Reports
Administration Use (AU)* = Use for management and administration			
AU1	3.69	0.62	Writing (e.g. official letters, reports, etc)
AU2	3.02	0.96	Preparing presentation slides or overheads
Communication Use (CU)* = Use for information search and collaboration with colleagues			
CU1	3.07	0.72	Use for information search and collaboration with colleagues
CU2	3.10	0.70	Searching for information associating with office tasks (e.g. governmental documents, product prices, etc)
CU3	2.88	0.79	Searching for information personal interest such as knowledge associated with personal continuing education and general knowledge



Table 4.5.1 Mean scores and Standard deviations (SD) of performance expectancy effort expectancy and social influence construct in part II of the questionnaire

\*\* Six point scale; 1= strongly disagree, 2= disagree, 3= neither disagree nor agree, 4=agree, 5= strongly agree, 6=not applicable

<b>Variable</b>	<b>Mean</b>	<b>SD</b>	<b>Construct definition / Item in questionnaire</b>
Performance expectancy (PE) ** = The degree to which an individual believes that using the client information system will help him or her to attain gains in job performance			
PE1	4.49	0.97	I find the client information system useful in my job.
PE2	4.35	1.19	Using the client information system enables me to accomplish tasks more quickly.
PE3	4.29	1.15	Using the client information system increases my productivity.
Effort expectancy (EE) ** = The degree of ease associated with the use of the client information system			
EE1	4.26	1.06	My interaction with the client information system is clear and understandable.
EE2	4.29	1.01	It would be easy for me to become skillful at using the client information system.
EE3	4.21	1.13	I find the client information system easy to use.
EE4	4.28	1.09	Learning to operate the client information system is easy for me
Social influence (SI) ** = The degree to which an individual perceives that important others believe he or she should use the client information system			
SI1	4.17	1.19	People who influence my behaviour think that I should use the client information system.
SI2	4.15	1.20	People who are important to me think that I should use the client information system.
SI3	3.86	1.36	The senior management of this organisation has been helpful in the use of the client information system.
SI4	4.00	1.31	In general, the organization has supported the use of the client information system.

Table 4.5.2 Mean scores and Standard deviations (SD) of facilitating conditions and voluntariness construct in part II of the questionnaire

\*\* Six point scale; 1= strongly disagree, 2= disagree, 3= neither disagree nor agree, 4=agree, 5= strongly agree, 6=not applicable

<b>Variable</b>	<b>Mean</b>	<b>SD</b>	<b>Construct definition / Item in questionnaire</b>
Facilitating conditions (FC) ** = The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the client information system			
FC1	3.63	1.38	I have the resources necessary to use the client information system.
FC2	4.03	1.13	I have the knowledge necessary to use the client information system.
FC3	3.60	1.42	The system is not compatible with other client information systems I use.
FC4	3.78	1.38	A specific person (or group) is available for assistance with client information system difficulties
Voluntariness (V) ** = The degree to which use of it is perceived as voluntary or free will			
V1	4.19	1.12	My line manager does require me to use computer.
V2	3.86	1.27	Although it might be helpful, using a computer system is certainly not compulsory in my job

#### 4.4 COMPARISON OF ADOPTION SCORES FOR CARE AND REPORT USE

On analysing the use in recording client information in the part 1 of the survey questionnaire it was found that 10.9% has never used, 20% have used it sometimes, 32.7% have frequently used and 36.4% has always used ICT in their routine recording. Similarly it was found that 28.2% have always used ICT in retrieving previous client information and 47.5 % have used in Mandatory reports. Details of the adoption scores for care and report use are shown in figure 4.2

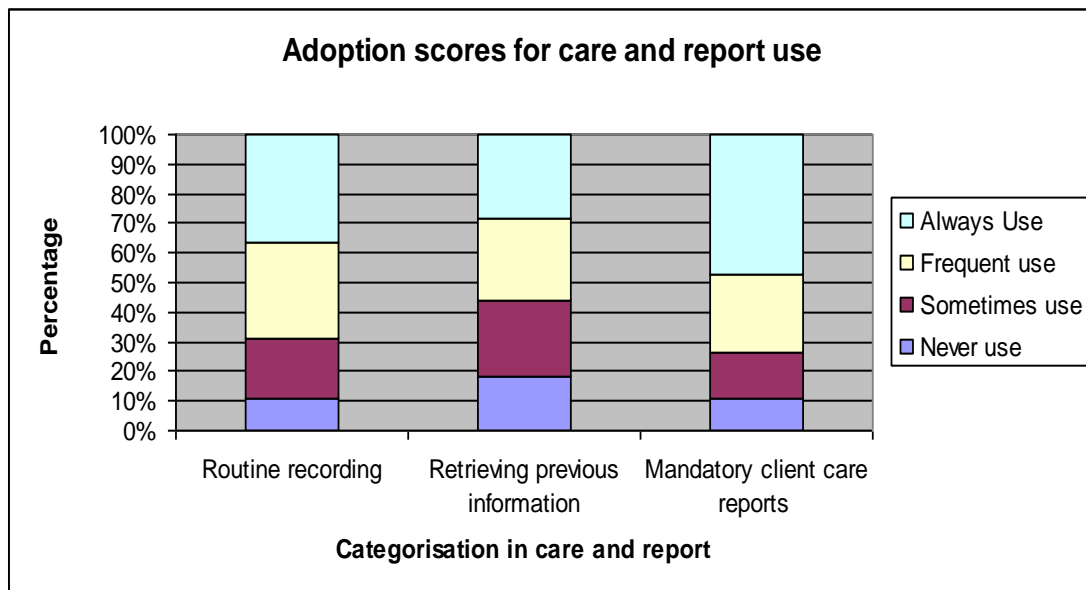


Figure 4.2 Adoption scores for care and report

#### 4.5 COMPARSION OF ICT ADOPTION FOR DIFFERENT ACTIVITIES

Details of the adoption of ICT in care and record use, administrative use and communication are shown in Table 4.6 and graph in figure 4.3.

Table 4.6 Details of the adoption of ICT use

	Never use	Sometimes use	Frequent use	Always use
Care and Report Use	6.06%	26.06%	38.18%	29.70%
Administration Use	1.82%	17.58%	39.39%	41.21%
Communication Use	0.00%	21.82%	55.76%	22.42%

ICT is being used routinely by Irish occupational therapist in their day to day clinical and non clinical practice. On analysing the use for different activities, it was found that it is more used for communication and administrative purpose as compared to care and report use. It was presumed that there is specific application or software required to record and retrieve client information. The data or information can be easily lost in case of system failure. Important information or client's confidentiality might get compromised in situation where occupational therapists share a computer. On the contrary, communicating with colleagues via e-mail appears to be a well utilised facility possibly because many people these days have personal as well as work e-mail addresses. The information related to CPD activities and government policies, etc can be easily searched by the use of internet.

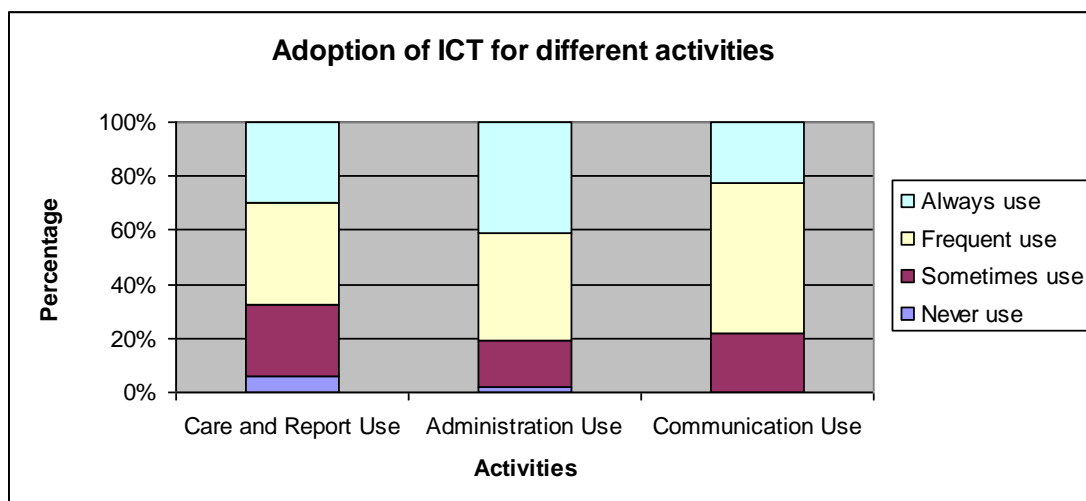


Figure 4.3 Adoption of ICT for different activities

## 4.6 ICT APPLICATIONS USED BY OCCUPATIONAL THERAPISTS IN IRELAND

### 4.6.1 ICT Applications used for care and record use

44.7% of the respondents used MS word, 41.0% Microsoft Excel, 7.5% OTIS (Occupational therapy information system) and 1.5% used eMOHO (is a software package that makes assessment administration, treatment planning, and documentation more efficient and more client centered. It helps to clarify the results of the assessment and presents them in a professional manner. Results can be easily interpreted so that the OT can move forward with a suitable plan of intervention. Finally, it provides an ease to understand evidence base to justify interventions.) for their clinical care records. Only 5.3% have showed the use of other applications for the above.

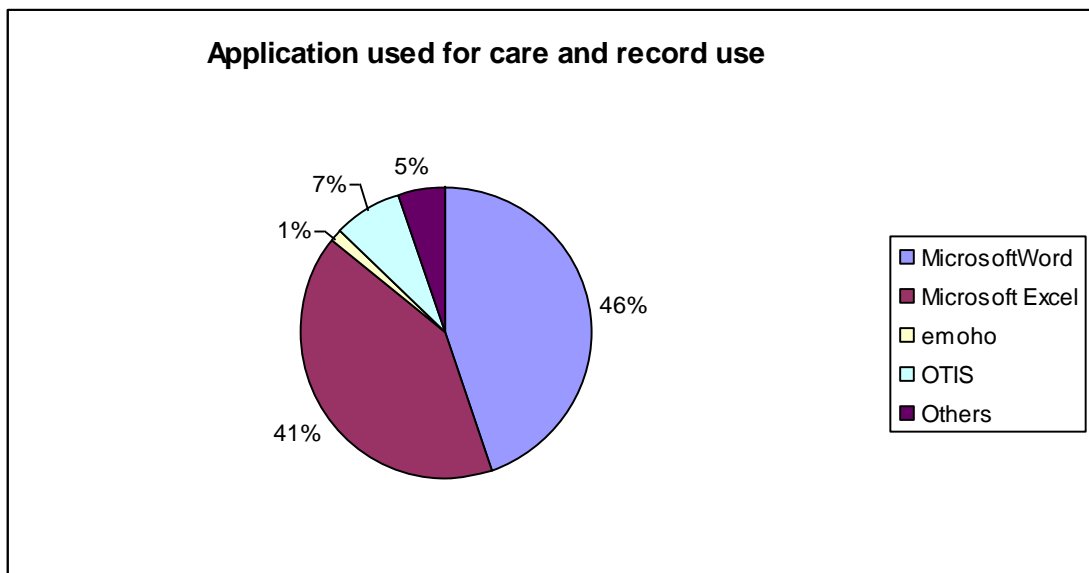


Figure 4.4 Application used for care and report use

#### 4.6.2 ICT Applications used for administrative use

There was a similar trend found in the administrative use, 90.1% of the respondents used Microsoft Word application for writing official letter or reports and 10% of Irish occupational therapists use other applications which include Microsoft Excel, Word, Outlook and OTIS, etc.

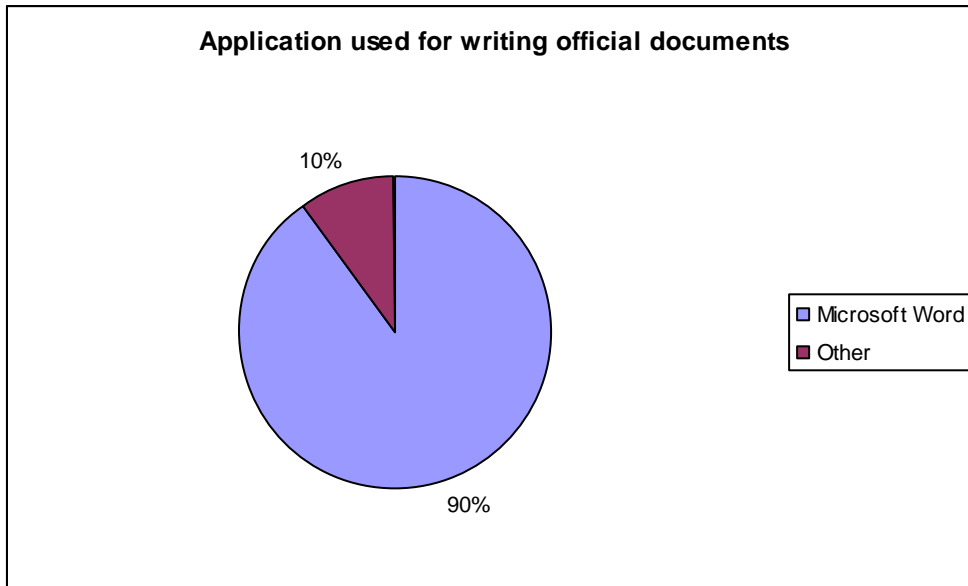


Figure 4.5 Application used for writing official documents

95.4 % of Irish occupational therapist used Microsoft Powerpoint to make presentation. Hence, it implies that Irish occupational therapists have some basic computer skills and they used different applications for different purpose.

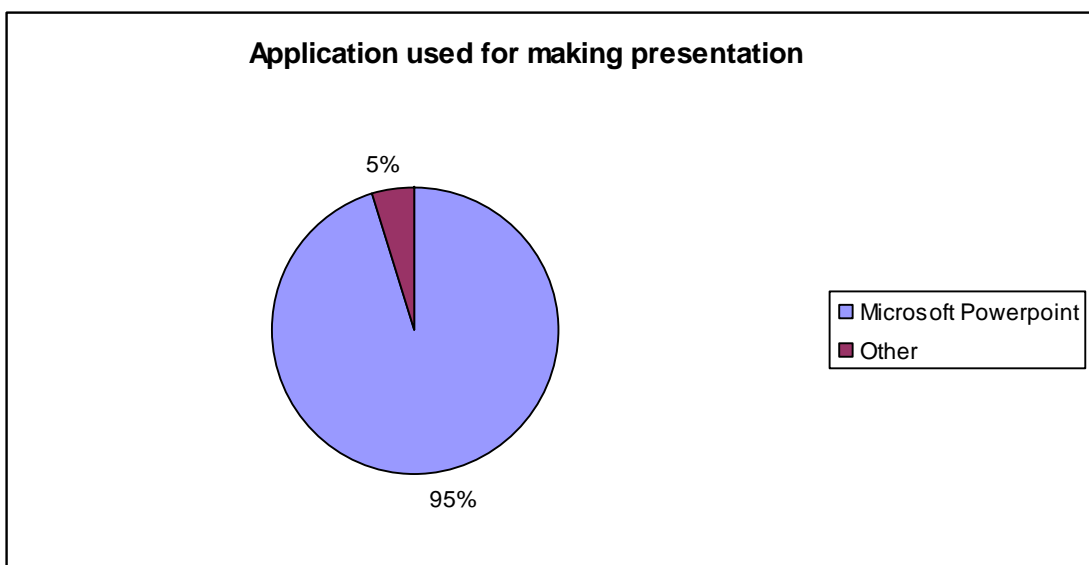


Figure 4.6 Application used for making presentation

#### 4.6.3 ICT Applications used for communication use

58.2% of respondents were using e-mail and 34.3% Microsoft outlook to communicate with colleagues. Very few, only 7 % of Irish occupational therapists were using different application like text message, telephone, Lotus notes (It is an application developed by IBM and they described the software as an "integrated desktop client option for accessing business e-mail, calendars and applications." It can be used for many collaborative applications, including e-mails, calendaring, Personal Information management (PIM), instant messaging, web browsing and a variety of feature-rich custom applications), etc.

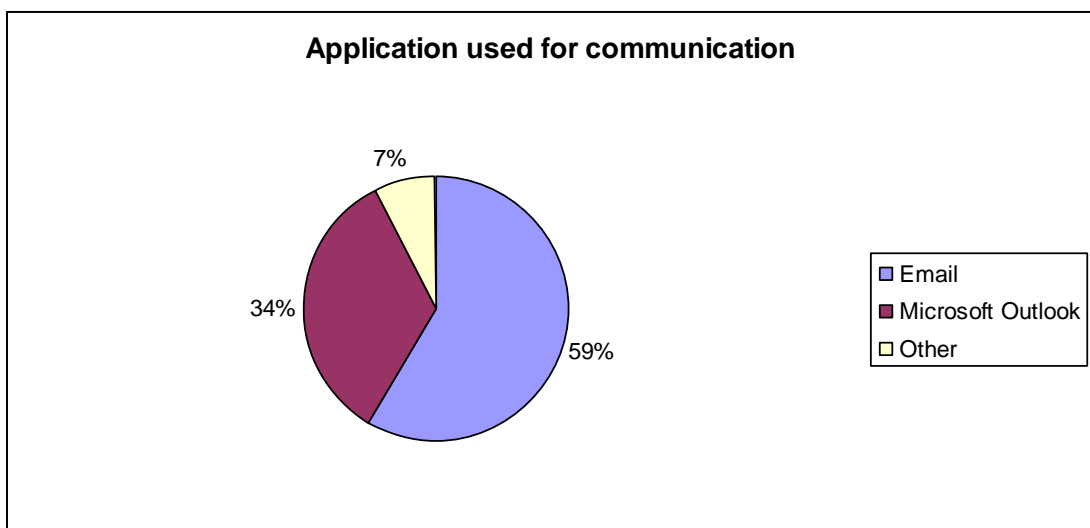


Figure 4.7 Application used for communication

#### 4.6.4 ICT Applications used for information search

70.8% of the respondents used internet to search any official documents. Internet is the most popular application among the Irish occupational therapist to search any information related with continuous professional development (CPD) and used by 67.7% of the respondents. The other applications used by respondents were intranet, AOTI, Athens, Google and other search engines.

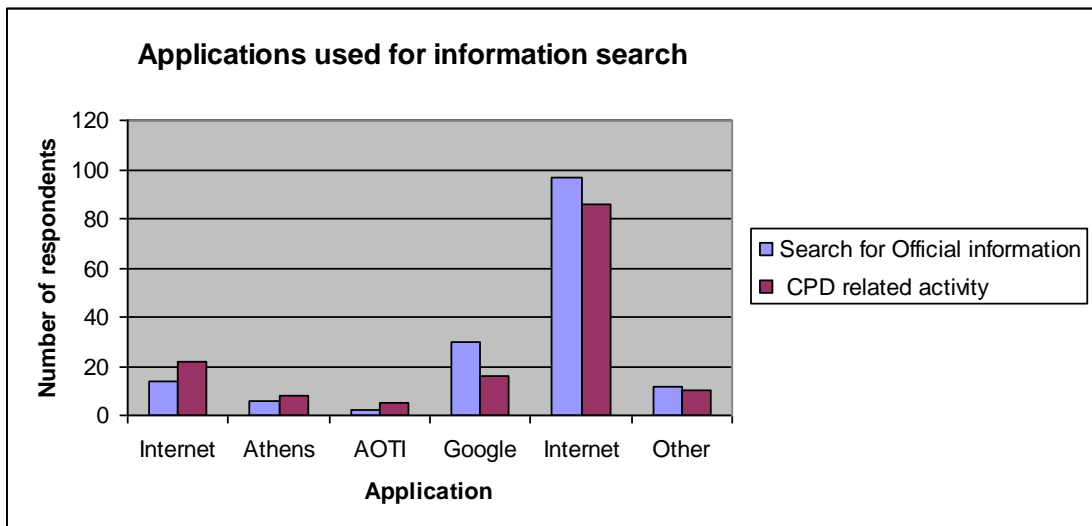


Figure 4.8 Application used for information search



#### 4.7 LEVEL OF ACCEPTANCE OF ICT

The acceptance of ICT was analysed using five different factors such as performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), and voluntariness (V) as described in chapter 2.

6% strongly disagree and 40% strongly believed that using the client information system will help them to attain gains in job performance. Similarly 3.6% did not agree while 34% strongly agree that it is easy to use client information system. 22.4% of the respondents agreed strongly that the important people in their social/professional sphere believed the importance of using the client information system whereas 4.8% did not agree with this. 39.4% of the respondents also believed that there is organizational and technical infrastructure in place to support the use of client information system where as 7.9% did not agree to this. Similarly 40.6% of the respondent agreed that he or she has choice to use information technology for their work, whereas 6.1% strongly disagree to this.

The different level of technology acceptance factors is shown in the figure 4.9

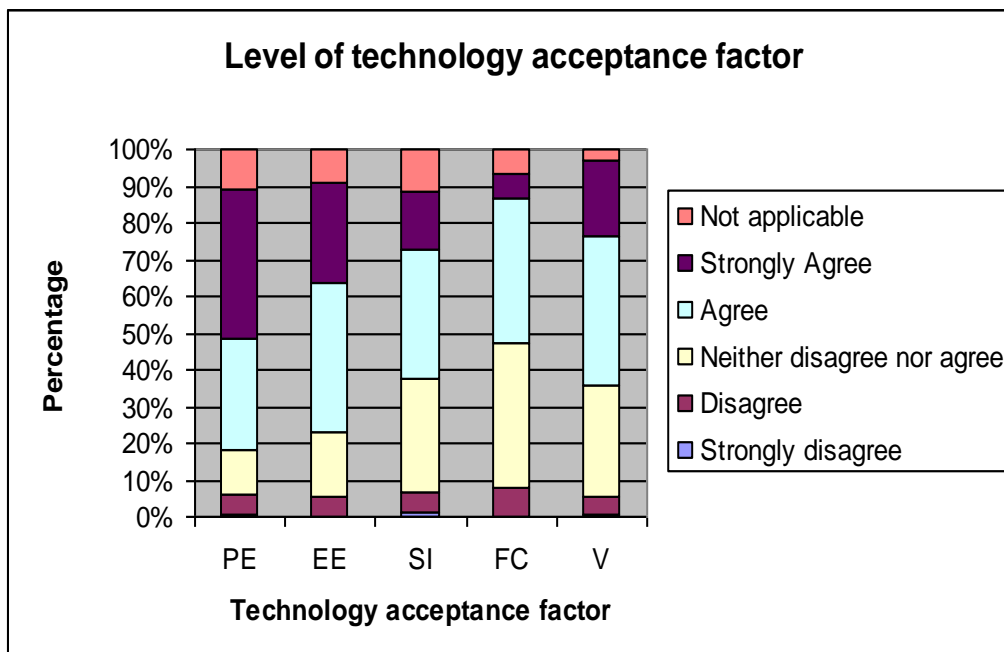


Figure 4.9 Level of technology acceptance factor

#### 4.8 ANALYSIS OF THE SIGNIFICANCE OF CORREALTION OF VARIABLES

Correlations between the variables were tested using Pearson's correlation and the two tailed significance were set at 0.01 and 0.05 level. Significance level is the level of probability at which the null hypothesis can be rejected with confidence, and the researcher hypothesis can be accepted with confidence (Levin and Fox, 2000). It is denoted by Greek letter  $\alpha$ . If  $\alpha = 0.05$  then results are only 5% likely or less, given that the null hypothesis is true. Whereas if  $\alpha = 0.01$  the null hypothesis is rejected if there is less than 1 chance out of 100 that the obtained sample difference could occur by sampling error (Levin and Fox, 2000). The lower the significance level, the more the data must diverge from the null hypothesis to be significant. Therefore, the 0.01 level is more conservative than the 0.05 level (Sherwan, 2009).

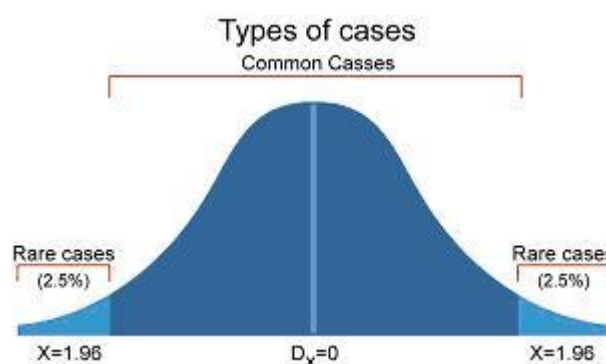


Figure 4.10 Two tailed significance at 0.05 level

#### 4.9 CORREALTION OF VARIABLES

Care and report use (CRU) when associated with the technology acceptance factors using bivariate correlations, did not show any significance at any level. Some of the technology acceptance factors were found to be correlated to each other. The performance expectancy (PE) was found to have significant correlation with effort expectancy (EE), social influence (SI) and facilitating conditions (FC) at  $p < 0.01$  level. Social influence (SI) was also found to have significant correlation at  $p < 0.01$  level with effort expectance (EE) and FC. Similarly there is a significant correlation between FC and EE at the same level. The details of what this significance means would be discussed in the following chapter

Table 4.7: Correlation matrix

		CRU	PE	EE	SI	FC	V	Gender	Age	Qualification	Experience
CRU	Pearson Correlation	1.000									
	Sig. (2-tailed)										
	N	166									
PE	Pearson Correlation	.089	1.000								
	Sig. (2-tailed)	.257									
	N	166	166								
EE	Pearson Correlation	.072	.677**	1.000							
	Sig. (2-tailed)	.356	.000								
	N	165	165	165.							
SI	Pearson Correlation	.068	.520**	.670**	1.000						
	Sig. (2-tailed)	.387	.000	.000							
	N	165	165	165	165						
FC	Pearson Correlation	.114	.507**	.625**	.621**	1.000					
	Sig. (2-tailed)	.146	.000	.000	.000						
	N	165	165	165	165	165					
V	Pearson Correlation	.014	.080	.088	.137	.079	1.000				
	Sig. (2-tailed)	.863	.305	.261	.080	.317					
	N	165	165	164	164	164	165.				
Gender	Pearson Correlation	-.095	-.036	.031	.027	-.007	.06	1.000			
	Sig. (2-tailed)	.227	.646	.693	.732	.928	.434				
	N	162	162	162	162	162	161	162			
Age	Pearson Correlation	-.022	.140	.102	-.021	-.056	-.083	-.032	1.000		
	Sig. (2-tailed)	.775	.072	.192	.791	.478	.288	.690			
	N	165	165	165	165	165	164	162	165		
Qualification	Pearson Correlation	.007	.190*	.106	.151	.144	.091	-.246**	-.238**	1.000	
	Sig. (2-tailed)	.927	.015	.176	.052	.065	.247	.002	.002		
	N	165	165	165	165	165	164	162	165	165	
Experience	Pearson Correlation	-.028	.065	.060	-.084	-.037	-.088	.057	.818**	-.234**	1.000
	Sig. (2-tailed)	.726	.414	.448	.291	.645	.272	.478	.000	.003	
	N	160	160	160	160	160	159	157	160	160	160

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

The only significant correlation at  $p < 0.05$  level, in the 2-tailed significance test was found to be between PE and the level of OT education in the respondents. It implied that the respondents with higher qualification like masters degree believed that using the client information system will enhance their performance. There was also a correlation between the gender and qualification, which reflects that males have higher level of qualification compared to females. A negative correlation at significant level ( $p < 0.01$ ) found between qualification and age and experience. Also experience has a significant correlation with age. This is shown in a correlation matrix in Table 4.7.

Although the acceptance factors relate to care and report use, a significant correlation was found between administrative use (AU) and communication use (CU) as shown in the table 4.8

Administrative use was found to be significant with EE, SI and FC at  $p < 0.05$  level. Similarly communication use also was found to have significant correlation with all the technology acceptance factors except voluntariness with which it did not show any significance. Where as PE, SI and FC were significant at  $p < 0.05$  level, EE was found to have significance at  $p < 0.01$  level.

Table 4.8 Correlations between the administrative and communication use with technology acceptance factors

		PE	EE	SI	FC	V
AU	Pearson Correlation	.098	.187*	.160*	.191*	.032
	Sig. (2-tailed)	.208	.016	.041	.014	.680
	N	166	165	165	165	165
CU	Pearson Correlation	.192*	.251**	.199*	.195*	.120
	Sig. (2-tailed)	.014	.001	.011	.012	.127
	N	165	164	164	164	164

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

#### **4.10 SUMMARY**

Hence to summarise, the result analysis showed that the technology acceptance factors did not have any significant correlations with care record use, where as there were significant association found between administrative and communication use amongst the 165 respondents that participated in the survey. It was also found that occupational therapists in Ireland use ICT more for administrative use compared to specific client related use. This would be discussed in details in the following chapter with appropriate link to the existing literature.

## **Chapter 5: Discussion**

The objective of this chapter is to discuss the findings from the result analysis in the previous chapter and how it is linked to the present context of the occupational therapy trend in Ireland. It also discussed the themes developed from the analysis and links it to the literature reviewed, objectives and methodology of the study. This will then lead to a brief discussion of the limitations of the study and recommendations for future studies and research.

UTAUT model was used for the current study as this has shown 69% of intention to use information and communication technology, while other previous models explained only 40% acceptance of technology acceptance. The basic UTAUT model consists of several component or constructs that are hypothesised to relate to the intention to use IT (Kijasanayotin et al., 2009). This led to identification of five major factors that could influence the use of ICT in health care, such as performance expectancy, effort expectancy, social influence, facilitating conditions and voluntariness. These were all adopted from the UTAUT model and used in the current survey to check the willingness, intentions and acceptance level in Irish occupational therapists, working both in the Health Service Executives organisations and others that are funded by them.

### **5.1 GENERAL ANALYSIS OF THE STUDY**

This study sought to identify the level of adoption of the care and record use, factors that predict their intention to use and their actual use of various IT applications by the occupational therapists in the acute and community health centres across Ireland. A survey method was found appropriate for the study as this covered a large number of OTs working in Ireland in various health sectors. However it was difficult to approach and include every occupational therapist in the study due to a lack of an appropriate data base or register nationally for all OTs in the country. This was also difficult due to that almost half of the registered occupational therapists who were unwilling to participate in such research studies.

Convenience sampling was found appropriate for the current study due to time constraints and to get maximum responses. This method was used whereby the nearest and most convenient people were chosen to be respondents (Robson, 2002). This helped the researcher to get an increased number of response rate by contacting the occupational therapist through managers and through AOTI registered members.

The response rate was further increased by contacting the HSE funded organisations. The convenient sampling was thus helpful to gather the maximum data for analysis. A web-based questionnaire was chosen for the study as it would allow wide coverage for the responses at a minimum expense of money, time and effort. Although this was limited by the assumption that all the OTs would have access to e mails and some form of computer access. It allowed coverage for a wider geographical in the country making the results more valid by promoting the selection of a large variety and more representative sample (Singh, 2006). This allowed that same question were asked to each respondents and maintained the anonymity of the participants.(McMillian and Schumacher, 2005). Another advantage of web based questionnaire was that the response was available as soon as it was completed by the respondent and the data could be easily imported to the data analysis program (Dillman Don, 2000, Denscombe, 2007). This saved a lot of time and effort by minimising chasing up for the Survey and also was a paperless, cost effective way to cover a larger area of practice. The major disadvantages of the questionnaire were the possibility of misinterpretation of the questions. The misinterpretations could be due to the respondent's willingness or impersonality. Mailed questionnaire are usually impersonal. The reliability of the questionnaire is often ignored. (Singh 2006)

To approach every therapist is a tedious task and it is difficult without a national register. If questionnaire was mailed to every therapist then it is difficult to get the addresses and the anonymity of the survey can not be maintained.

## **5.2 USE OF ICT WITHIN OT PROFESSIONALS**

As the focus of the study was to identify the current use of health IT within OTs, the study identified 69.1 % of Irish OT to be already using various applications of IT frequently, the most application being used were MS Word (44.7%) an MS Excel (41.0%). It was interesting to find out the use of some OT specific database like e MOHO, OTIS etc. although the percentage use was very low. This shows a poor availability of OT specific database among Irish OTs in care record use. Although there were some mention of use of systems like PAS and Goldmine software, MHIS etc, the details, usefulness and specific use in client care/record is not clear.

For the administrative use the OTs were mostly using MS Word (90%) for reporting and MS Powerpoint (95%) for presentations. Communication with colleagues were mostly done by using MS Outlook (34.3%) and e-mails(58.2%), where as government policies were mostly searched using internet(70.8%). Only 10.2% were found to use the HSE

website for this. However Athens was only used by 4.3% for searching government policies and 6.3% for continuous professional development. The respondents used the AOTI website only by 3.9%, HSE website for 17.3% for CPD whereas 67.7% used general internet. This trend shows again a lower level of acceptance of profession specific or health care specific database like HSE, AOTI or Athens sites for their professional development whereas there was a bigger trend towards use of internet. This is positive in the sense that the Irish OTS had a good level of use of ICT in various ways. This trend could be due to lack of awareness of health related search engines like Athens. The lower number of use of AOTI website due to inadequate information related to CPD.

Literature shows that there is a place for discipline-specific bibliographic databases such as OTseeker, particularly those designed to make it easier to locate and appraise research evidence. There is some indication that discipline-specific databases complement the more comprehensive databases such as MEDLINE, CINAHL and The Cochrane Library accessed via Athens (Bennetta et al., 2007). Studies from other professions have also shown that use of online evidence systems and databases have enabled confirmation of clinical decisions or changes in practice. Research showed that access to information on OTseeker contributed to a change in practice in OTs (Bennetta et al., 2007). Hence raising awareness of such database could be the next step action for the development of OTs in Ireland.

### **5.3 ACCEPTANCE OF ICT BY OCCUPATIONAL THERAPISTS**

There was a huge positive response towards the acceptance of use of health IT throughout the OTs in Ireland. This shows that they are willing to use information technology at work in all areas of health recording and communication. The small number who disagrees to this could be due to the convenience in using conventional paper writing system and IT literacy level. This could also be due to the lack of understanding of the usefulness and application of IT system and the support available at the organization level.

### **5.4 FACTORS INFLUENCING ACCEPTANCE LEVEL**

Performance expectancy construct is consistently a strong predictor of intension (Venkatesh et al., 2003, Venkatesh and Davis, 2000, Taylor and Todd, 1995). According to Schaper & Pervan (2007), in a health care context performance expectancy is



important to technology acceptance decision making and may influence behavioural intention both directly and indirectly through the determinant of attitude (Chau and Hu, 2002a). The significance of performance expectancy to the health profession has been consistently shown in those studies that have examined technology acceptance in health. However in the current study performance expectancy was not found to be significantly correlated with care record use. The similar trend was found with effort expectancy, social influence, facilitating conditions and voluntariness. This leads to the somewhat surprising conclusion that none of the factors identified in the UTAUT model were found to influence the acceptance of ICT for CRU in Irish OTs included in the survey.

However the educational qualification of the Irish occupational therapists were found to be significantly correlated to the performance expectancy showing that the respondents with higher level of education believed that using the client information system will improve their performance. The performance expectancy (PE) was also found to have significant correlation with effort expectancy (EE), social influence (SI) and facilitating conditions (FC) at  $p < 0.01$  level indicating that the factors are not independent.

This implies that the ease of using the system influenced significantly the belief of OTs that the system will result in gains in job performance. Similarly the social influence of important others towards the use of ICT also stimulated significantly the belief of gain in performance.

Literature has shown the direct effect of social influence on behavioural intention in technology acceptance studies (Venkatesh and Davis, 2000, Karahanna et al., 1999). However these conflict with studies that have occurred in the health sector. Also according to Schaper and Pervan (2007) occupational therapist are small communities of allied health care professionals within the health sector and do not generally act as autonomously as physician. So it is plausible that social norms and pressure may be significant in determining their technology acceptance decisions. This could lead to the inference that the general norms in the healthcare towards technology acceptance could have significantly influenced the respondents' performance expectancy level.

Social influence (SI) was also found to have significant correlation at  $p < 0.01$  level with the facilitating conditions including the organisational and technical infra structure available to support the required information technology system. Again this is in line with the general acceptance level and norms towards use of ICT in specific health care organisations and health care professionals. This also corresponds to the findings in the UTAUT model that shows the influence of organisational facilitating conditions on actual use.

Effort expectancy was found to have significant correlation at  $p < 0.01$  level with social influence and facilitating conditions. This shows that the degree of ease of use of the ICT in OTs was significantly influenced by the social influence or trends for use of IT. This is also influenced by the support available at the organisational level to facilitate and encourage use of various systems. This could imply that the growth of use of ICT in the other health care sectors including allied health care could have a positive influence on the growth and development of ICT system as well as use of the technology within OT.

This could have also set a positive support system to encourage and adopt more IT based system in routine care recording and communication system.

Literature shows that technology acceptance studies in the health sector, in stark contrast to those in the other environments suggest that the effort expectancy is not applicable in the health care context. In some studies this was found to have no significant influence on intention behaviour (Jayasuriya, 1998, Chau and Hu, 2002b, Sheng et al., 1999). The current study is in line with the above fact as the EE did not show any significant relationship with the care record use within occupational therapists currently working in Ireland.

However the care record use was not found to be significantly correlated to the technology acceptance factors, the correlations of use in administration and communication areas showed significant values showing increased acceptance.

The administrative use showed significant correlation with effort expectancy, social influence and facilitating conditions at  $p < 0.05$  level which implies that the social norms in healthcare organisation supporting electronic record system has influenced the ease and use of technology in day to day administrative use amongst the OTs. This also shows that the infrastructure is well suitable towards this in contrast to the application and infrastructure used and available for care record use which did not show any significant correlation.

Use for communication purposes including use for professional development was also found to be significantly correlated to all the technology acceptance factors except voluntariness. This indicated that the respondent occupational therapists in Ireland accepted technology to a greater extent while communicating with colleagues, for searching official documents and for other searches and work towards their professional development.

This also indicates that a significant number of respondents believed that accepting and using various ICT applications for the above purpose increases their performance, a significant number found it to be easy enough to apply and showed a

greater willingness to use variety of system available within their organisational and technological infrastructure.

## **5.5 SIGNIFICANCE OF THE CURRENT STUDY**

The study gathered preliminary information about the use of information technology in occupational therapy service in Ireland and this was one of the first attempts in the area and topic of its own kind. Hence this would provide basic information about the ICT use amongst the OTs in Ireland.

Knowledge acquired from this study could potentially benefit future researcher on the basic information and level of understanding of the following:

- Awareness of various system/ database/ software being used currently by Irish OTs in the areas of care records, administrative purpose and communication that included searching for government policies and procedures, guidelines related to practice of OT with in HSE and for evidence based practice and professional development.
- Understanding of the level of IT use with in OT community. The result of current study showed that most of the occupational therapists in Ireland have basic knowledge and skills to operate computer applications and are willing to accept new technology in their work both for clinical and non clinical purposes.
- Evidence and awareness of benefits and use of various data base, software and applications being used in the occupational therapy profession across the various countries as obtained from the literature review. This broaden the horizon for a better future of OT documentation and clinical practice in Ireland, should we adopt more to the developing tools and technology.
- The study might add to another dimension to the information database available at the AOTI level about the Irish OTs and their usage and acceptance of ICT in various Occupational therapy practice areas. This might lead to development of a nationalised data base of OT applications in future.
- The study might provide useful information to HSE about the most used applications among the occupational therapists in Ireland and would help to choose the most suitable one for future. The high level of IT literacy and willingness to accept them in their daily clinical practice for recording client information, communication and administration would be helpful while deciding to implement new technology applications in health sectors.

The data of this study will provide important information for further studies in comparison of use of ICT and its acceptance in Ireland to other country.

## **5.6 LIMITATIONS OF THE STUDY**

The study was the first attempt to identify the level of use of ICT within occupational therapists in Ireland. However the study has the following limitations

- As the researcher conducted a web based survey and the occupational therapists were invited to the study by e-mails only, this excluded the therapists who did not have access to IT system at their organisational level. Hence could not capture their ideas, intention and willingness to accept the new technology in care use.
- The study was limited by the unavailability of a complete national database at the AOTI level. This was not helpful as the researcher could not have an idea of the number of OT to approach for the survey. This also did not allow him to approach all the area of Occupational therapist.
- The study used a convenience sample to include the OTs the researcher could approach. This again excluded the areas of OT unexplored/ unknown by the researcher
- The number of respondent were limited again as some of the members of AOTI were not working in the country, hence was difficult to get an exact number of AOTI registered OT working in Ireland to get an exact picture of the ICT acceptance in the country.
- Also not all the respondents were approached directly leaving an exclusion of a therapist not approachable by direct contact by the researcher. Some of those who were contacted by the managers, it was completely at the discretion of the manager to forward the request to participate
- The current study is a small study having only 179 respondents compared to other technology acceptance studies.
- As this was small pilot study aimed at the first attempt to get a basic idea of technology use amongst the OTs, the behaviour intention construct was not tested in the current survey and no technology acceptance model was tested.

## **5.7 DELIMITATIONS**

Although the intention-behaviour relationship was found to be strong and was well documented in many technology acceptance literature (Venkatesh and Davis, 2000,

Taylor and Todd, 1995, Sheppard et al., 1988, Ajzen, 1991) including the UTAUT model (Venkatesh et al., 2003), this was not included in the current survey. As the questionnaire already was asking about the willingness to use, the amount and variety of use of technology applications, it was assumed by the researcher that the Irish Occupational therapists have already got some acceptance of information technology in some or other form in their day to day practice.

## **5.8 SUMMARY**

Hence to summarise, the current chapter identified that the occupational therapist in Ireland were using information technology for their practice in some or other form, the most acceptance being in the non clinical field as compared to the clinical record use. This could be due to the poor availability of more OT specific database or system for clinical use. The study was helpful in the fact that it established some awareness of the various application/software in health IT, amongst the occupational therapists. It was also promising to establish that some occupational therapist used OT related application like e-MOHO, PAS, etc. Although no further details were available at this stage, this indicated that there could be a potential voluntariness towards learning and acceptance of these and more systems in future practice.

There is no specific, unanimous / centralised system in use across OTs in Ireland or any OT specific client information system. Further research and study should be carried out to find the most appropriate and most accepted one to get into the country's national health system and facilitating training and use in future.

## Chapter 6: Conclusions

Information and communication technology, such as client information system, telemedicine, electronic health record, etc are increasingly used in health care globally (Luo et al., 2009). These technologies have enhanced the communication between the service user and health professional. These technologies will help to deliver safe, effective and efficient service to clients which will improve the quality and efficiency of health services (HISI 2009). One of the most important factors for the successful implementation of information technology is users' acceptance and use of that technology.

The current study was conducted to understand the factors that influence ICT acceptance and use by occupational therapist working in Ireland.

The study used a quantitative methodology. The convenient sampling method was used to get the maximum response. A web based questionnaire was designed to collect the data. The questionnaire consisted of set of questions related to use of ICT and factors influencing its adoption by Irish OTs. A pilot study was conducted on 6 occupational therapists to improve the reliability and clarity of the questionnaire. The survey was then emailed to 350 occupational therapists working in different clinical areas in Ireland. The response rate was 165 or 47.14% excluding the 14 incomplete surveys.

SPSS and Microsoft Excel applications were used to analyse the data. The data showed that the occupational therapists working in Ireland exhibited a high degree of ICT acceptance and use. The result indicated that the Irish occupational therapists used information and communication technology more for administrative and communication purpose compared to specific client related use.

The occupational therapist in Ireland were using information technology for their practice in some or other form, the most acceptance being in the non clinical field as compared to the clinical record use.

Several studies on the intention to use health IT has showed that it is a function of various concepts including the perception that health IT is useful, it is not too difficult to use, important persons and others believed that they should use health IT and the perception of free will to use IT. Among these factors performance expectancy exerted the strongest effect (Kijasanayotin et al., 2009). However in the current study the researcher did not find any influence of this on the care record use. This could be due to the poor availability of more OT specific database or system for clinical use

The fact that there is no specific, unanimous / centralised system in use across OTs in Ireland nor any OT specific client information system suggests that further research and study is needed to find the most appropriate and most accepted one to get into the country's national health system and facilitating training and use in future

## **6.1 FURTHER RECOMMENDATION**

This leads to further recommendation that more research would be needed to find out the awareness and willingness of the OTs to accept the other OT specific application or software available in other countries across the world in their day to day clinical practice.

Further studies would also be helpful to identify more research into the area of clinical practice in OT to gain more understanding of the intention of OTs to use further clinical database, worldwide in addition to other use. Studies to find out the most suitable applications for occupational therapists might need attention to as a follow up.

Coming back to the Irish context, at present there is no system for communicating patient related information between community and acute sector or across the health sector. The current study also added to this as there was no application reported by the OTs which supports this. Hence further studies on designing and implementing a centralised clinical database would be beneficial in future health development.

As this was a first attempt of its kind to report the popularity and use of health informatics amongst Irish OTs, further studies are strongly recommended in this field keeping it pace with the growing use and application of ICT amongst the health sector world wide.

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## APPENDICES

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## **Appendix 1— Cover letter**

Dear Colleague,

I am a senior occupational therapist working with Mid- Leinster Health Services Executives (HSE). I am currently in second year of M.Sc Health Informatics in Trinity College Dublin. This year is focused on completing a thesis in the area of occupational therapy and information technology.

The title of thesis is:

**“Exploring the acceptance and barriers to usage of information and communication technology (ICT) by Irish occupational therapists”.**

For this thesis to complete, I need you to take time to share your experiences and opinions by completing this questionnaire which will take at most 10 minutes to complete. The survey will ask you about your use of information and communication technology in your occupational therapy practice. The survey questionnaire consists of three parts: Part 1 deals with usage of information technology for providing care, administration and communication and which application is being used currently for the same. Part 2 deals with acceptance of client information system for occupational therapist and Part3 consist of demographic and background questions.

The results should help to plan for improvements in ICT support for occupational therapists. Your responses are invaluable, anonymous and confidential.

This research has been approved by the research ethics committee of the School of Computer Science and Statistics, Trinity College Dublin.

Many thanks for your support and co-operation.

Anil Gupta

Senior Occupational Therapist

Email: [anil.gupta@hse.ie](mailto:anil.gupta@hse.ie)

Tel: 086-3803454

## **Appendix 2— Instructions for Survey Questionnaire**



## **General Instruction for completing the questionnaire**

- Do not complete this questionnaire twice.
- The survey will take 10 minutes to complete.
- Please work through each part of the questionnaire by reading each statement and ticking the appropriate response or completing the text box.
- All questionnaires are to be submitted no later than 20<sup>th</sup> May 2010

**Appendix 3—Survey Questionnaire (Word document copy)**

## **“Exploring the acceptance and Barriers to usage of ICT by Occupational Therapists working in Ireland”**

### **Survey Cover Sheet**

By completing and returning this survey you are agreeing to the following:

- I am 18 years or older and am competent to provide consent.
- I am working as an Occupational Therapist in Ireland.
- I understand that I have been invited to participate in a web based survey.
- 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.
- I understand that my participation is fully anonymous and that no personal details about me will be recorded.
- *<If the research involves viewing materials via a computer monitor>* I understand that if I or anyone in my family has a history of epilepsy then I am proceeding at my own risk.
- In the extremely unlikely event that illicit activity is reported to me I will be obliged to report it to appropriate authorities.

- Please do not name third parties in any open text field of the questionnaire. Any such replies will be anonymised.
- 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 have received a copy of this agreement.
- **Please do not put your name on this survey.**
- If you have any other query please contact me at [anil.gupta@hse.ie](mailto:anil.gupta@hse.ie)

## Questionnaire on the use of ICT by Occupational therapists working in Ireland

Part 1 Please indicate the extent to which you use information technology for the following activities and where applicable indicate what applications you use.

Applications, E.g. Ms word/ Excel,/MS PowerPoint/Internet explorer/ Fire fox/ Safari/ Heath Stat / Others.

Q1. I use information technology for recording client information

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

Q2. I use information technology for retrieving previously recorded individual information for providing care

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

Q3. I use information technology to generate mandatory reports regarding client care

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

Q4. I use information technology in writing official letters, reports, etc

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

Q5. I use information technology to prepare presentation slides or overheads

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

Q6. I use information technology to collaborate with colleagues

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

Q7. I use information technology to search information to guide client care  
(e.g. governmental policies, product prices, etc)

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

Q8. I use information technology to search information for service development and planning, continuing professional development(CPD), etc

- Never use
- Sometimes use
- Frequent use
- Always use

The Application I mostly use is .....

Part 2 This section measures acceptance of client information system for occupational therapists. For this section “Client Information System” refers to whatever computer system is used in your practice to record and retrieve the previously information about clients and their care.

Please tick the appropriate box (✓)

**Performance expectancy:** The degree to which an individual believes that using the client information system will help him or her to attain gains in job performance.

	Strongly Disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Not applicable
a) I find the client information system useful in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Using the client information system enables me to accomplish tasks more quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Using the client information system increases my productivity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Effort expectancy:** The degree of ease associated with the use of the client information system

	Strongly Disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Not applicable
a) My interaction with the client information system is clear and understandable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) It would be easy for me to become skilful at using the client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I find the client information system easy to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Learning to operate the client information is easy for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Social influence:** The degree to which an individual perceives that important others believe he or she should use the client information system

	Strongly Disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Not applicable
a) People who influence my behaviour think that I should use the client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) People who are important to me think that I should use the client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) The senior management of this organisation has been helpful in the use of client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) In general, the organisation has supported the use of client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Facilitating conditions:** The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the client information system

	Strongly Disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Not applicable
a) I have the resources necessary to use the client information system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I have the knowledge necessary to use the client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) The system is not compatible with other client information system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) A specific person or group is available for assistance with client information system difficulties.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Voluntariness:** The degree to which use of it is perceived as voluntary or free will.

	Strongly Disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Not applicable
a) My line manger does require me to use computer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Although it might be helpful,using a computer system is certainly not compulsory in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 3 Demographics and background

Q1. Please indicate your gender.

- Male
- Female

Q2. Please indicate your age

- under 20 years
- 20-29 years
- 30-39 years
- 40-49 years
- 50-59 years
- 60 plus

Q3. Which county are you currently practicing in?

.....

Q4. Please indicate the highest level qualification you currently hold in Occupational therapy

- Diploma/ Certificate in occupational therapy
- Bachelor's degree in occupational therapy
- Entry level masters degree in occupational therapy
- Taught masters or research masters
- Doctorate in occupational therapy
- PhD

Q5. Please indicate the number of years experience you have working as an occupational therapist.

.....

Q6. Please indicate the clinical area(s) you are currently working in? Please tick as many as options as appropriate:

- General Community elderly (over 65 years)
- General Community disabilities (18-65 years)
- General Community mental health
- General Community paediatrics (0-18 years)
- Cardiac rehabilitation
- Episodic care (Acute hospital setting)
- Hospice unit / Nursing home
- Primary care
- Rehabilitation hospital / unit
- Residential / respite unit (18-65 years )
- Other (Please specify).....

Q7. Please indicate, have you use computer before the introduction of computer system in your service.

- Yes
- No

Thank you for taking the time to complete this survey!

## **Appendix 4— Letter to Occupational Therapy managers**

Dear Manager,

I am a senior occupational therapist working with Mid- Leinster Health Services Executives (HSE). I am currently in second year of M.Sc Health Informatics in Trinity College Dublin. This year is focused on completing a thesis in the area of occupational therapy and information technology.

The title of thesis is:

**“Exploring the acceptance and barriers to usage of information and communication technology (ICT) by Irish occupational therapists”.**

As a part of my thesis I intend to conduct a nationwide web based survey on all currently working occupational therapists in Ireland. It will take at most 10 minutes to complete the questionnaire. The survey will ask about use of information and communication technology in occupational therapy practice in your area of service. The survey questionnaire consists of three parts: Part 1 deals with usage of information technology for providing care, administration and communication and which application is being used currently for the same. Part 2 deals with acceptance of client information system for occupational therapist and Part3 consist of demographic and background questions.

The results should help to plan for improvements in ICT support for occupational therapists. The survey is anonymous and confidential.

In order to make contact with the population of occupational therapists I am requesting your help as manager. Could you please invite employees to volunteer to participate in this survey.

This research has been approved by the research ethics committee of the School of Computer Science and Statistics, Trinity College Dublin.

Your support and co-operation is much appreciated.

Anil Gupta

Senior Occupational Therapist

Email: [anil.gupta@hse.ie](mailto:anil.gupta@hse.ie)

Tel:

086-3803454

## **Appendix 5— Letter to AOTI Research sub group**

Ms. Alison Warren,  
Chair of Research Sub Group,  
Association of Occupational Therapist of Ireland,  
Bow Bridge House, Bow Lane, Kilmaniham,  
Dublin-8

Dear Alison,

As discussed with you on telephone I am a senior occupational therapist working with Mid- Leinster Health Services Executives (HSE). I am currently in second year of M.Sc Health Informatics in Trinity College Dublin. This year is focused on completing a thesis in the area of occupational therapy and information technology.

The title of thesis is:

**“Exploring the acceptance and barriers to usage of information and communication technology (ICT) by Irish occupational therapists”.**

As a part of my thesis I intend to conduct a nationwide web based survey on all currently working occupational therapists in Ireland. It will take at most 10 minute to complete the questionnaire. The survey will ask about use of information and communication technology in occupational therapy practice in your area of service.

The survey questionnaire consists of three parts: Part 1 deals with usage of information technology for providing care, administration and communication and which application is being used currently for the same. Part 2 deals with acceptance of client information system for occupational therapist and Part 3 consist of demographic and background questions.

The results should help to plan for improvements in ICT support for occupational therapists. The survey is anonymous and confidential.

In order to make contact with the population of occupational therapists I am requesting your help as a chair of research sub group of AOTI. Could you please invite all registered occupational therapists to volunteer to participate in this survey.

This research has been approved by the research ethics committee of the School of Computer Science and Statistics, Trinity College Dublin.

Your support and co-operation is much appreciated.

Anil Gupta  
Senior Occupational Therapist  
Email: [anil.gupta@hse.ie](mailto:anil.gupta@hse.ie)  
Tel: 086-3803454

## **Appendix 6— Coding frame for Result Analysis**



## Coding Frame for Question analysis

Part 1: ICT use for different activities includes care and report use, administrative use and communication use

Q1. I use information technology for recording client information

Code	Response
1	Never use
2	Sometimes use
3	Frequent use
4	Always use

Q2. I use information technology for retrieving previously recorded individual information for providing care

Code	Response
1	Never use
2	Sometimes use
3	Frequent use
4	Always use

Q3. I use information technology to generate mandatory reports regarding client care

Code	Response
1	Never use
2	Sometimes use
3	Frequent use
4	Always use

Q4. I use information technology in writing official letters, reports, etc.

Code	Response
1	Never use
2	Sometimes use
3	Frequent use
4	Always use

Q5. I use information technology to prepare presentation slides or overheads

Code	Response
1	Never use
2	Sometimes use
3	Frequent use
4	Always use

Q6. I use information technology to collaborate with colleagues

Code	Response
1	Never use
2	Sometimes use
3	Frequent use
4	Always use

Q7. I use information technology to search information to guide client care (e.g. governmental policies, product prices, etc)

Code	Response
1	Never use
2	Sometimes use
3	Frequent use
4	Always use

Q8. I use information technology to search information for service development and planning, continuing professional development (CPD), etc.

Code	Response
1	Never use
2	Sometimes use
3	Frequent use
4	Always use

Part 2 Factors influencing acceptance of client information system for occupational therapists.

Q1. Performance Expectancy

Code	Response
1	Strongly Disagree
2	Disagree
3	Neither Disagree nor Agree
4	Agree
5	Strongly Agree
6	Not Applicable

Q2. Effort Expectancy

Code	Response
1	Strongly Disagree
2	Disagree
3	Neither Disagree nor Agree
4	Agree
5	Strongly Agree
6	Not Applicable

Q3. Social Influence

<b>Code</b>	<b>Response</b>
1	Strongly Disagree
2	Disagree
3	Neither Disagree nor Agree
4	Agree
5	Strongly Agree
6	Not Applicable

Q4. Facilitation Conditions

<b>Code</b>	<b>Response</b>
1	Strongly Disagree
2	Disagree
3	Neither Disagree nor Agree
4	Agree
5	Strongly Agree
6	Not Applicable

Q5. Voluntariness

<b>Code</b>	<b>Response</b>
1	Strongly Disagree
2	Disagree
3	Neither Disagree nor Agree
4	Agree
5	Strongly Agree
6	Not Applicable

Part 3 Demographics

Q1. Gender

<b>Code</b>	<b>Response</b>
1	Male
2	Female

Q2. Age

<b>Code</b>	<b>Response</b>
1	Under 20 years
2	20-29 years
3	30-39 years
4	40-49 years
5	50-59 years
6	60 plus

Q4. Qualification

<b>Code</b>	<b>Response</b>
1	Diploma / Certificate in Occupational Therapy
2	Bachelor's Degree in Occupational Therapy
3	Entry Level Masters Degree in Occupational Therapy
4	Taught Masters or Research Masters
5	Doctorate in Occupational Therapy
6	PhD

Q5. Experience

<b>Code</b>	<b>Response</b>
1	Less than 5 years
2	5-9 years
3	10-14 years
4	15-19 years
5	20-24 years
6	24 plus

Q6. Clinical area of practice

<b>Code</b>	<b>Response</b>
1	General community elderly (Over 65 years)
2	General community disabilities (18-65 years)
3	General community mental health
4	General community paediatrics (0-18 years)
5	Cardiac Rehabilitation
6	Episodic care (Acute hospital setting)
7	Hospice unit / Nursing home
8	Primary care
9	Rehabilitation hospital / unit
10	Residential / respite unit (18-65 years)

Q7. Computer use prior to introduction in your service

<b>Code</b>	<b>Response</b>
1	Yes
2	No

## **Appendix 7— Additional tables from Chapter 4**

## Appendix-7

Table- 1 Reliability of ICT use for different activities constructs (CRU1, CRU2, CRU3, AU1, AU2, CU1, CU2, CU3)

CRU: Care and Report Use  
AU: Administrative Use  
CU: Communication Use

Cronbach's Alpha	No. of Items
.755	8

Table- 2 Reliability of Technology acceptance constructs (PE1, PE2, PE3, EE1, EE2, EE3, EE4, SI1, SI2, SI3, SI4, FC1, FC2, FC3, FC4, V1, V2)

PE: Performance Expectancy  
EE: Effort Expectancy  
SI: Social Influence  
FC: Facilitating conditions  
V: Voluntariness

Cronbach's Alpha	No. of Items
.909	17