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Opportunities and constraints provided by ICT supported practices in vocational education

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University of Limerick

Opportunities and Constraints provided by ICT
supported practices in Vocational Education

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Masters in Digital Media Development for Education

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Declaration

“I, Shaun Ferns hereby declare that this thesis is entirely my own work and that it has not been submitted for the award of any degree at any other university.”

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Abstract

This case study examines issues surrounding the use of Information and Communication Technology (ICT) supported practices in vocational education at an Irish third level institution. In particular it investigated the opportunities presented and the constraints to the use of ICT with in a vocational educational setting. It also investigated lecturers' perceptions and current use of ICT. The research consisted of interviewing six key informants in relation to the factors affecting the use of ICT supported practices for vocational education. These interviews informed the design of the questionnaire that was then given to 19 lecturers involved in vocational education at the selected Irish third level institution. Two focus groups of four lecturers concluded the investigation by discussing the findings from the questionnaires.

The research revealed that staff felt that ICT has a positive role to play in education. They find it allows them to gather information, organise it and distribute it to their learners. They have also found the use of ICT is helping to reduce the amount of time required to complete their work. All lecturers highlighted the need for further training. And those with a previous qualification in education were particularly vocal in their need for training. Lecturers indicated a high use of e-mail and the internet. Educational software, Blogs, CD-ROM/DVDs, and Podcasts are rarely used by lecturers.

The study concludes that appropriate training and time for preparation will improve the opportunities and reduce the constraints in the implementation of ICT supported practices within the selected Irish third level institution.

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List of Abbreviations

an Foras Aiseanna (Irish National Training and Employment Authority)	- Fás
Information and Communication Technology	- ICT
Institute of Technology	- IoT
Virtual Learning Environment	- VLE

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Chapter One

Introduction

1.1. Introduction

The major technological advances of the last few decades in Ireland such as internet access, computers in the classroom, and data projectors are beginning to have an impact on education throughout the world. The use of Information and Communication Technology (ICT) is now encouraged (to various degrees) by the stakeholders of the educational community as a tool to improve education and to help attain the objective of ‘Life Long Learning’ and “Second Chance Education.” Information and Communication Technology (ICT) is considered essential in the practice of engineering (Engineers Ireland, 2003) and vocational education. All progressive educational institutes have evolved from the traditional didactic style of learning to a more computer based interactive style of learning. So that students may be facilitated in adapting to this more modern approach, computer education is now standard in most second level schools and is a component in many third level courses. In addition to this Information Technology support service staffs are available to accommodate students with any associated difficulties. The vast majority of academic students are proficient with computers and the associated benefits they bring to their education (Weston & Barker, 2002). This is not always the case when it comes to those students involved in vocational education. In addition many of the staff involved in vocational education are still to be convinced of the benefits of using ICT supported practices

1.2. Objectives

This research examines issues surrounding the use of ICT supported practices in a vocational educational setting. Opportunities and constraints have been examined in previous research to determine the overall effectiveness of using these types of techniques. This thesis's objectives is to look at

- current use of ICT by lecturers involved in vocational education
- the particular opportunities and constraints presented to lecturers involved in vocational education at an Irish third level institution.
- staff perceptions of ICT by lecturers involved in vocational education

1.3. The study

The research will consist of a review of relevant literature regarding opportunities and constraints afforded by the use of ICT supported practices in vocational education. This review will follow by interviewing six key informants in relation to the factors affecting the use of ICT supported practices for vocational education. It is the intention of the key informant interviews to inform the creation of a questionnaire that will be distributed to all 19 vocational lecturers at the selected Irish third level institution. Two focus groups discussing the data emanating from the completed questionnaires will complete the investigation. Each focus group consisting of four lecturers will have representation from the four trades on offer at the institute (brick & stone, carpentry & joinery, electrical, plumbing).

1.4. Rationale

This thesis will set out to examine academic staffs' perceptions towards the use of ICT. This will in future help to inform the discussion on how to support and implement ICT

supported change within the Institute. It will highlight opportunities and constraints that may affect staff and students use of ICT and allow them to make informed decisions in implementing its further use.

It is important to provide a context in which the research takes place. A description of the types of learners that engage in vocational training will be provided in order to achieve this. The description will follow by explaining the situation regarding vocational education in Ireland and in particular its implementation at the particular Irish third level institution that the research is taking place. It also will highlight characteristics of the Institute in particular those that may affect its approach to ICT. It is the intention that the context will reflect the situation ‘on the ground’.

1.4.1. Andragogy (adult learner)

Houle (1961) divided the adult learner into three main criteria with the first, the ‘goal-oriented learner’ being the most relevant to learners involved in vocational education. Houle hypothesised that these types of learners have clear-cut objectives when engaging in education. Though Houle published his work in 1961, most of the recent research is based on work by Knowles. His research has indicated that the teaching of adults differs from the pedagogy (the teaching of children). Knowles (1973) when attempting to describe these differences borrowed the term ‘andragogy’ from a Yugoslavian colleague. Andragogy can be defined as ‘the science of understanding (= theory) and supporting (= practice) lifelong and lifewide education of adults.’ (Reischmann, 2004) Knowles’ theory of andragogy (adult learning) is based on four main assumptions;

- **Changes in self-concept** – Knowles believes that as a learner becomes older they are no longer dependent on others; they become more independent in accessing their needs in relation to learning.
- **The role of experience** – as a learner matures they acquire knowledge and this allows them to relate this to their new learning environment.
- **Readiness to learn** – Knowles assumes that as a learner matures they require knowledge in order to fulfil certain roles. This readiness to learn can be expressed as an awareness of why they need to learn.
- **Orientation to learning** – The adult learner wants to learn so that they can directly apply this new learning. Problem based learning is of particular importance to the adult learner. (Knowles 1973)

Usun (2003) seized on work by Knowles as he attempted to understand the meaning of andragogy and how this might be reflected in adult education. He wrote that the term adult education is often used to mean ‘a process of self-directed inquiry through which individuals systematically learn from their daily experiences and other resources in their environment.’ This concept of ‘self-directed inquiry’ is the belief that adult learners are more likely to take ownership for their learning. The adult learner will be more likely to direct their learning into areas of where they have a need.

1.4.2. Vocational education

The term vocational can be used to describe an occupation to which a person is particularly suited for. ‘Vocational education and training enables people to acquire the knowledge, skills and competences they need on the labour market, whether for a

particular job or for a broader range of occupations.’(europa.eu, 2010) The form of vocational education that this research deals with is the process of learning about a trade which involves hands on experience and technical training. This form of vocational education involves an apprenticeship. (Buck & McGinn, 2005). In Ireland, an Foras Aiseanna (Fás) the department with legislative responsibility for training introduced a Standards based apprenticeship system in 1991 to cater for vocational education. Prior to this there was no formal mandatory apprenticeship (vocational) system. The standards based apprenticeship system is a competency based system which is divided in to seven phases. The odd numbered phases 1-3-5-7 are the On-the-Job phases. These consist of working with an employer over a four year period. The even-numbered phases 2-4-6 are the Off-the-Job phases. These consist of 22 weeks within a Fás training centre for Phase 2 and 11 weeks in an Institute of Technology for both Phase 4 and Phase 6. The purpose of the Off-the-Job phases is to deliver the theoretical components of the trade as well as to allow for the practice of specialised craft skills. (Fás, 2001)

1.4.3. The institute of technology

The research carried out will be based on one Institute of Technology (IoT) in the Dublin region involved in vocational education. Due to the relative young age of the Institute (ten years old) it’s important to have an appreciation of the type of investment in its ICT infrastructure and the educational role it fulfils. The central mission of this Institute is to serve students and the community by achieving consistently high standards of relevance and quality in teaching, research, development and consultancy. The Institute has adopted an admissions and student support policy to ensure that a

relatively high proportion of its students are 'non-standard entrants' such as mature students. The use of ICT is also central to this mission. (ITB, 2010)

So that the institute may achieve its mission it has had to invest a large amount of resources in its ICT infrastructure. So as to understand the effect this spending has had, a description of the resources follows. The computing facilities comprise of 25 computer laboratories. There are over 700 computers available for student use with application software for respective course module requirements. Students also use the computers to access the internet for sourcing of information pertinent to their study, and to send or receive electronic mail. Each computer laboratory is fitted with an overhead projector with integrated sound system, and is connected to the lecturer's PC. The lecturer's PC also has internet access and is linked to a video camera and video player. A networked laser printer and portable memory drives are also located within each laboratory for student use. Other non-computational hardware includes desktop scanners and digital cameras.

1.5. Research Methodology

As this research focused on a small group of lecturers involved in vocational education at a particular Irish institute of technology a small "collective case study" (Stake 1995), was selected as the research methodology. This method would not allow for a generalization but rather allow for focused view on a particular situation. As the institute intended to further encourage the use of ICT in vocational education this research would also allow for a baseline of activity and attitude towards its use to be set.

1.6. Structure of the thesis

Chapter two reviews the writings of accredited researchers in the field of information and communication technologies in an educational setting. It begins by setting out the rationales for ICT, describing the types of technology in use, and presents the opportunities and constraints provided by ICT supported practices. It concludes with view of approaches to teacher development in ICT.

Chapter three describes the case study research method used and supporting reasons for selecting it. It explains the reasoning behind the research tools which include; interviews, questionnaires, and focus groups. It clarifies the research process to achieve the research. It then concludes by discussing ethics and credibility and bias.

Chapter four details the findings of the research. It presents the data collected from six key informant interviews, 19 questionnaires, and two focus groups in a several different formats which include charts, quotes and summarisations of discussions.

Chapter five discusses the implications of the data in relation to the research questions. It begins by investigating the demographics of the sample group. The use of ICT by the sample group is then evaluated. Opportunities and constraints are then presented based on underlying themes. This is then followed by interpreting staff perceptions towards ICT use in a vocational setting. Finally the weaknesses of the research are set out.

Chapter six brings the paper to a close by setting out responses to the fundamental research questions. It follows this by highlighting the major factor in reducing the constraints and maximising the opportunities presented by the use of ICT in vocational

education. Chapter five concludes by presenting a set of recommendations in regard ICT use in vocational education with in the particular institute.

Chapter 2

ICT in Vocational Education; Opportunities and Constraints

2.1. Introduction

This section of the research is focused on a literature review of relevant educational research areas. This review will create an awareness of the issues concerning the use of information and communication technologies, with specific attention to vocational education. Descriptions about the various rationales that are given in support of the increase of ICT in education will be presented. This will begin by describing these rationales in detail. It will define the various opportunities and constraints presented by the use of ICT supported practices. An overview of the various ICT technologies that are being used within the vocational setting will be presented. It will then conclude by briefly highlighting literature in regards continuous professional development in this area. It is the ultimate aim of this section of the thesis to set the scene for the research questions.

2.2. Rationales for ICT in education

The debate on using ICT supported practices within the classroom has been taking place since the first computer was invented. It is clear that ICT is well funded (Pelgrum, 2001; Mulkeen, 2003) so it would be understandable to believe there must be a clear rationale for using ICT Supported practices in the classroom. Cuban (1986) and Cohen (1987) have suggested the use of computers must be aligned to a teacher's model of learning and that the first question by teachers that needs to be answered is why they should use ICT supported practices in the classroom. In response educators

have presented many reasons for the implementation of ICT to our classrooms. Papert (1996) when asked “why use computers to learn?” said he believed that they help learners not only to learn but also to learn about learning. Valdez (2004 p. 12) cites three main reasons that educators need to know and utilise ICT, especially those that are used for finding information and creating and communicating new knowledge.

‘(1) the need to prepare students to function in an information-based, Internet-using society;

(2) the need to make students competent in using tools found in almost all work areas; and,

(3) the need to make education more effective and efficient.’

Those 21st Century skills mentioned above are learned when technology is integrated into the teaching and learning process. Broadie (2003) listed eleven areas of added value in education from ICT;

- Extending learning time
- Increasing communication
- Improving access to resources
- Increasing motivation
- Re-balancing teacher mediation and autonomous learning
- Increasing scale-ability and consistent replicability
- Access for minorities
- More information channels
- Brain centred learning
- Publishing and audience
- Management and recording

Cuban also highlighted three goals behind the introduction of computers in education;

- To keep the education system at the forefront of technological development and students’ skills up-to-date with those expected in the workforce
- To increase efficiency and productivity in teaching and learning; and
- To enable more self-directed learning, with student as active learners assisted by teachers to construct their own understanding (Cuban, 1993)

Hawkrige (1990) believed one obvious reason is the computers are everywhere so why wouldn't they be in the classroom. He similarly believed that there were clear rationales for the introduction of ICT supported practices in the classroom He defined them as Social, Vocational, Pedagogical, and Catalytic rationales.

2.2.1. Social rationale

Citizens need to be prepared to participate actively within their communities. They need to be able to function in the 21st century where information is delivered digitally over the internet. With the evolution of living patterns in modern Ireland due to long commute times or shift work patterns, as well as reluctance to allow children to play un-supervised, social networking site such as Bebo, Facebook, and professional sites such as LinkedIn have begun to fill in the traditional community ground of the Church, Parish Hall, sports organisations and the 'Irish Pub'. Most government departments in Ireland deliver information through their websites while some use it as their main means of communication. Internet booking for travel is fast becoming the norm with high penalties for not availing of it.

So that the populace may become actively involved in these 21st century communities, they will require skills to communicate effectively through the use of ICT, such as blogs, forums, and email. Even as Ireland's economic fortunes evolve these essential skills will be required to cope with a diminishing employment market. By developing ICT skills it will help to stop a two-tier society, it will create a society where information becomes available to all.

2.2.2. Vocational rationale/economic rationale

Ireland's growth during the Celtic Tiger years has developed on the willingness of staff to continually upgrade their skills. These required skills are based on the needs of business community, major players in the computer industry (INTEL, HP and Google) as well as international pharmaceutical companies (Pfizer, Wyeth) which have made Ireland their base for the European market. The rationale behind the company decisions are that Ireland possess an English speaking workforce, highly educated staff, who are generally considered to have an aptitude for rapidly changing industries. Irish Minister for Education and Science Martin (1999) confirmed this rationale when he stated 'We are convinced that technology if applied thoughtfully and well integrated into a curriculum, can be utilized as a helpful tool to assist student learning, provide access to valuable information and ensure a competitive edge for our workforce.'

Now during Ireland's recession of 2010 the use of the term 'Smart Economy' hints at the belief that to become a more competitive nation the ICT skills of our students (future workforce) will need to keep pace with similar sized European nations. At WSIS (2005) the UN World Summit on Information Society in Tunis, Craig Barret, Chairman of Intel Corporation highlighted the; '...impact of technology on economic competitiveness.' He emphasised the need for knowledge-based decision-making which, he said, can only be made possible through education and skills development. The focus, he said, should be as much on the quality of teaching as it is on technological access.

2.2.3. Pedagogical rationale

Education reasons including motivation, increased retention, and improved academic results have all encouraged the use of ICT based on a pedagogical rationale. The goal of the pedagogical rationale is the promotion of an improved quality of the educational experience (Galvin, 2002, Cuban, 2001) There are recognised benefits of using ICT in improving students learning. It is also important to develop the role of teachers in facilitating a learner's use of technology (access, role model, source of advice). (Selwyn & Bullon, 2000)

2.2.4. Catalytic rationale

It is believed by some that the use of computers may accelerate another educational innovation. They may enable a desired change in education to occur just by their introduction. This is defined as the catalytic rationale. As Pelgrum stated 'the use of computers may accelerate another educational innovation the possibility that schools can be changed for the better by the introduction of new technologies' (Pelgrum and Plomp 1991). Sälj  (1999) agrees with this and further argues that ICT supported practices must be implemented in order to spur further educational innovation. However Cuban (1993) disagrees maintaining that with regard to education, ICT supported practices may have a negative effect on development. Those that do adhere to the catalytic rationale see the introduction of ICT supported practices as improving the performance of educational institutions and thus making an improvement in the standards of education. For example Donal O'Mahony, an assistant principal at an Irish post-primary school, believes that "using Moodle (*virtual learning environment*) has ... been a catalyst for further online innovations" (Irish Times, 2009) (authors italics)

Hawkridge (1990) also states that there may be more rationales though they are not really supported in formal education. For example it is believed by filling schools with computers it will help stimulate a national computer industry. There is also a belief that the use of computers in schools will help reduce the number of teachers required. It can be seen that when policy makers develop programmes for the use of ICT in education they base their decisions on one or more rationales. The selection of these rationales will for the most part determine the implementation strategy and the budget costs. Following on from this examination of literature regarding the rationale of why ICT may be used an examination of the most relevant types of technology being utilized is now required.

2.3. Types of technology in use

There are various type of technology being used within the classroom. Knowles (1973) stated that ‘In no dimension of education have there been more explosive developments in recent times than in educational media.’ These technologies being integrated offer the lecturer opportunities to deliver materials in a variety of methods in varied formats. According to Haddad and Drexler (2002) there are five levels where appropriate information and communication technologies can be successfully integrated in education. They created a table depicting the five levels and an example of the types of technology.

TECHNOLOGY					
USE	TEXT	AUDIO	VIDEO	COMPUTER	INTERNET
Presentation	X	X	X	X	X
Demonstration	X	X	X	X	X
Drill & Practice	X	(eg. language lab)		X	X
Interactive	hyperlink			X	X
Collaborative				networked	X

Table 2.1 Five levels of technology use

Dillemans et al (1998) while proposing his six critical dimensions in the use of educational technology indicated that an appropriate selection and use of synchronous and asynchronous communication tools was of paramount importance. Mishra (2002) suggested “advances in education technology have led us to accept that the benefits from TVET (*Technical and Vocational Education*) through ODL (*open distance learning*) are far greater than from other types of courses.” (authors italics) He then went further suggesting that traditional vocational education can be supported by the use of virtual learning environments to allow for open distance learning.

This section sets out to describe synchronous and asynchronous communication technologies commonly used and referred to in Dillemans (et al) six critical dimensions as well as a look at virtual learning environments are how they are being used to allow the two distinct communication types to co-exist in the one platform.

2.3.1. Synchronous communication

Synchronous communication refers to communication that occurs simultaneously and at the same time (Lehmann 2004). In relation to the online classroom, synchronous communication can only occur if all relevant participants are connected or online at the same time. The most common form of internet based synchronous communication is chat rooms. Chat rooms are real time communication. Messages (chat) are sent and received instantly. They provide an opportunity informal quick conversations and quick questions and answers. Other examples of synchronous communication are phone calls or video conferencing. (Schlager et al, 1998) Video conferencing allows the transfer of aural and visual communication over the internet, thus communication occurs without typed words but speech can be heard. Both forms of communication are similar in nature to face to face communication. Communication is essentially the process of attempting to impart information from a sender to a receiver. While the medium may vary, the aim remains, that is to impart information.

2.3.2. Asynchronous communication

Asynchronous communication does not occur in real time. Participants are therefore not communicating with each other simultaneously (Lehmann 2004). The most widely used method of asynchronous communication on the internet is e-mail communication. Other methods include discussion groups, blogs, newsgroups and forums. When sending an e-mail the receiver does not need to be connected to the internet at that time to receive it. The message and its contents are stored for retrieval at a later time or date. Liang and McQueen (1999) found that e-mail interactive learning was more effective for peer-oriented learners. They pointed out that Web-based interactive

learning may help in keeping the various types of learners together. Discussion groups are also an asynchronous communication tool as they are based on a topic that is discussed by a group of learners. These students may make contributions to the discussion at any time. A learner might leave a message or make an enquiry for other people to reply to at some later date. Forums are where learners exchange ideas on a specific topic, with entries being made at different times by those participating in the forum. A blog is a personal webpage in which written entries are added by the owner. These pages can be read and commented on by others at any time, by accessing the web page on which the blog is contained. Blogs have recently come to prominence in education as they are a relatively simple way for a learner to keep a reflective journal or portfolio of their work (Stiler & Philleo, 2003; Wagner, 2003). Compared to asynchronous discussion forums, Williams (2004) believes that, 'blogs are more successful.... conducive to improved student and teacher relationships, active learning.' The various forms of asynchronous allow for greater flexibility, reduce the isolation of learning and may promote reflective learning practice by the learner (McKenzie & Murphy, 2000).

2.3.3. Virtual learning environments

A virtual learning environment (VLE) is an internet based educational environment built for schools which combines many of the tools previously mentioned. It allows for 24/7 safe secure access to school resources and learning activities (Kumar et al., 1998). Once logged in to an instance of a VLE using a personal username and password, a learner can select to proceed through a lesson assigned to them, or they can discuss it in the message boards, or work with their group on a problem. It also provides an online platform where teachers and students can share lessons, tests, quizzes and

questionnaires. VLE's are all about social education, students are encouraged to develop an identity within and create and sharing through collaboration. A VLE offers several distinct advantages:

- **Engaging** -- students often enjoy using technology and will spend more time-on-task when working with technology.
- **School-To-Career Preparation** -- employers are requiring their employees to be proficient computer users. College-bound students may be interested to know that many colleges and universities now offer completely internet-based courses and most courses have an online component.
- **Learning** -- Technology use allows for increased interactivity and individualized learning for all students
- **Resources** -- The internet brings to bear many resources that are not available in books alone.
- **Personal-Productivity** -- Technology allows for an increase in the personal productivity of both students and teachers.

The VLE has also been the victim of some negative comment, for example Wilson (2003, p. 73) refers to 'pedagogic poor' applications of technology. He stated that; 'I groan at the thought of students faced with death by PowerPoint both in the lecture theatre and now in the VLE.' An evaluation of a VLE by Mikropoulos (2010) of 37 in-service teachers agreed with Wilson. His study concluded; 'the context... has to be closely related to its content, the didactic goals and the learning activities, in order that learning outcomes can be realised constructively'. Many educators would agree with Wilson and Mikropoulos that the use of technology must be appropriate to the learning that is taking place. The use ICT in learning must be focused on supporting the achievement of the learning outcomes. Following on from this examination of literature

regarding the most relevant types of technology being utilized a review of the opportunities and constraints its use my present.

2.4. ICT – Opportunities and Constraints

The opportunities and constraints afforded by the use of ICT in adult education can be examined from several different perspectives i.e. the students, teachers, schools, industry and management, and many of these perspectives have factors which overlap. This section will look in particular at the most frequently debated opportunities and constraints found within documented research. Hennessy et.al. noted several factors relating to development and dissemination of ICT-Supported Practices such as organisation, motivation, and pedagogical issues. Her research in the area provided a framework in order to present the relevant literature with sections labelled time, access, organisational change (culture), technical (equipment & skills), funding, and motivational factors that affect staff & students.

2.4.1. Time

From a student's perspective the use of ICT has opened great new opportunities, it allows the student, through the use of CD's, web-based resources and distance learning, to name but a few, to acquire new skills at a time and place that suits them. For the adult learning community this allows them to juggle the responsibility of adulthood (working, family life) as well as engage in their own personnel development. As Stennes (2008) believed the significant barriers of time and distance are rendered almost obsolete. However it also demands the learner to take greater ownership of their learning and this can sometimes be seen by the learner as a constraint. As with all

innovation there is a requirement of short-term costs, by way of an investment of time and energy in acquiring new skills, with no certainty of payoff.

From a teacher's perspective lack of time is also seen as a major constraint. Time has become an issue for the teacher from the point of view time to develop material. This material that is used tends to be self-developed. In addition a large effort is required to produce this type of material, which when it is created may only cover a small part of the curriculum. A report by PricewaterhouseCoopers (PwC) looking at the issues surrounding teacher workload estimated that through the use ICT supported practices teachers could save between 3.25 and 4.25 hours per week (PwC, 2001).

2.4.2. Access

Access to technology is an ever-increasing constraint to the delivery of adult education. More and more adult learners are demanding access to the type of equipment some of them have in their own homes. Learning centres for adult learners have to try and meet this escalating demand but are struggling due to funding issues. The constant state of change and improvement in the technology industry means that for a learning centre to keep up to pace with these changes, large funding or innovative public private partnerships will be required. Adult learners also have a problem with funding. Adult learners who cannot purchase their own ICT equipment such as a computer are at a serious disadvantage to those who can. Access to the new ICT supported practices, would be confined to a time when learners have an opportunity to access the necessary equipment. In their benchmarking study of six highly adult learning focused colleges and universities, The Council for Adult and Experiential Learning (CAEL, 1999) found that the lack of access threatened open access to education. As they stated in their

publication; ‘uneven access to technologies due to income, race/ethnicity, disability, or other personal traits threatens the goal of universal access to higher education.’ The previously mentioned report by PricewaterhouseCoopers (PwC) in 2001 highlights access issues in regard to teachers. They state, ‘access to adequate ICT is key to being able to implement many of the strategies we discuss.’ (PwC, 2001) This statement suggests that innovation in using ICT supported practices will suffer until adequate access for both the teacher and learner is achieved.

2.4.3. Organisational change (culture)

Organisational change must take place if the opportunities presented by ICT-Supported Practices are to be grasped. If the use of ICT is to be introduced and succeed in adult education, school managements and governments are going to have to be able to respond to what is becoming an escalating commercialisation of education. They must also manage this change while still allowing staff to become actively involved in the implementation and delivery of learning materials using ICT. They have a requirement (and a need if they want to survive) to provide the culture to allow for learning of teachers to take place (staff development).

In providing this culture as well as resources, whether hardware, software, training, or time they have the opportunity to developing a top class learning environment which will help to motivate both the learners as well as the learning provider (teacher). The successful implementation of ICT supported practices has the potential of galvanising the adult educational community where as a poorly supported implementation will have the opposite effect; it will demoralise the adult educational community. ‘As a general matter, innovation represents change, and there is usually built-in resistance to change’

(Maier and Weidner, 1975, p 70)' A negative centre ethos to the implementation of ICT-Supported Practices can be considered by some as a constraint. Staff and learners must feel that the appropriate use of ICT is not only an aspiration within a particular adult educational school but also fundamental to the expressed educational policy of the school. This may manifest itself as a detailed policy on how ICT practices will be supported within the school. Research has also found that changes in structure without changes in school culture are likely to be only superficial (Stoll & Fink, 1996).

2.4.4. Technical (equipment & skills)

Cuban (2000) states 'that insufficient technical skills are not holding back teachers, he says the potential of new technologies to alter existing social practices is the cause of concern.' Technological reliability can become a limitation if it is not adequately planned for and resourced. The breakdown of equipment can diminish adult learners' acceptance of new technologies in the delivery of knowledge. Adult learners' fears of using new techniques or new equipment can be increased if equipment fails while they use it, particularly if this happens before the advantages of the techniques are realised. Research has found trying something new typically produces feeling of discomfort or anxiety (Bonwell and Eison, 1991; Woods, 1994) especially when change has been imposed externally and the person feels relatively little control over the event (Fisher, 1994; Woods, 1994) Lack of technological reliability though could also be seen as an opportunity for the adult learner to use prior learning experience in order to overcome and adapt to unexpected situations as would be expected in industry. This may contribute to the idea that the role of the teacher is not as a fountain of knowledge, that all within the room have a teaching role to play. This will help move away from the teacher-centred model of education (pedagogy) to a learner-centred model (andragogy).

2.4.5. Funding

Adequately funded training provides the greatest opportunity for the positive acceptance and implementation of ICT supported practices by teaching staff. Training will allow staff to see the potential of using ICT in their classroom or workshop. It will give them the increased confidence they need to use equipment previously unfamiliar to them. Proper resourced training will give them new skills in information and instructional design, web publishing, general internet and digital archive searching skills, evaluation methodologies, team working, and one-to-one teaching skills with the use of ICT. It provides the possibility for teaching staff to acquire new teaching and research related skills and may lead to publishable research. It will allow them to create and adapt ICT materials that, after an initial investment period, may help to reduce their preparation time and provide a valuable centre resource.

2.4.6. Motivational factors that affect staff

‘The realisation that not all change is improvement, but all improvement involves change challenges the education system.’ (Stoll and Fink, 1996) Factors in motivating the adult learning community such as technical skills, experience, confidences in approach, affinity with approach, age, and resistance to change are crucial to realising the opportunities presented by ICT-Supported Practices. Technical skills and experience would be seen as the key factor towards improving motivation at all levels. Teachers must feel comfortable with the ICT equipment and that only comes with experience, support and time. Watson (1993) stated; ‘The effective use of ICT in classrooms is... linked to teachers theories, beliefs and understandings of the subject domain, as well as access to, and competence with, resources.’ They must gain the

skills necessary to enable them to be able to adapt and improvise if ICT related equipment fails them. As a recent study found that the primary reason teachers were afraid of technology was a lack of experience using computers (Rosen & Weil, 1995). Thus teacher obstruction is not an insurmountable barrier to computer use; teachers simply need to be trained and supported before they will feel ready to use them. (Wenglinsky 1996)

Failure to meet practicable training requirements for teaching staff will place more constraints on the use of ICT-Supported Practices. Staff will become anxious about adopting teaching methods and materials that are much more open to peer examination and appraisal. They will also become reluctant to acquiring new ICT related skills. Fullan (1992) emphasized this, agreeing that people have to delve into something before they discover new meanings.

Teaching staff will also become disinclined to give up their traditional method of delivering content and use new forms of delivery. Adult learners must also acquire confidence in their own ability to use this ICT equipment. At all times the new acquisition of knowledge and the meeting of learning outcomes should be the goal and confidence of using ICT equipment is essential to reaching this goal. For an equitable classroom/workshop situation to occur the use of ICT-Supported Practices must feel as comfortable for the users as they would find without using ICT-Supported Practices. A major constraint to enabling and motivating the Adult Learning Community to progress using ICT-Supported Practices is a resistance to change. Many in this community feel that the standard practices that are currently in use are working, so why change. Teachers using standard methods see learning taking place, students achieving learning

outcomes and are not convinced that change is necessary. Mulkeen believes that a change in practice incorporating the positive use of ICT may be influenced by what is termed, ‘a product of teachers beliefs.’ (2003)

Age, especially within the Adult learning Community can also become constraint. Technology and the use of computers are seen as something that young teachers and learners do and if this age constraint is going to be overcome adult learners are going to have to be motivated to accept this new technology.

In a case study of an integrated learning system in a UK school where 5 teachers were interviewed it was found that management play a key role in implementing and then supporting the introduction of ICT practices with the school. They reported that, ‘In the absence of a clear management perspective on the costs and benefits of the ILS and the continuing oversight of the implementation and the results of use, “ad hoc” factors and individual opinion interacted in a way that resulted in failure to realise anticipated benefits.’ (Jervis & Gkolia, 2005) This case study concluded that there was little benefit of using an integrated learning system. Further research (Winburg, 1995; Van Dusen & Worthen, 1992) conducted in schools that used ILS’s collaborated this view when they wrote that when integrated learning system did not appear to develop the learning of students this was due to some or all of the following;

- De-motivated pupils/users (usually SEN or low ability pupils);
- Unenthusiastic teachers;
- Insufficient time

The difficulty with these conclusions is that there appears to be no pre-introduction research published to confirm that these constraints did not exist before the introduction

of the ILS's. Taylor's (1999) research in the UK investigated the effect of ILS on examination performance contradicts these conclusions. She found a positive correlation between ILS use and examination performance.

2.4.7. Motivational factors that affect students

Many believe that the successful implementation of ICT-Supported Practices provides great opportunities to improve learning and enhance student motivation. Hypertext for example allows learners to follow their own path of learning within a non-linear structured environment. The learner is able to access information in the order most appropriate to them. This fits in with the previous description of andragogy as learning-centred and education as freedom. ICT-Supported Practices also allow for the delivery of knowledge to match the learning style of the learner. Research has shown that learners learn in different ways (Cassidy, 2004). Firstly there are those who respond better to what they see and are visual learners. Secondly there are those who respond better to what they hear and they are auditory learners. Thirdly there are also those who respond better by doing and they are kinaesthetic learners. The use of ICT-Supported Practices would be able to present the knowledge to suit any one or all of the above styles. In a case study carried out by Passey (2006) while interviewing 36 teachers he found that the majority of digital resources were used to stimulate visually, with an extensive use of video clips and still imagery with auditory tracks to complement auditory learners and he felt that this would have been expected. He also felt that the two most important factors for motivating student was a diversity of resources and the inclusion of all the learners. Some would not be in agreement with this approach; they argue that learners should be stretched by learning in a style un-suited to them i.e. mismatching. Research has found that this mismatching of learning style is more

appropriate for high ability learners and matching deemed to be important for students with a lower ability. (Riding, 1998) Cognitive styles and learning strategies: understanding style differences in learning behaviour.

To successfully motivate the adult learner in the use of ICT they must feel the use of ICT-Supported Practices is relevant to the learning objective. They must also believe that their use will increase the likelihood of them reaching their own learning potential. The disadvantages of using ICT-Supported Practices must be minimized and the advantages expanded upon.

ICT provides unexpected opportunities for active, self-directed learning for which many learners are unprepared for. In a case study of a third year undergraduate unit at Australian National University while introducing new technologies as a means to greater learner autonomy found that it is likely to produce at least some student resistance. This resistance they found was due to change of students were expected to learn. The ideal of learner autonomy is not always seen as a positive aspect of learning. Boud (1981, p 13) supported this conclusion when he stated, 'Student reticence and resistance to take responsibility for learning are likely to be among the first problems the teacher will meet.' The case study concluded that this change to the learning process produces stress and can inhibit the learning process and both staff and students must be aware of this in order to take advantage of opportunities of technological innovation (Akerlind & Trevitt, 1995). Many studies have referred to the 'motivating' power of computers (Kulik et al., 1983; Papert, 1993; Cox, 1997; Dix, 1999) and this may also play a part in the pupils' attitudes. Following on from this examination of

literature regarding the opportunities and constraints presented by its use an examination of the approaches to teacher development will follow.

2.5. Approaches to teacher development in ICT

A scientific understanding of learning includes understanding about learning processes, learning environments, teaching, social and cultural processes, and many other factors that contribute to learning. Research on all of these topics, both in the field and in laboratories, provides the fundamental knowledge base for the understanding and the implementing changes in education (Bransford et al., 2000, p. 233)

The teachers role is changing with the introduction of ICT supported practices into the classroom; they find that they are no longer the ‘sage on the stage’. They are no longer the fountain of all knowledge. Those who find themselves embracing ICT supported practices still find themselves fulfilling the leading role, though their role is transforming allowing them to becoming more of a facilitator to the learner. It may provide them an opportunity to engage with the learner on an equal basis. Though ICT presents many challenges, for example students access to vast quantities of knowledge. As teachers begin to take note of the opportunities and constraints provided by ICT supported practices there is an understanding that continuous professional improvement will need to take place. Knezek (2000) found that for technology integration to be successful, it requires a classroom environment where a teacher has the will, skills, and access to ICT tools. Michael Martin (1999) presented the Irish government position when he wrote, ‘government programme of investment in information and communications technology.... professional development of teachers, representing a key strategy for the support of the future learning society.’ Bransford, Brown, and Cocking (2000) though cautions that the positive impact of technology does not come

automatically; much depends on how teachers use ICT in their classes. Part of the problem, they argue, has been a tendency to only look at the technology and not how it is used. Merely introducing technology to the educational process is not enough. However, it is becoming increasingly clear that our primary focus should be on studying how the technology is used. (Mishra & Koehler, 2006, p. 3)

Ofsted (2001) found that teachers rarely have the pedagogic expertise to utilise ICT supported practices effectively. Teacher competence and confidence with ICT are the principal determinants of effective classroom use by students (Collis *et al.*, 1996). Research carried out by Taylor (2004) on forty-four student teachers understanding of Information and Communications Technology (ICT at the University of Cambridge UK in 2000-2001) found that pedagogy led use of ICT was an important factor. It stated that there was a variety of methods for delivering training to teachers in order to focus their attention on pedagogy while using ICT supported practices. She concluded that there were two particular techniques that appeared successful, as she commented; 'It emerged from this research that reflection on practice and integration with reading played a crucial role in creating thoughtful teachers who know why they're doing what they're doing.' O'Grady (2007) also found while observing of thirteen newly qualified primary teachers (NQPTS) in Ireland in relation to Information and Communication Technology, that there is a need to change the approach to teaching using ICT. He wrote 'an integrated model be put in place where the students observe skilled practitioners in the classroom.' This may become easier to provide as the existing skill level develops throughout the teaching community.

2.6. Conclusions

In conclusion, there are many opportunity and constraints to the successful implementation of ICT supported practices. We are all aware that within the adult learning community the use of ICT has entered the classrooms and workshops. This growth of ICT use can be attributed to several rationales as Hawkrigde (1990) made clear. The role this new technology is playing within education is also being driven by adult learners, and because ICT supported practices have been shown to improve the quality of teaching and learning and represent an efficient use of resources. Despite all these new opportunities, careful planning at all levels will be required. Management and government will be required to create implementation plans and provide resources. Within these new plans allowances will need to be made for teachers to gain and develop new skills. Support structures will also be required in order to boost confidence and motivation. Even with adequate planning and resources it will be important to remember that ICT should only be seen as a tool, as Mellon (1999:34) believed ‘Technology cannot guarantee learning; students cannot be forced to learn; learning styles differ widely and teachers are more important than even the most sophisticated educational tools.’

Chapter 3

Methodology

3.1. Introduction

The primary methodologies utilised in this research can be categorized as desk research, qualitative research and quantitative research. The desk research focused primarily on the literature review of the opportunities and constraints provided by the use of ICT in education with a particular focus on third level and Vocational education. Drawing on the literature review, the qualitative research involved carrying out a number of semi-structured interviews with key informants within an Irish Institute of Technology. Two focus groups and a questionnaire were also utilized to collect information from lecturers involved in apprentice education. A diverse group of individuals which included lecturing staff, management, and experts in teaching and learning techniques (National Learning Network, Moodle users, Breeze Users Group), as well as interested parties involved in ICT supported practices were also consulted. Quantitative findings from completed questionnaires were also extrapolated though the intention was not intended to generate precise statistical significance, but to indicate and support important themes relating to use of ICT and its significance to vocational education.

The methodology chapter first looks at the fundamental research questions behind this paper that were explored to help clarify specific objectives of the research. An explanation then follows as to why the predominant research approach taken was qualitative, as opposed to quantitative. In addition, this section looks at how the

qualitative data was collected and analysed, how the research was managed, and how issues such as ethics, credibility and bias were dealt with. Finally, there is a reflection on the learning from the research methodologies used in the thesis, including how the researcher would do things differently for future research projects.

3.2. Research Questions

It is this research papers objective to examine the issues surrounding the use of ICT supported practices in vocational education. Its purpose is to elicit answers to the following questions;

- What are the perceived opportunities for the use of ICT in the vocational educational setting?
- What are the perceived constraints for the use of ICT in the vocational educational setting?
- What is the current usage level of ICT amongst vocational lecturers at the selected institute?
- What are staff perceptions towards the use of ICT in the vocational educational setting?

3.3. Research Methodology

Mertens (1998) suggested that research is ‘one of many different ways of knowing or understanding.’ There are many different research paradigms available to the prospective researcher. A research paradigm is a set of assumptions about the nature of reality, knowledge, and the goals and aims of the research process combined. Paradigms represent a distillation of what we think about the world, yet often cannot prove. Researchers’ actions are based on the underlying assumptions of each paradigm (Maione 2007).

As this research focused on a small group of lecturers involved in vocational education a small “collective case study” (Stake 1995), approach was deemed to be the most appropriate research method. A case study as a research method refers to the collection and evaluation of data about an individual or small group of individuals. This approach would not allow for a generalization that could be applied in various settings but rather its focus would be entirely on the particular institute selected with its conclusions based entirely on the selected participants at the institute. Russ-Eft & Preskill (2001) created a table (3.1) depicting the advantages and disadvantages of a case study approach to conducting research.

The advantages portrayed by the table were the main reason for selecting the case study approach and in particular to capture the information that is important to the participants as well as not requiring control of participants or the setting.

Advantages	Disadvantages
Provides descriptive data	Results may not lead to scientific generalizability
Does not require control of participants or setting	Researcher bias may interfere with validity of the findings
Reports include verbatim quotes	May take too long to conduct
Leads to a greater understanding of the context of the evaluation	May produce more data than can be analysed in an effective manner
Gather data using multiple methods	
Provides data that are rich in examples	
Captures what is important to the participants	
Portrays the multiplicity of causes that are associated with various outcomes	
Embraces diversity of perspectives and experiences of participants	
Allows the researcher to collect information on outcomes not known prior to the learning and performance initiative	

Table 3.1 Advantages and disadvantages of a case study

One further reason the case study approach appealed was that qualitative research takes the view that the researcher and the data are intertwined and that no dividing line exists between the two. According to Dukka (1995:10) ‘there is no substitute for an informed, authoritative person who can relate to respondents on their own terms. The point is reinforced by Alizadeh, Perry and Riege (1997) who suggest that, since only observable phenomena can be researched by quantitative means, critical realism (qualitative research) rather than positivism is a more appropriate research paradigm for studying external world phenomena such as inter-organisational links, communicative networks, interpersonal relationships and participation in collaboration activities.

Therefore, a deliberate decision was made that the research methodology would be primarily based on qualitative techniques and it was understood that the outcomes would not claim to be representative in terms of the answers that would be forthcoming. Furthermore, the analysis of several of the quantitative type questions on the questionnaire demonstrated competence in quantitative analysis as it was felt important to demonstrate an ability to use both techniques.

Qualitative research tends to be inductive in its analysis of data, implying that critical themes emerge from the data (Patton 1990). This implies that the research process requires some degree of creativity, as the challenge is to place the raw data into logical, meaningful categories; to examine them in a holistic fashion; and to find meaningful ways to communicate this interpretation to others.

3.4. Background to Study

The research for this study was carried out during Term 3 of the 2009/2010 academic year in an Irish Institute of Technology. This Institute of Technology currently caters for two groups of sixteen for four trade groups which include Brick & Stone, Carpentry and Joinery, Electrical, and Plumbing. The participants of the research included all lecturers involved in the delivery of vocational education at the selected institute. This consisted of twenty-nine Lecturers; three Brick & Stone, three Carpentry and Joinery, seven Electrical lecturers, and six Plumbing lecturing at the Institute during term 3. The lecturers ranged in age from between thirty and fifty. The institute was selected due to the fact that the research was employed there and had access to all staff members. The research was carried out by a lecturer at the particular Institute of Technology who has an interest in the use of learning technologies.

3.5. Research Tools

Denzin and Lincoln (1994) encourage the qualitative researcher to ‘use the tools of his or her methodological trade, deploying whatever strategies, methods or empirical materials are to hand.’ In the data collection phase face-to-face meetings were used to conduct the semi-structured interviews and focus group meetings and a questionnaire was employed to collect data.

3.5.1. Interviews

A commonly used qualitative technique is the use of one-to-one. Qualitative interviews can be used either as the primary mechanism for data collection, or in conjunction with observation, document analysis, or other techniques (Bogdan and Biklen, 1982). Qualitative interviewing utilises open-ended questions that allow for individual

variations in responses. Jancowitz (2000) writes about a number of methods in qualitative interviewing, including: 1) informal, conversational interviews; 2) semi-structured interviews; and 3) standardised, open-ended interviews.

Erlandsen et al (1993:86) advocated that the semi-structured interview is ‘guided by a set of basic questions and issues to be explored, but neither the exact wording, nor the order of the questions was predetermined.’ The typical style of open ended questions in these interviews provide a greater depth of data than structured interviews in that they attempt ‘to understand the complex behaviour of members of society without imposing any a priori categorisation that may limit the field of inquiry.’ (Fontana and Frey, 1994: 362) Semi-structured interviews are, therefore, particularly useful when it is important to understand the construct that the interviewee uses as a basis for their views or beliefs about a particular topic, a factor that is eminently significant in this research.

Interviews were digitally recorded and later transcribed for analysis purposes. Dukta (1995:28) stresses the importance of using a recorder: ‘The use of a tape recorder reduces the almost unavoidable bias created by an interviewer documenting his or her own work.’

Having had each taped interview transcribed, the interviews were then listened to several times, along with reading the transcripts, to ensure that the transcript material was an accurate interpretation of the interview. Having someone else transcribe the interviews saved considerable time and also instilled some objectivity into the interpretation of the interviews.

There were a number of questions, which required investigation before the soliciting information from lecturers involved in vocational programmes. In order to inform this investigation six key informants were selected for interview. Their selection was based on three factors;

1. Their knowledge of the particular Institute in question
2. Their knowledge of ICT supported practices
3. Their knowledge of vocational education in Ireland

The questions that were required to be asked formed the basis for the interviews. However, the interviews were deliberately kept semi-structured to encourage a flow of information, both expected and unexpected. By attempting to answer these questions, it became possible to base-line where the institute being researched currently stands in relation to ICT supported practices, and vocational education.

3.5.2. Questionnaire

A self-administered paper questionnaire (see appendix) was created and implemented on academic staff in order to evaluate the opportunities and constraints perceived to exist in the use of ICT in vocational education. Its purpose was to articulate some form of understanding of the use of various forms of ICT. Dukta (1995) highlights the importance of the questionnaire design stating: ‘It is exceptionally difficult to create a questionnaire that is both accurate and relevant. The skilful preparation of such a questionnaire will contribute significantly to the success of the research.’ This method was selected as it is appropriate with respondents who are reasonably articulate though can be difficult to organise. (Bradburn, et. al., 2004)

The discussions that took place with key informants together with literature review helped formulate a questionnaire. The questionnaires were designed in a manner to collect both qualitative data and quantitative data. A variety of question types were utilised including; 'circle one', 'tick the box', 'likert scale', and 'open response.' The questionnaire was designed to ask factual non-sensitive questions leading to questions of a more sensitive nature regarding attitude and beliefs. The likert scale was of particular benefit when trying to ascertain respondents' beliefs and attitudes. As Bradburn et. al. (2004) states 'If you ask respondents to agree or disagree with a sample of propositions... ...you can combine the answers to get a better measure of the attitude'

The questionnaire was piloted on two lecturers uninvolved with the location of the research. They were both selected due to the fact that they were both involved in vocational education, had understanding of the issues surrounding ICT use in an educational setting and were accessible to the researcher. The two lecturers recommended revisions in relation to question type in order to make the questions more accessible in order to ease their completion. They also suggested a reduction in the number of questions to reduce the amount of time it would require to complete the questionnaire. All recommendations were integrated within the final questionnaire design.

The piloted (tested) questionnaires were then delivered by hand to all lecturers involved in vocational education at the Institute. In the documentation included with the questionnaires the respondents were asked to return the completed questionnaires to the

researchers' office within two weeks. Through the use of two email reminders and one phone call all completed questionnaires were returned within the deadline.

3.5.3. Focus Groups

Focus groups are a qualitative method for gathering data sometimes described as group interviews. The researcher acts as a facilitator of the discussion taking place amongst the group, prompting participants to comment to a series of open-ended questions. By interviewing the participants in a group setting it allows for the collection of data simultaneously as well as providing an opportunity for group interaction. (Leedy & Ormrod, 2005) Focus group members through this interaction begin to describe their experience using a similar type of language providing for a “vernacular phraseology.” Focus groups raise questions regarding the validity and reliability of the research. Heisenberg pointed out that, ‘What we observe is not nature itself, but nature exposed to our method of questioning.’ He implied that the researcher has a large influence on the data retrieved from a focus group. (Tjaco H. Walvis 2003)

Two focus group discussions were also held consisting of one lecturer from each of the four trade areas (Brick & Stone, Carpentry, Electrical and Plumbing). While completing the questionnaire several lecturers indicated that they would be willing to participate in a focus group to discuss issues raised by the results of the questionnaire. The eight lecturers who made up the focus groups were selected from those who indicated their availability and were available on the day of the scheduled focus group. Their involvement in a particular trade also influenced the decision of who to select as it was the researcher's strategy to have one lecturer from each trade area at each of the two focus groups.

It is important to note that although part of the analysis from the questionnaire is quantitative, it merely reinforces some of the common themes that emerged from the qualitative analysis, i.e. the semi-structured interview, questionnaire and focus groups. By combining the qualitative analysis with the quantitative analysis backed-up by the literature survey and the analysis of the views expressed in interviews, it was felt that the issues had been tackled from enough different vantage points to achieve sufficient data triangulation, which would help to illuminate important findings and conclusions from multiple standpoints, thereby enhancing the credibility of the findings.

3.6. Managing the Research Process

The initial scoping of the project took considerable time, as it involved assessing alternative fields of interest. In selecting the general topic, several important factors were weighed-up:-

- that the timeframe for the research was kept to between 26 to 32 weeks. This had to be balanced with other time-commitments including work, other assignments, family, rest and sport;
- to select an area that was not entirely new to the researcher, yet would provide significant learning opportunities;
- to select an area that was relevant to the researcher's current employers.

Having narrowed the research down to the general topics of learning platforms, information and communication technologies, vocational education, and apprenticeships some time was spent refining the scope of the research, yet encompassing these general areas. A useful tool that helped to clarify the objectives

was to write a project objective statement, which in turn became the basis for the title of the project. It was decided to use the following statement;

‘opportunities and constraints provided by the use of ICT in vocational education’

Although research projects by their nature are open-ended, the project objective statement nevertheless provided a mechanism for scoping exactly what was required to do over the defined time-frame. The employer of the researcher offered their full support; the only proviso was that the results of the findings would be made available to both the researcher’s employer and staff involved within the research.

As part of the planning process, a work-schedule was prepared (Fig. 3.6). Although due to family commitments the schedule was not strictly adhered too, it helped to monitor progress and define a suitable order in which to tackle key deliverables.

Through the researchers engineering experience in dealing with qualitative research it was considered essential to take a very structured and objective approach to data analysis. However, it is fair to say that researchers tend to notice only those things that they are personally interested in. Again, it is important to reiterate that the sample size implies that the results probably do not have any statistical significance but merely help to articulate the degree of alignment among key informants on central themes and reinforce the qualitative findings.

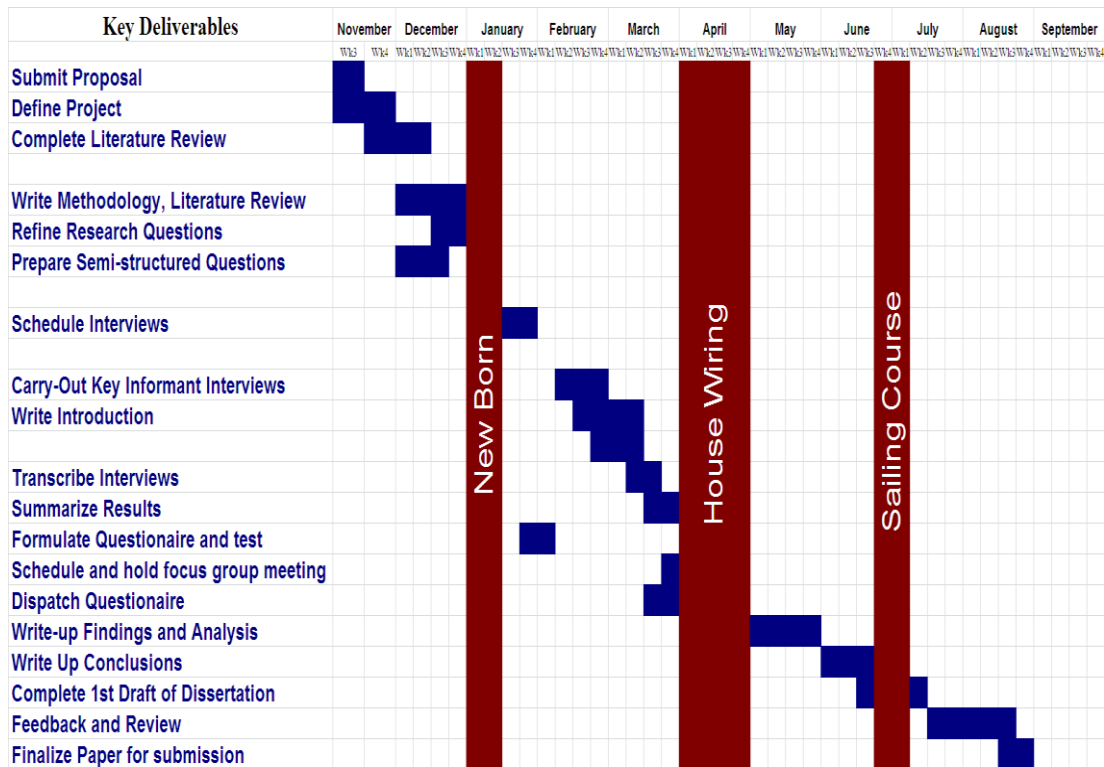


Table 3.2 Schedule of Key Deliverables

3.7. Ethics

Examining peoples’ opinions, attitudes and preferences requires sensitivity, particularly in cases where comments are driven by emotions, as opposed to logic. Although there was never anything inherently confidential in what was set out to investigate, it was set out with the intention of adhering to the principle of informed consent. As Howe (1999) stated, ‘protecting individual autonomy has long been considered a central principle of ethics.’ All key informants were informed of the background and purpose of the study, were given a copy of their interview transcripts, and asked to validate the interview summaries. It was also clarified that they had the option to request confidentiality and anonymity of any information that they provided. To avoid any complications arising directly from quoting an individual interviewee, it was decided not to publish the transcripts of the interviews or questionnaires. By doing this, it not only avoided

unnecessary pointing to “who exactly said what” but it also avoided unwarranted clouding of the qualitative analysis that ensued.

3.8. Credibility and Bias

Credibility tends to be more a function of the richness of the information gathered and of the analytical abilities of the researcher than of on sample size (Patton 1990). As pointed out earlier, the researcher can enhance the credibility of his / her findings through triangulation of data. Creswell (1994) argued that triangulation was based on the assumption that any bias inherent in particular sources of data, investigators and methods could be neutralized when used in conjunction with other data sources, investigators and methods. This research involved ‘between’ methods, drawing on a questionnaire, semi-structured interviews, focus groups and relevant literature. In qualitative research, the researchers regard bias as unavoidable and they are likely to state their biases openly. As Brody (1992:179) states:

Since the naturalistic investigator is him or herself the research instrument, naturalistic inquiry cannot avoid observer bias Instead, open disclosure of preconceptions and assumptions that may have influenced data gathering and processing becomes an inherent part of the conduct of the inquiry.

Greene (1994:539) regards bias as the qualitative researcher’s greatest asset: ‘it is precisely the individual qualities of the human inquirer that are valued as indispensable to meaning construction.’ The researcher was aware that their own personal perspectives could influence how they viewed the importance of some findings relative to others. It could have been decided to increase the sample size of the interviewees to increase the level of objectivity and statistical significance of the result but at the end of the day regardless of the method of data analysis used researchers see data through ‘the

lenses we have at our disposal at any given time' (Ely et. al 1991:143). Apart from having the interviews semi-structured, key informants were deliberately chosen on the basis of their specialised knowledge and experience. Depending on their role, job-title, and their likely perspective on the issue of ICT and vocational education, some questions were more relevant to some interviewees than to others.

3.9. Conclusion

The research methodology used in this thesis was a case study which combines quantitative and qualitative techniques, with the overriding emphasis being on qualitative research. Having said that, the analysis of the literature review represents a major part of the research as it sets the scene for the appropriate research questions. Qualitative analysis was based on key informant, semi-structured interviews, two focus groups and a staff questionnaire. Quantitative analysis was limited to a particular amount of questions from the staff questionnaire.

On reflection of the research that was carried out, the following are highlighted as critical success factors, which the researcher would try to incorporate into any future research projects in order to improve the quality of the research;

- balance well-defined goals and objectives with a degree of open-mindedness and flexibility in relation to the questions and answers that the research uncovers.
- Conduct a thorough literature review before finalizing the research questions.
- prepare a schedule of interviews well in advance and have a careful selection process for key informants (they must provide a balanced set of expertise).

Chapter 4

Findings

4.1. Introduction

Informants were chosen due to their knowledge of educational issues affecting all students while several were selected because of their expertise in the use of ICT in an educational setting. Although the research consisted of all active lecturers involved in vocational education within the Institute at the time of the study, it is essential to bear in mind that the sample size was (19). It must also be noted that data generated through the interviews, two focus groups and questionnaires must be considered as each respondent's opinion only.

The findings are presented first by detailing the general demographics of the participants of the research. This is then followed by a detailed examination of the data in relation to the opportunities and constraints in relation to ICT supported practices. The findings conclude by presenting the data in relation to staff perceptions to the use of ICT.

4.2. Demographics

The research for this study was carried out during Term 3 of the 2009/2010 academic year in an Irish Institute of Technology. This Institute of Technology currently caters for two groups of sixteen for four trade groups which are Brick & Stone, Carpentry and Joinery, Electrical, and Plumbing. The participants of the research included nineteen

Lecturers; three Brick & Stone, three Carpentry and Joinery, seven Electrical lecturers, and six Plumbing lectures at the Institute during Term 3.

The bar chart (4.1) highlights three-quarters of the lecturers were 40 years old or younger. A quarter fell within the range of 41-50.

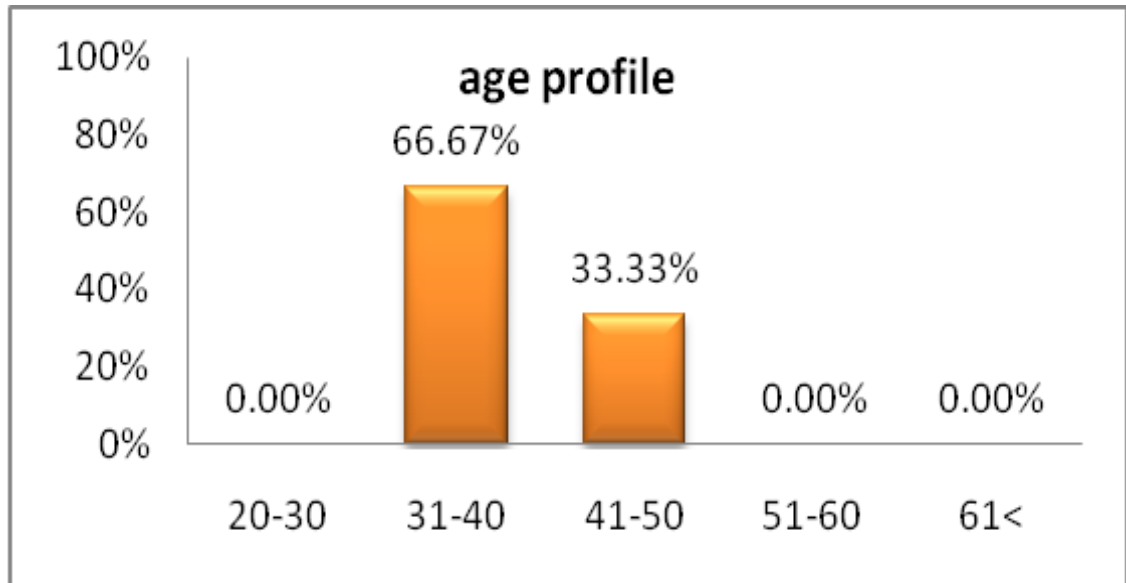


Chart 4.1 Age Profile

The majority of lecturers (58%) questioned had served between 6-10 years lecturing within a vocational education setting with a quarter responding that they had completed over ten years of service. A small percentage (17%) indicated they had served five years of less. These results should be considered in the context that the part of the Irish apprenticeship system that is delivered at the Institute of Technology consists of two 11 week blocks (phase 4 & phase 6).

This allows for three 11 week blocks per academic year, as opposed to the standard two semester system employed for traditional courses at most Irish third level institutions.

As well as this, the plumbing area would have additionally taught a further block per year during the last seven years.

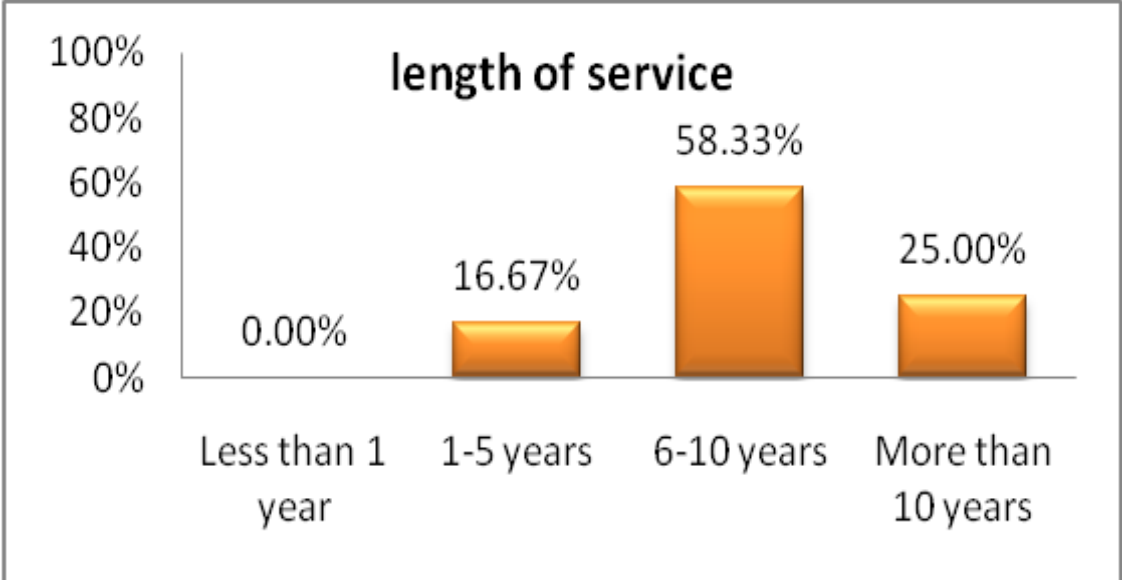


Chart 4.2 Length of Service

All respondents replied that they had reached a high level of education with 43% achieving a BA, BSc, or MA. This high level of education achievement was reinforced with more than one responding that either they had achieved the level of Masters in the use of ICT in an educational setting or were currently engaged in attaining that level. It is also noted that in order to be employed as a lecturer in an Institute of Technology in Ireland delivering vocational education (trades) the applicant must already have achieved an Advanced Craft Certificate as well as have 5 years post-apprenticeship experience.

4.3. The use of ICT by the sample group

It was decided from the beginning of this study to determine what types of ICT resources were being used, and a list was created following a discussion with the key informants and a review of the relevant literature. Lecturers while completing the questionnaire were asked to indicate their frequency for the use of 13 types of ICT resources listed in each of four contexts: classroom practice, professional development, personal use and administration. Their responses were scored as follows; Daily=4, Weekly=3, Monthly=2, Termly=1, with 'never' and no responses being given a score of zero. An average score was then derived for each resource in order to compare frequency of use of the different resources. A maximum score would consist of daily use in all four contexts or a mean of 16.

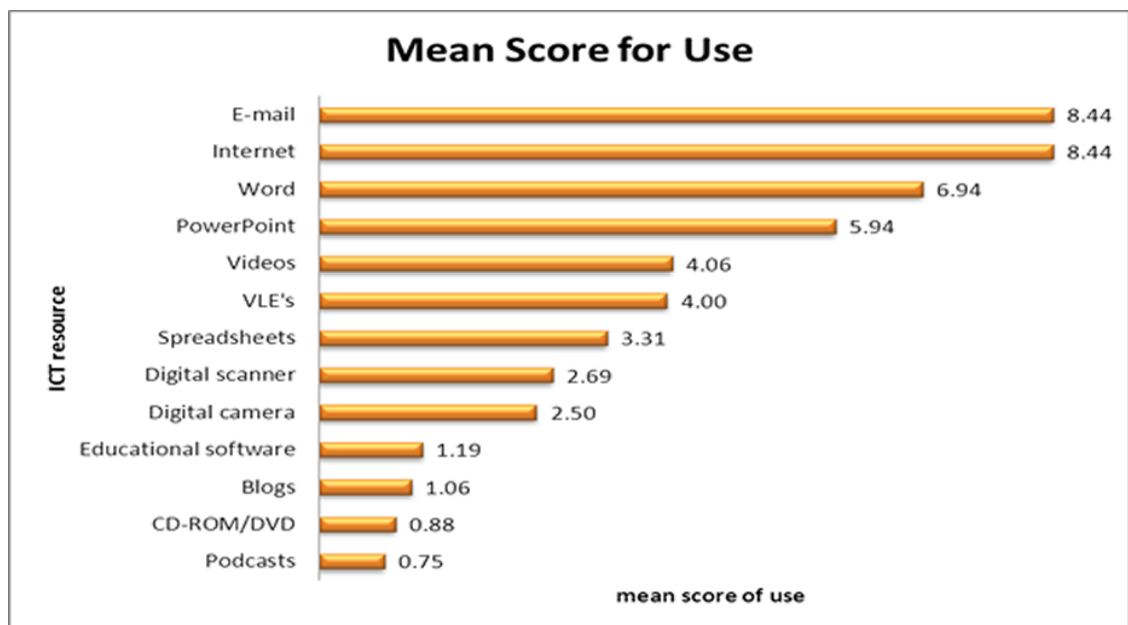


Chart 4.3 Mean Score of Use

As can be seen from the bar chart (4.3), e-mail and the internet scored the highest with a mean rating of 8.4. The scores for email and internet are closely followed by the use of word-processing and PowerPoint at 6.94 and 5.94 respectively. Videos' (4.06) and

Vle's (4.00) with almost identical scores are used 50% less than both email and the internet and 25% overall total mean score. Educational software (1.19), Blogs (1.06), CD-ROM/DVDs (0.88), and Podcasts (0.75) are rarely used by lecturers.

In order to compare frequency of use in each context, the individual scores for use of each type of ICT resource were summed within each context (classroom practice, professional development, personal use and administration) allowing an average score for use to be derived for each context. The scores can range from 0 (never use any of the resources listed in a particular context) to 52 (daily use of each of the 13 resources in a particular context).

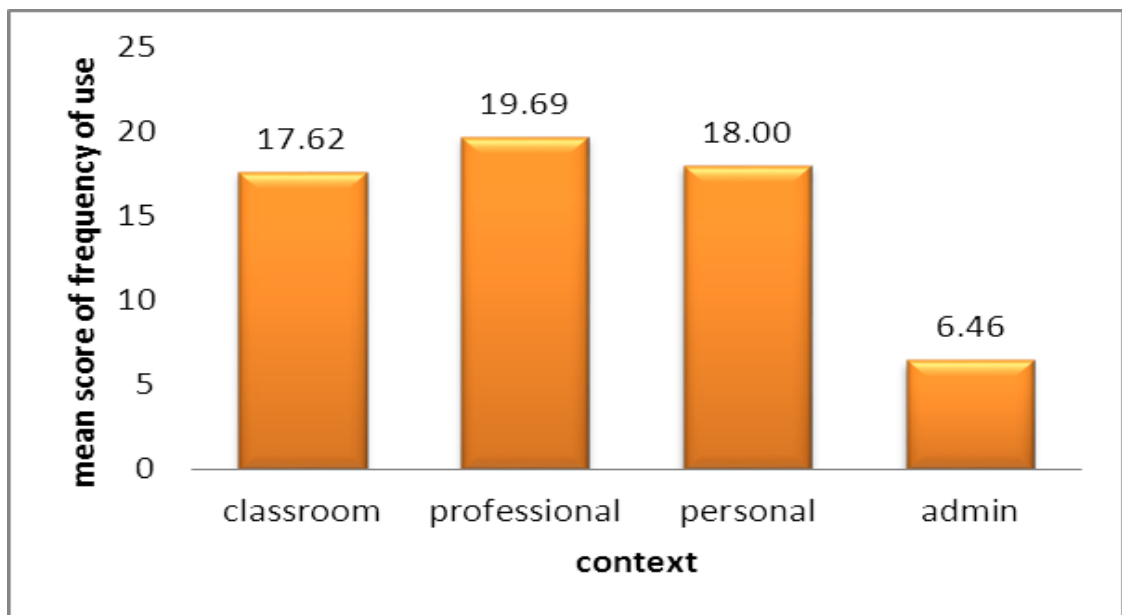


Chart 4.4 Mean Score of Frequency of Use

The chart (4.4) depicts a relatively low level of use regarding ICT resources across the four contexts. Classroom practice, professional development and personal use all scored moderately close to each other with professional development achieving the highest mean score of 19.69. Personal use recorded a mean score of 18, and classroom

practice realizing a mean score of 17.62. ICT used for administration purposes showed very little use, with respondents indicating that they mainly use it on termly basis (6.46).

4.4. Opportunities presented by the use of ICT in vocational education

Through the examination of the data from questionnaires, focus groups and interviews as well as a review of relevant literature several themes began to emanate as to the opportunities presented by ICT. They are time, access, technical (covering both training and equipment) and motivational factors. The following section will present the data in relation to the opportunities presented by ICT supported practices in vocational education.

4.4.1. Time

Lecturers have found that the use of ICT supported practices could help support the improvement of the delivery of their modules. For instance one Lecturer expressed the belief that; “I find putting my material on Moodle helps me plan my teaching.” Another lecturer involved in this research highlighted the rewards of engaging with ICT stating, “A lot of time needs to be out in the start, once the time and effort is out in the rewards can be seen because class preparation time can be reduced.”

The use of spreadsheets has also been acknowledged by several respondents as a benefit when correlating results for submission with one stating; “the spreadsheets clearly identifies each students results onto one page and decreases the amount of time required in determining final results.”

4.4.2. Access

Regarding access a respondent to the questionnaire stated; ‘Students are more likely to access material outside classroom time.’ Focus group one in particular discussed the issues surrounding access and the particular benefits that ICT supported practices can afford. The first that spoke on this issue stated; “it allows student access to information from outside college which previously they could not achieve.” The second felt that “ICT allows every student access to subject material. If students are unable to attend lecturers because of health reasons or bad weather they can still access class notes.” Echoing the previous comments, the third highlighted the monitoring of students; “Share more information with students – can set up learning aids – can monitor student use.” The final member stated;

It provides me with the opportunity to keep in touch outside of the classroom with my students – this in turn affords the student the opportunity to access learning material at any time or place while choosing modalities of preference

4.4.3. Technical (training)

Examples of written statements from the questionnaires regarding technical training include, ‘I would like to know more about Moodle as I feel it has a lot more to offer, particularly with revision’ and ‘I don’t know enough about blogs but I would like to use them.’

The chart (4.5) illustrates the type of training that the lecturers feel would allow them to take advantage of ICT supported practices. The majority (28%) felt that that they would benefit from training in a virtual learning environment. Many of the comments were similar to the following, ‘e-learning may help to improve the current learning outcomes

of the apprentices as an ‘add-on’ to existing studies.’ Power point (18%) was also highlighted as an area where respondents felt that they would like to receive training. Videos received 3% with only a two lecturers showing interest in this area. When lecturers were questioned during both focus groups about the use of video one stated, “YouTube is brilliant, anything that you want to show there is a video on YouTube of it. The students like it, it suits the visual learner.”



Chart 4.5 Training Requested

4.4.4. Technical (equipment)

All lecturers who replied to the questionnaire indicated that they used a variety of ICT supported practices within the classroom. The most used resources were educational software (53%) and PowerPoint (48%), closely followed by VLE's (41%) and videos (38%). A lecturer responding to the discussion regarding ICT equipment highlighted the use of PowerPoint in the classroom, “You can flick through material in clear step

by step clicks of a mouse and go forward or back if necessary, you couldn't do that without the overhead projectors”.

4.4.5. Motivational factors

One lecturer suggested that ICT provided an; ‘Opportunity to approach delivery differently allowing learning to be less formal.’ Several lectures discussed the approach of implementing ‘a system of continuous assessment.’

Focus group two debated the merits of problem based learning and many suggestion that student need opportunities with a representative statement from the focus group being; “This all comes more easily to those who are willing to make a mistake or two.”

Quality of learning material was discussed as a motivational factor. One lecturer stated that; “the boys can read through you, they know if what you have on the board is waffle”, with another highlighting the advantage of using ICT equipment stating that it, “provides better quality and delivery of up-to-date material”.

4.5. Constraints encountered by the use of ICT in vocational education

The themes that emanated in relation to the opportunities presented by the use of ICT have also been highlighted as possible constraints. These data pertaining to the perceived constraints will also be presented under the headings time, access, technical (covering both training and equipment) and motivational.

4.5.1. Time

The one constraint of ICT supported practices that was consistently mentioned in both focus groups as well as several of the interviews was lack of time. With one participant

stating; “A lot of time needs to be in the start. Once the time and effort is put out the rewards can be seen because class preparation time can be reduced”. During focus group one it was stated that; “module allocation can change from term to term, why would I spend a huge amount of time developing resources maybe never to use them again”, with other respondent making the point, “I’m not sure of the value to the students of using my time in that manner”.

A majority of participants expressed that they had to create their own resource for use in their classes. “Getting time to develop my material” was a common statement. This tallied with the questionnaire where it was confirmed that Educational software, CD-ROM/DVDs’ are rarely used by lecturers. When lecturers responded to the statement ‘I’m interested but don’t have the time’ the average result was that they neither agreed nor disagreed with it.

4.5.2. Access

Many of the lecturers mentioned practices they were or would like to implement but were restrained from due concerns over the lack of access. Examples of this concern include statements such as; “Convenient access to a computer is also a barrier for some students”, and “Not all students have home pc’s.’ The use of passwords for access to the Institutes ICT hardware was also mentioned as a possible constraint. Some of the lecturers felt that too much time was lost at the start of the term waiting for learner passwords to be distributed.

4.5.3. Technical (training)

During focus group two a discussion began by debating the educational merits of using ICT supported practices. One respondent felt that the course length of 11 weeks and the academic level of the students are not suited to the use of ICT supported practices and his comment was debated on during a focus group. He stated, “The length of the course and the level of the students attending lend itself to particular methodologies”. A colleague of his commented; “I’m not sure ICT suits apprentice training”. He further stating; “I desperately require training in Moodle, PowerPoint, and Word”. And another spoke about his, “Lack of training”. A respondent summarized the discussion when he stated that there is a; “Lack of awareness, knowledge, know-how, Lecturers require more confidence in using ICT”.

4.5.4. Technical (equipment)

Many members of staff detailed the constraints in relation to ICT equipment. In particular some members highlighted the costs involved; one interviewee discussed the issue from a management perspective stating:

I’ve always argued that they’ll give you millions to build buildings but I’ve never managed to successfully convince them to give us millions to achieve the same end result by using a ICT infrastructure. So ultimately that will be our main constraint.

Several lecturers also raised the issue of cost; during one of the focus groups they debated the merit of making small amounts of funding available to support ‘local’ projects. Though the Institute has a fund for such projects they expressed the opinion that the paper work placed an additional burden in the implementation.

Lecturers continuously stated that access to ICT equipment that was working first-time in the classroom was consistently a problem. An individual lecturer stated that he had to locate all his learning material on his own website; “I got some help from outside and now have all my material on my own site, with no passwords, hassle free”.

4.5.5. Motivational factors

Many of the comments during the focus groups in relation to motivational factors stated that there is a general “lack of interest in ICT” and “students not happy using computers”. As one lecturer stated; “many apprentice students are not computer literate – this can sometimes be a barrier when seeking student buy-in.” For instance a lecturer commented; “Lack of knowledge by the student in e-learning but may need extra tuition at the start of the course/term to bring student up to date”. A further constraint highlighted by a lecturer was that the use of ICT supported practices may be a disincentive to a learner from attending classes. During focus group one it was suggested; “If all class material is available electronically this may reduce the number of students attending class”.

Towards the end of one of the focus groups a discussion took place about the difficulties of finding appropriate material on the web, and the skills required to filter through the large amount of material. One lecturer is recorded as saying; “it is difficult to find appropriate and exacting information on the web and students are not prepared to scroll through lots of crap to find out about a particular subject.”

4.6. Staff perceptions towards the use of ICT in the vocational educational setting

A series of questions were asked of the questionnaire respondents in order to gauge their perceptions towards the use of ICT supported practices. The respondents rated each question from one to five. (one = strongly agree, two = agree, three = neither agree nor disagree, four = disagree, five = strongly disagree). The responses were grouped by vocational trade area and an average of their responses was recorded. What follows is the finding from the questionnaire as well as a discussion in relation to these results.

There is very little difference between those members of the four trades' responses in relation to ICT supported practices with a variance of .4 in the following questions.

They all replied for example that;

- 'ICT helps me find heaps of relevant information for my teaching' (1.6)
- 'I manage information more effectively because of ICT.'(2.0)
- 'I find using ICT time consuming.' (1.8)
- 'I'm not particularly fond of computers.'(4.3)
- 'I wish it had never been invented.' (4.6)

When asked if training was a priority the Electrical (3.7) area were less likely to say it was. With both Brick and Stone (2.0) and Carpentry (2.0) indicating that they see training in ICT supported practices as a priority. Plumbing (3.0) neither agree nor disagree that training was a priority for them.

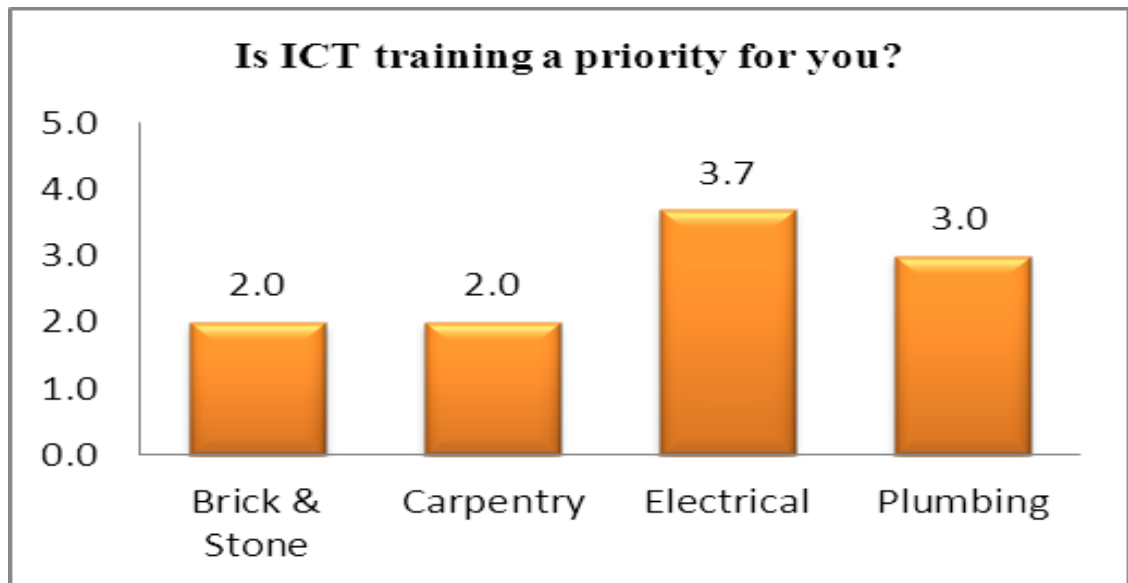


Chart 4.6 Is ICT training a priority for you?

They were then asked if they felt that their skills and knowledge in ICT are adequate. The Electrical (2.1) area denoted that they agreed that their skills and knowledge in ICT are adequate. Brick and Stone (3.3) and Carpentry (3.7) convey that they disagreed

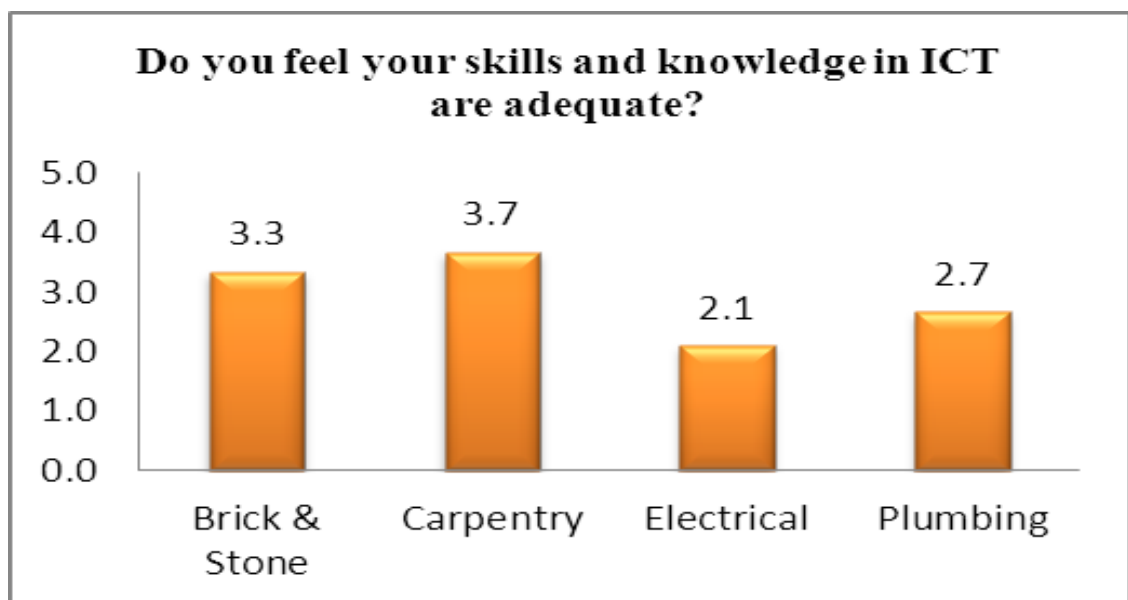


Chart 4.7 Do you feel your skills and knowledge in ICT are adequate?

which suggest that they feel they require further training in this area. Plumbing (2.7) neither agrees nor disagree that their skills were adequate.

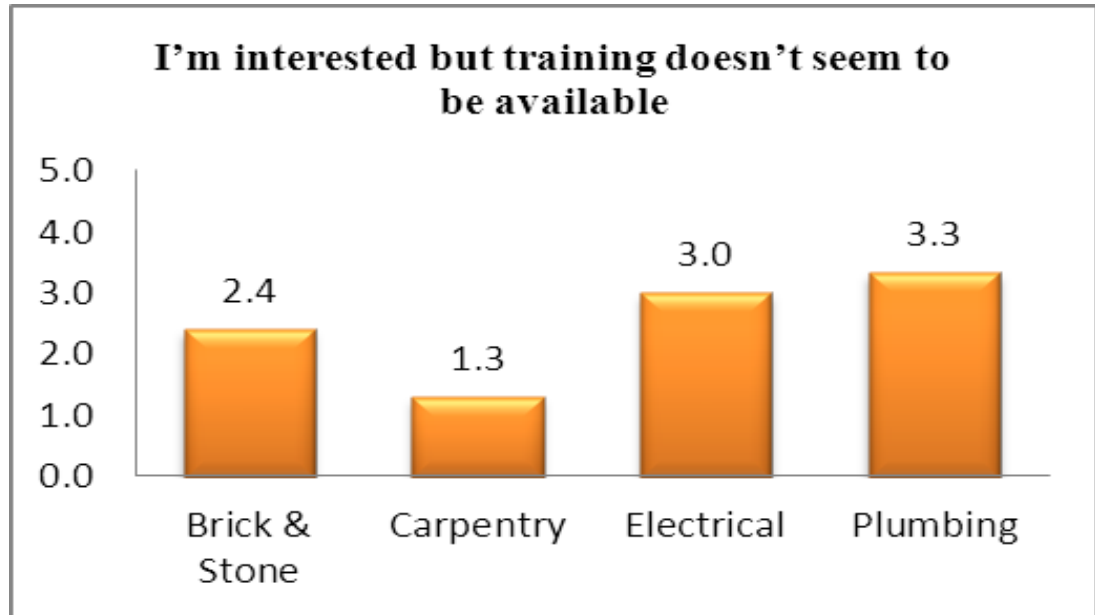


Chart 4.8 I'm interested but training doesn't seem to be available

Both Brick and Stone(2.4) and Carpenrty(1.2) indicated that they were most interested in further ICT training and saw it as a priority. They also signified that they felt that their skills and knowledge in ICT were inadquaete. Further investigation highlighted the fact that the Brick and Stone and Carpenrty area consists of several lecturers who have undertaken further study in the area of ICT supported practices. This investigation also highlighted the fact that the electrical area (3), neither agree nor disagree with the statement 'I'm interested but training doesn't seem to be available' consists of lecturers who have specialised in their domain as opposed to further studies in the field of education. Plumbing (3.2 also neither agree or disagreed with the statement though no explanation why was provided.

Chapter 5

Discussion

5.1. Introduction

It is proposed that an examination of the retrieved data will provide an insight to possible answers to the questions posed at the beginning of this paper. This section contains a detailed examination of the themes emanating from the data in relation to the specific research questions of the dissertation.

5.2. The use of ICT by the sample group

The bar chart highlights three-quarters of the lecturers were 40 years old or younger. A large amount of research has shown there is a relationship between age and technology adoption in learning. Technology assimilation among older people is slower compared to younger people (Morris & Venkatesh, 2000) (Bosma et al., 2003).

This high score for email (8.44) reflects the situation at the institute where most formal communication taking place between management, academic staff, and students is through the use of email. This coincides with a case study in the Faculty of Business at Central Queensland University Australia where researchers (Gregor and Cuskelly 1994) found that over 80% of students surveyed thought the use of email assisted in their learning, they suggested that the instructor seemed more accessible and that they would recommend further use of email in their studies.

When asked about their reasons for using PowerPoint members of the focus group two expressed that they found it easy to use as it allowed for the conveyance of a large amount of information. It enabled information to be delivered in a variety of formats to allow for differing learning styles and students expect a lecture to be delivered using PowerPoint. This last statement concurs with a survey carried out by researchers at the Hamilton Library, University of Hawaii at Manoa on the use of PowerPoint's they found that 73% of 181 respondents indicated "they usually frequently or always prefer speakers to use PowerPoint." (Brier and Lebbin 2009).

Educational software (1.19), Blogs (1.06), CD-ROM/DVDs (0.88), and Podcasts (0.75) are rarely used by lecturers. There are two main themes emanating from discussion on why Educational software, Blogs, CD-ROM/DVDs and Podcasts might not be used. The first revolves around the funding issues in purchasing the relevant educational software and CD-ROM/DVDs. One interviewee described fears about spending large amounts of money and not getting the educational return for the investment stating; "I would imagine that to purchase the relevant gear that it is very expensive, will we get the return." The second element of the discussion revolved around how to use the different ICT resources particularly in an education setting Blog's and podcast were seen as an update and interesting way of delivering content but staff were unsure on how the opportunities presented by these resources could be achieved. This discussion is best summed up with the following quote from focus group two; "the main reason why I do not use blogs or podcasts is because I am not familiar with them and I am unaware of their educational uses".

This relatively high score can be attributed to the use of PowerPoint (19.69) within all classrooms and workshops within the institute. The two focus groups agreed that ICT use for administration was limited to two main tasks, attendance returns for apprentice learners and entering results.

5.3. Opportunities presented by the use of ICT in vocational education

Through the examination of the data from questionnaires, focus groups and interviews as well as a review of relevant literature several themes began to emanate as to the opportunities presented by ICT. They are time, access, technical (covering both training and equipment) and motivational factors. The following section will present these themes in relation to the opportunities presented by ICT supported practices in vocational education.

5.3.1. Time

Time is considered by most lecturers as their most precious resource. Becta the government agency in Britain that is tasked with ensuring the effective and innovative use of technology throughout learning has expressed the opinion that, 'Research on teacher workloads is extensive but there is relatively little on the role information and communications technology can play in reducing teacher workloads.' (Becta, 2002) Though the PricewaterhouseCoopers (PwC) report previously discussed estimated that through the use ICT supported practices teachers could save between 3.25 and 4.25 hours per week. If any opportunities of using ICT supported practices are to be achieved a reduction in the total time required to support these practices must be kept to a minimum.

Two main areas that have been highlighted is the use of ICT is for the delivery of modules and administration of programmes. Lecturers have found that the use of ICT supported practices could help support the improvement of the delivery of This compares favourably with research carried out by Gilligan (2001) involving 21 business lecturers where he found; ‘All module leaders/teaching teams liked the VLE to provide module and subject resources.’

Material can be delivered in a variety of formats to suit the learner. Knowles (1973) in his book *The Adult Learner: A Neglected Species* wrote; ‘an aspect of the environment which all theorists agree is crucial to effective learning is the richness and accessibility of resources.’ He highlights the importance of effective learning materials being available to a learner at a time of their choosing.

5.3.1. Access

A majority of respondents agreed that ICT could have a positive impact on allowing learners to progress at their own pace; allowing access to resources which better suited their individual learning style. Having material available at home on 24/7 basis opens up opportunities for students who live long distance from a learning centre. ICT supported practices allow lecturers to provide material in a variety of formats including text, video, audio and interactive multimedia. It can also allow for students to meet in less formal situations to discuss and learn, in essence forming a community of practice. (Nickols, 2007)

5.3.2. Technical (training)

Many of respondents of the research expressed the opinion that if they received training in specific areas that that would allow them to take advantage of ICT supported practices. There appears to be an appetite for training among some of the lecturers. YouTube, the popular video sharing website, was being used by many of the lecturers though the result of 3% appears to reflect an apprehension on their part in learning the skills in order to create videos themselves.

Interestingly all of the respondents discussed the questions relating to the opportunities of training in relation to the effect they would have on their own knowledge as opposed to the opportunities it would provide for their learners in learning. This may indicate that ICT supported practices are such a new field that lecturers are still trying to identify their role and how it will fit in with the delivery of material and their own assumptions and views on education

5.3.3. Technical (equipment)

As stated previously, the institute at which this research is focused has invested heavily in ICT resources. The computing facilities within the Institute comprise of 25 computer laboratories. With over 700 computers available for student use with application software for respective course module requirements, each computer laboratory is fitted with an overhead projector with integrated sound system, and is connected to the lecturer's internet enabled PC. Other non-computational hardware includes desktop scanners and digital cameras. The availability of hardware has allowed lecturers to take advantage of ICT supported practices.

5.3.4. Motivational factors

There are many opportunities to improve student motivation through the use of ICT supported practices. Many adult learners suggested that their students prefer a system of continuous assessment as opposed to end of term. The use of the communication technologies allows for students to learn at their own time and location. This regular, almost industry like communication style, can allow for a different dynamic to be created between the lecturer and the learner. This change can allow the lecturer to perform the role of facilitator, engaging with the learner as an equal and allowing the learner to take control of their learning. Researchers (King, 1993, Jones, 1999) describe this as moving from the ‘sage on the stage’ to the ‘guide on the side’ or moving to a more constructivism type of model of education. Many adult learners prefer a system of continuous assessment as opposed to end of term exams and the use of VLE’s can support a lecturer’s use of continuous assessment methods. With the assignment function with the institutes VLE a student may submit assignments to the lecture on a regular basis, ‘to implement a system of continuous assessment.’ The lecturer can also set self-marking quizzes for the learners to take. These allow the learner to demonstrate their learning at regular intervals.

Computer software allows for a user to make mistakes and have them easily corrected. Learners are sometimes apprehensive of investing large amounts of time on learning activities only to learn that it may have been wasted. Through the use word processing packages such as Microsoft Word learners can easily rectify errors and the copy and paste facilities allows them to share their learning activities with a variety of software packages. For the learner to be in a position that they are able to make mistakes and

then remedy them effortlessly can contribute to the learning experience which helps to increase learner motivation.

Quality of learning material provided to the learners can also improve motivation of learners. The use of high quality and appropriate material was deemed to be fundamental to learner engagement. Students seem to feel more comfortable when presented with professional appearing material.

The majority of the comments in relation to motivational factors and their impact on the successful use of ICT supported practices suggest that the learners' predisposition to the use of technology greatly determines its success. This concurs with Lee et al. (2002) who found in a study evaluating student perspective on using computers that their attitude played an important role determining the success of its use.

5.4. Constraints encountered by the use of ICT in vocational education

Interestingly the themes that emanated in relation to the opportunities presented by the use of ICT have also been highlighted as possible constraints. These constraints will also be discussed under the headings time, access, technical (covering both training and equipment) and motivational.

5.4.1. Time

The one constraint of ICT supported practices that was consistently mentioned in both focus groups as well as several of the interviews was lack of time. Though it is acknowledged that if the effort is put at the start it will free up time in the future, lecturers are still apprehensive to frontload any extra amount of time than they feel is

essential. Lecturers clearly make the point that module allocation must be consistent and well planned to enable them to plan the use of ICT supported practices. They also feel that they must get reuse out of any ICT resources that they create. This concurs with work that Unwin (2007) completed where he stated;

teachers do not have time to learn from experience and have difficulty keeping up to date and they may feel reluctant to invest time and effort with the latest technologies.

In research evaluating the Teaching and Learning Technology Programme in the UK, Joyes (2000) also found, ‘the notion is that ‘experts’ outside of the lecturers’ culture are unlikely to produce software or teaching materials that support their use of ICT.’ This tallied with the questionnaire where it was confirmed that Educational software, CD-ROM/DVDs’ are rarely used by lecturers. Though, many feel strongly that they don’t have the required time to contribute to creating ICT supported learning activities or as implied in their response to the questionnaire, the material that they used must be created by them.

5.4.2. Access

The issue of access has also been acknowledged as a barrier for the use of ICT supported practices. All of which contain elements requiring the learner to engage with the learning material from outside the institute. Though it is important to have a concern about access to a computer for assisting in their studies, previous research would confirm that this is increasingly becoming a smaller barrier for learners in the use of ICT supported practices. In one recent European funded project, a phase 4 electrical apprenticeship class consisting of 32 students, none of the students had difficulty in access the institutes VLE sufficiently in order to fully engage with their studies. (Owende, Lavelle & Ferns, 2007) The use of passwords for access to the

Institutes ICT hardware was also mentioned as a possible constraint. The concern with regard to learners remembering passwords is diminishing within the vocational learning area as more and more of the learners attend with improved ICT skills. They have become accustomed to the idea of having to remember passwords for use in areas such email, online banking and community forums.

5.4.3. Technical (training)

Lecturers' attitude to the use of ICT supported practices appears to stem from their lack of training both in the creation of learning resources as well as their integration into teaching. Many of the lecturers stated that they are aware of the various types of technology available to them, but they have also expressed the opinion that they are unsure on how to implement their use in an educational setting. The use of Blogs, podcasts and forums were particularly mentioned as areas that further investigation into their educational use would be required.

5.4.4. Technical (equipment)

Though the Institute has invested heavily in ICT infrastructure, the requirement to have state of the art facilities places a heavy burden on management.

Claims with regard the filling in forms in order to receive funding may be a legitimate though the subtext of many of the lecturers arguments hinted to a fear of successfully applying for funding for a project and the project not deemed to be a success. Interestingly Oliver (2003) notes that funding for research and developments projects centred on ICTs are short term and positive outcomes are expected.

5.4.5. Motivational factors

There are many constraints in student motivation through the use of ICT supported practices. Respondents stated that they felt their learners would not engage with ICT supported practices though this contradicts much of the information emanating from research in to the use of ICT by learners. For example, Hickey (2010) found in a study of 32 brick & stone apprentices at an Irish Institute of Technology that they enjoyed using technology and thought it played an important role within their learning. Over 90% indicated they would like to learn using technology again. In order to alleviate some learners discomfort in using ICT in an educational setting the students may require an introduction to ICT supported learning. The training would concentrate on the students' role within this new learning paradigm. They maybe unsure of their own role within the new dynamics that are being created by the use of ICT supported practices. A further constraint highlighted by a lecturer was that the use of ICT supported practices may be a disincentive to a learner from attending classes. This claim is refuted by a report from the Dublin City University Teaching and Learning Committee (TLC). The authors (McMullan & Munro, 2003) of their report on '*Access to Lecture notes: Review and Best Practice*' found that there may be many reasons why students do not attend classes as they stated;

A number of those staff who had provided notes reported that lecture attendance dropped off during the course of the semester, but the general feeling was that this was unlikely to be a direct consequence of the provision of notes.

Following on from this, lecturers were asked if learners can learn completely online, they stated that it wasn't possible. It can be seen that there is a real issue here. It may be due to a lack of training on how to decide what type of material is appropriate to be made available online.

Finding appropriate and exacting information on the web was highlighted as a difficulty amongst both lecturers and students. Wikipedia is an example of this difficulty. The popular information resource goes to great effort to ensure the reliability and validity of its content. As they state; “articles should be based on reliable, third-party, published sources with a reputation for fact-checking and accuracy.” (Wikipedia, 2010) This is not always the case as some sources of information particularly on the internet are of a dubious nature. Even with Wikipedia’s emphasis on ensuring material is factually correct many academics disapprove of its use.

5.5. Staff perceptions towards the use of ICT in the vocational educational setting

Summarising the responses to the questions regarding the staffs perceptions towards the use of ICT in the vocational educational setting it becomes evident that the respondents across all trades agree that ICT has positive role to play. They find it allows them to gather information, organize it and distribute it to their learners. Though they find the use of ICT is impacting on their time to complete their work.

Interestingly there is a difference in opinion between the various trades in relation to training. Lecturers require training in the area of ICT supported practices if they are to become aware of the possibilities that exist. Brick and Stone and Carpentry area consists of several lecturers who have undertaken further study in the area of ICT supported practices and continue to be the most innovative in the use of ICT. The Electrical and Plumbing areas consist of lecturers who spent more time on further studies in their own domain so have not been introduced properly to the opportunities that ICT may present to them.

5.6. Weaknesses of the research

There were several weaknesses that presented themselves while undertaking this research. Firstly it was felt that the cohort of lecturers that responded to the questionnaire and took part in the focus groups were not of an adequate size to gauge an accurate outcome. In reality the study would need to cover all lecturers involved in vocational education within Ireland at a particular time. As previously mentioned several of the lecturers are in the process of completing masters programmes in the areas of ICT and education. Their particular interest in the area of ICT will have an impact on their perceptions of the opportunities and constraints. The institute also has a positive view of ICT in education and actively promotes its use. Another weakness could be attributed to the researcher's professional relationship with the respondents of the research. They may have been inclined to respond with that answers they thought were wanted as opposed to their true beliefs. Finally the researcher's intimate knowledge of the institute, vocational education, and in particular the use of ICT within them may taint the outcomes.

5.7. Conclusion

The discussion section of this paper set out to present an insight to possible answers of the following research questions and provide an opportunity for their discussion.

- What is the current usage level of ICT amongst vocational lecturers at the selected institute?
- What are the perceived opportunities for the use of ICT in the vocational educational setting?

- What are the perceived constraints for the use of ICT in the vocational educational setting?
- What are staff perceptions towards the use of ICT in the vocational educational setting?

It began by detailing the general demographics of the participants of the research and then is followed by a detailed examination of the data in relation to the opportunities and constraints for the use of ICT in vocational educational setting. This detailed examination presented several themes, consisting of time, access, technical (covering both training and equipment) and motivational factors.

It is worth mentioning that the findings of this research would prove difficult to apply in another context. There is however several general conclusions that can be made in regard to making the most of the opportunities and reducing the constraints in relation to using ICT supported practices in vocational education. The following chapter will present these conclusions and also suggest a series of recommendations for improving the use these ICT practices within an Irish third level institution.

Chapter 6

Conclusion

6.1. Introduction

The final chapter of this research project is a discursive representation of conclusions drawn from the findings and discussion and a list of recommendations. This paper set out to examine issues surrounding the use of ICT supported practices and though many examples of opportunities and constraints have been examined in previous research it was this papers rationale to look at the particular opportunities and constraints presented to lecturers involved in vocational education at an Irish third level institution.

The research consisted of interviewing six key informants in relation to the factors affecting the use of ICT supported practices for vocational education. These interviews informed the design of the questionnaire that was then given to 19 lecturers involved in vocational education at the selected Irish third level institution. The investigation was completed by holding two focus groups each consisting of four lecturers at the institute.

The perceived opportunities that presented themselves were grouped under four main themes and the following is a conclusion of these themes.

The first theme was time and the opportunity that ICT presented in reducing teacher workload. It was highlighted that the use of ICT helped organise course resources and reduce time spent on administration.

The second theme that presented opportunities was access. ICT supported practices supported students in access material of a time of their choosing. Lectures also noted that material must not only be available at a time that suites the students but also in a format that can understand and digest.

The third theme presented covered technical requirements consisting of both training and equipment. Training was considered of most importance in relation to seizing the opportunities presented by the use of ICT supported practices. All of the data highlighted the need for further in depth training in ICT and how it may be applied within the delivery of the curriculum.

The fourth theme is in the realm of motivation and the positive aspect that ICT supported practices can affect student motivation. Lecturers found that appropriate use of ICT allows for student to learn at a time and location of their choice which in turn changes the dynamics of the teacher/student relationship. It allows the lecturer to perform the role of facilitator, engaging with the learner as an equal and allowing the learner to take control of their learning. ICT allows the students to make mistakes and correct them easily. Finally they highlighted the use of high quality and appropriate material was consistently mentioned as fundamental to learner engagement.

The perceived constraints that presented themselves were also grouped under four main themes and below is a conclusion of these themes.

The first theme that was perceived as constraint was time. Lecturers consistently stated that time required more time to create appropriate materials in order to implement ICT

supported practices. They also indicated that buying learning resources was not the answer, suggesting that materials that they are involved in creating will be the most relevant and most utilised.

The second theme that was perceived as constraint was access. Issues relating to logging on to pc and access to VLE's were the main constraints highlighted under this theme.

The third theme, technical (training and equipment) highlighted the need for training in the use of ICT. They named specific technologies that they felt would allow them to instigate ICT supported practices, but the lack of training was a barrier to its successful implementation. ICT equipment that was working first-time in the classroom was also noted as a barrier to the use of ICT supported practices.

The fourth constraint that was construed from the research data was poor motivation. Many of the lecturers stated that students are not happy using computers though much research contradicts this view. As technology becomes more available, this may become less of an issue. They also stated that finding relevant material in a timely manner was difficult. If they could not find material quickly they found it demotivating to continue using ICT for learning.

The staff indicated they felt that ICT had a positive role to play in education. They find it allows them to gather information, organize it and distribute it to their learners. They have also found the use of ICT is helping to reduce the amount of time required to complete their work. All trades highlighted the need for further training. Those with

previous qualification in education were particularly vocal in their need for training in the implementation of ICT supported practices

In conclusion this research has shown that lecturers will find it difficult to ascertain the opportunities that ICT has to offer until they understand the principles of andragogy and various pedagogical models of education. As Olson (2000) suggested; “integrating new technologies requires innovators to understand and engage in conversations with teachers about their work culture, the technologies that sustain it and the implications of new approaches for those technologies”. Training is the key and time allowance to allow the training to take place. The ultimate goal in taking advantage of the opportunities and reducing the constraints is to allow ICT supported education to become normal working practice. Joyes summarises this paper when he writes; (2000)

Experience suggests that a prerequisite for embedding ICT in learning and teaching is that the academics teaching the course recognise the need for appropriate holistic evaluation to provide them with not only an understanding of how best to use the ICT, but more generally in improving their understanding of how to develop effective learning environments.

6.2. Recommendations

The following are recommendations for taking advantage of the opportunities and reducing the constraints of using ICT supported practices in a vocational educational setting.

1. Same modules to be allocated over an appropriate length of time. This would allow for a lecturer to create comprehensive learning material and also encourage the front loading of time to ICT supported practices.
2. Training in andragogy. This would allow lecturers to have a greater understanding of the needs of their learners
3. Reflective practice to become normal working practice. This would provide a framework for continuous improvement of the learning environment.

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Appendix

Appendix A: Questionnaire

Lecturers involved in Vocational Education Questionnaire

Dear Colleague

I am conducting research in the area of ICT and its use in vocational education as part of a MSc in Digital Media in Education. The purpose is to gain an understanding of the provision and development of the use of ICT and highlight opportunities and constraints it provides. This will allow the development of a model for development and implementation of ICT supported practices. Ultimately it is hoped that the information gathered in this study will ensure that ICT is used effectively to enhance the teaching and learning experience of learners.

I would be grateful if you could indicate as accurately as possible the options that most closely represent what you think. All responses will be treated in confidence and no individuals will be named in the reporting of results. I would like to express my gratitude for your help, as without you the study would not be possible.

Completed questionnaires to be returned by **March 19, 2010**
Thank you in anticipation of your co-operation in this study.

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Notes

For the purposes of this questionnaire you may interpret ICT (Information and Communications Technology) to mean:

Any computer based and communication technologies, networked and stand alone, including both hardware and software, which can be used as teaching, learning and information resources.

I am interested in your experiences of ICT in different contexts. I have defined these as follows:

Classroom practice e.g. using ICT to support your teaching in the classroom.

Professional development e.g. networking with other teachers; using software packages for developing professional skills.

Personal use e.g. finding information for personal interest; playing computer games.

Administration e.g. monitoring learner progress; recording learner grades.

YOUR USE OF ICT

I am interested in finding out your opinions of ICT. I would also like to know how you use ICT.

1. Do you use computers? (Circle One please)

Yes (please go to Q2.)

No (please go to Q4.)

2. How often do you use the following ICT resources in each of the contexts - classroom practice, professional development, personal use, administration? (see notes above)

Please code as follows: **D = Daily W = Weekly M = Monthly T = Termly** (leave blank if never)

	Classroom				Professional				Personal				Admin			
	D	W	M	T	D	W	M	T	D	W	M	T	D	W	M	T
Internet and World Wide Web (WWW)																
E-mail																
Word-processing																
Spreadsheets																
PowerPoint presentations																
Videos (e.g. YouTube)																
Virtual Learning Environments (e.g. Moodle)																
Blogs																
Podcasts																
Digital camera																
Digital scanner																
Educational software packages (e.g. Flash, Dreamweaver)																
CD-ROM/DVD information sources e.g. Encarta																

3. Where do you generally use ICT resources? (please tick all that apply)

- Classroom
- Computer lab
- Library
- Home
- Other (please state)

4. If you **do not** use a specific ICT resource in a classroom, professional development, or administrative context, (please tick the appropriate boxes).

- Internet and World Wide Web (WWW)
- E-mail
- Word-processing
- Spreadsheets
- PowerPoint presentations
- Videos (e.g YouTube)
- Virtual Learning Environments (e.g Moodle)
- Blogs
- Podcasts
- Digital camera
- Digital scanner
- Educational software packages (e.g. Flash, Dreamweaver)
- CD-ROM/DVD information sources e.g. Encarta

Please indicate why you don't use the specific resources

5. What do you think about ICT?

Whether you use ICT or not, I would like to know what you think about it. Please indicate whether or not you agree with each of the statements below by ticking the most appropriate box.

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
I'd like to know more about ICT					
I'm not particularly fond of computers.					
ICT helps me find heaps of relevant information for my teaching					
I know the basics of ICT but that is all.					
I've got information overload.					
I use it effectively myself but I'm not sure how to teach the learners to use it.					
I don't know what I would do without it.					
I manage information more effectively because of ICT.					
I wish it had never been invented.					
I find it helpful for non-work related tasks.					
I find using ICT time consuming.					
Some pupils are not particularly fond of computers.					
It makes my work easier.					
I prefer using it on my own when no-one is around to see me make mistakes.					
ICT helps pupils acquire new knowledge effectively.					
It cuts down my preparation time					
It's all moving too fast for me.					
I find it easy to select appropriate ICT resources for my teaching.					

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
I can't cope with all the ICT jargon.					
I feel supported in my use of ICT.					
Learners can get distracted by all the technology.					
ICT helps me communicate with colleagues.					
Systems are slow; I'd be quicker using a book.					
I feel lost in the information age.					
ICT encourages learners to work together collaboratively					
I can never find anything relevant for my learners.					
My current college has a positive attitude to ICT use.					
I don't have the appropriate skills to use it effectively.					
It seems to motivate the learners to learn.					
ICT swamps learners with information.					
The learners are way ahead of me in their use of ICT.					

6. In general has ICT had a positive or a negative impact on your teaching? (circle one please)

- Positive
- Negative
- Mixed
- Don't know

Please give examples (positive and negative)

7. In general has ICT had a positive or a negative impact on your pupils' learning? (circle one please)

- Positive
- Negative
- Mixed
- Don't know

Please give examples (positive and negative)

8. What opportunities do you feel ICT may be able to provide you in the delivery of your subjects? (for yourself, for your students)

9. What constraints do you feel may limit or constrain you taking advantage of the opportunities you have highlighted ICT may provide? (for yourself, for your students)

KEEPING UP-TO-DATE WITH ICT

10. How do you keep up to date with ICT developments? (Please tick all that you have used)

- Other lecturers
- E-mail
- Librarians
- Conferences
- Senior management
- In-service
- Computing department
- Schools Library Service
- Technician
- Educational Resource Services(E-learning manager)
- Educational Advisers(BUA, National Learning Network, PBL manager)
- Teacher Education Institutes
- Professional journals
- Newsletters
- Research journals
- Computing journals
- Internet
- Publishers catalogues
- World Wide Web
- CESI (computer education society of Ireland)
- Other (please state)

11. If you use ICT, how would you describe your level of ICT competence in the following contexts? If you do not use ICT, please go to question 10.

	Classroom practice	Professional development	Personal use	Administration
Very competent				
Competent				
Not competent				
Don't know				

12. Have you ever received any ICT training? (circle one please)

Yes

No

Can't remember

If yes please give details of this training.

and a) anything that was useful about it

and b) anything that was not useful

13. a). Are you interested in developing your skills and knowledge in ICT?

Yes

No

b) Please indicate whether you agree or disagree with the following statements:

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
I am interested in learning more about using ICT.					
I feel ICT training isn't appropriate to my teaching.					
I find training courses in ICT useful.					
I need to develop my skills and knowledge for professional development.					
I feel I should develop my skills to keep up to date with developments in teaching.					
I don't think I need ICT skills to progress in the profession.					
I'm not that interested but I suppose I should be.					
I need to develop my skills and knowledge for the learners' benefit.					
I don't see the need to learn about ICT.					
I'm interested but don't have the time.					
I'm interested but don't have access.					
I don't need to use ICT in my teaching.					
I really want to know more about developing my skills in ICT.					
I am interested personally but developing my skills and knowledge in ICT isn't appropriate to my teaching.					
I'm interested but training doesn't seem to be available.					
I don't think it's necessary, no-one else in the college is bothering.					
I would like to develop my skills and knowledge in ICT as everyone else is.					
I feel my skills and knowledge in ICT are adequate.					
ICT training isn't a priority for me.					

14. What are your priorities for developing your skills and knowledge in ICT in each of the contexts below? Please rank the list below from 1 to 10, 1 being your highest priority and 10 being your lowest

Internet and World Wide Web (WWW)	
Word-processing/Spreadsheets	
PowerPoint presentations	
Videos (e.g. YouTube)	
Virtual Learning Environments (e.g. Moodle)	
Blogs	
Podcasts	
Digital camera	
Educational software packages (e.g. Flash, Dreamweaver)	
Other	

If other please state here _____

YOU AND YOUR LECTURERING EXPERIENCE

15. How long have you been teaching (including probationary period)?

- Less than 1 year
- 1-5 years
- 6-10 years
- More than 10 years

16. Would you describe your teaching experience as predominantly?

- Full-time?
- Part- time?
- Supply?
- Mixed?

17. What trade area are you currently teaching?

18. Which Phase of the Apprentice training programme are you responsible for delivering?

- Phase 4?
- Phase 6?
- Both?

19. Which of the following educational qualifications do you have?

- College DipEd
- Med
- Mphil
- BEd
- PhD
- BA, BSc, MA
- MSc

Other (please state)

20. Are you:

- Male ?
- Female?

21. Which age group do you belong to?

- 20-30
- 31-40
- 41-50
- 51-60
- 61 \leq

OTHER COMMENTS

22. Please use this space for any additional comments (e.g. what you feel would encourage your use of ICT in the classroom; anything you feel discourages you from using ICT)

I will be following up this survey with in-depth interviews and focus groups looking further at teachers' experience of ICT and what teachers perceive to be the important issues. If necessary would you be prepared to take part in these interviews and focus groups? If so, please tick the box below, providing your name, email address, and telephone number. As stated at the beginning all responses will be treated in confidence and no individuals will be named in the reporting of results

I am interested in taking part in the interviews.

Name:

Telephone number (work):

E-mail:

Thank you very much for your assistance.