An Investigation into the Use of Interactive Whiteboards in VTOS Centres in Munster

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Submitted to the University of Limerick

October 2012
Abstract

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The Vocational Training Opportunities Scheme (VTOS) is a second chance education programme aimed at unemployed adults to up skill them for re-entry to the 21st century work force or progression to higher education. IWBs have the potential to expose the adult learner to stimulating educational environments if they are used by educators who are skilled in their operation and who believe that these devices can foster critical thinking skills.

The purpose of this study is to ascertain if IWBs have a role to play within a VTOS Centre. The study investigates the perceived benefits and constraints of using IWBs in VTOS centres from the point of view of the adult learner and the adult educator. The barriers associated with use and the role of professional development is also investigated.

Descriptive research using survey data and a case study was used to collect data. Quantitative data was obtained from teacher and learner questionnaires, and qualitative data was collected from semi-structured interviews, observations and focus groups.

The results of this research reveal that IWBs are not being used to their full potential in VTOS centres. The initial training offered by the vendors is inadequate and consequently educators are using IWBs as a presentation and visual tool and hence there is no change in their teaching style. Peer mentoring according to the relevant literature is one of the few methods of professional development which is successful in changing teachers’ pedagogy with the IWB; this form of training is underutilised in VTOS centres. The lack of a cohesive policy from the Department of Education and Science along with inadequate funding and time constraints are also contributing factors to the underutilisation of IWBs. This study also found that many educators understand interactivity in technical terms rather than pedagogical interactivity which fosters higher order critical skills. Teachers must be encouraged to design higher levels of interactivity into their resources with collaboration from the adult learner and within class time. The study also found that there is a lack of IWB resources suitable for the adult learner and to the Irish curriculum.
Declaration

I hereby declare that this project is entirely my own work, and that it has not been submitted for any other academic award, or part thereof, at this or any other educational establishment.

Signed ____________________________

Leesha Foley

Student ID: 0810394

Date ________________________________
Acknowledgements

I wish to thank the following people who helped with the completion of this thesis.

My supervisor, Ken Rea for his guidance

The organising committee of the VTOS Coordinators Conference

The VTOS centres in Munster along with the VTOS coordinators, teachers and students who completed questionnaires, and facilitated with interviews

The staff at University of Limerick

My family - Mike, Colm, Brian, Niamh and Kate
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<td>Apple Classrooms of Tomorrow</td>
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<tr>
<td>BECTA</td>
<td>British Educational Communications and Technology Agency</td>
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<tr>
<td>BIM</td>
<td>Bord Iascaigh Mhara</td>
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<tr>
<td>BTEI</td>
<td>Back to Education Initiative</td>
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<td>DES</td>
<td>Department of Education and Science</td>
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<td>DfEE</td>
<td>Department for Education and Employment</td>
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<td>FETAC</td>
<td>Further Education and Training Awards Council</td>
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<td>FES</td>
<td>Further Education Sector</td>
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<td>ICT</td>
<td>Information Communications Technology</td>
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<td>IRF</td>
<td>Initiation Response Feedback</td>
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<td>IWB</td>
<td>Interactive White Board</td>
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<td>NCTE</td>
<td>National Centre for Technology in Education</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<tr>
<td>PLC</td>
<td>Post Leaving Certificate</td>
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<td>SEC</td>
<td>State Examinations Committee</td>
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<td>SOLAS</td>
<td>Seirbhís Oideachais Leanunaigh Agus Scileanna</td>
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<td>TALIS</td>
<td>Teaching and Learning International Survey</td>
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<td>VEC</td>
<td>Vocational Education Committee</td>
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Chapter 1

Introduction

“The whiteboard is not a magic carpet. It will not float into your classroom and whisk your troubles away. It is more like investing in a new house, certain things are in place when you agree to the purchase, not all of it is organised as you would like, but with the careful gathering of the things you need, and a few new installations, it soon begins to feel familiar. However, it will need continued love, investment and maintenance to ensure that it remains adequate to be your C21st home.” (Diana Bannister 2010, p2)

1.1 Introduction

There has been extensive investment by governments and schools in interactive whiteboards throughout the world. As of December 2010, global classroom penetration of interactive whiteboards was 9% (Smart, 2011, p4). However, according to McIntyre-Browne (2011) this was expected to increase substantially and rise to over 23% in 2011, despite budget deficits and austerity measures faced by many countries (McIntyre-Browne 2011, p1).

1.2 Interactive Whiteboard Penetration in Ireland

In Ireland IWBs are becoming increasingly popular. According to the Inspectors’ report on ICT in Schools published in 2008, 2% of primary schools and 5% of post primary schools had an interactive whiteboard (Dept. of Education & Science 2008, p15). In 2010 it was estimated that 20% of classrooms had an IWB. Futuresource estimate that IWB penetration rates for Ireland in 2012 to be at 74% and projected in 2016 to be 94% (Messenger, 2012). There is no breakdown of these IWB penetration
rates between the primary and post primary sector. At present there are no corresponding figures for further education in Ireland.

Generally funding for IWBs is obtained through fundraising activities by parents as opposed to government initiatives (Kennedy, 2009). This is in contrast to other countries where governments actively invest in this technology for schools. The Irish Government has allocated €43.75m in funding, to post primary schools through its 2009 projector initiative. The focus of this initiative was to equip all classrooms where Maths, Science and T4 subjects are taught with a fixed digital projector and a desktop computer. Any remaining funding was to be used to purchase equipment from a prioritisation list, such as visualisers and digital cameras (NCTE 2010). IWBs are placed second last on this list, thereby signalling that this was not a priority.

Despite the lack of government policy guidelines and funding, IWBs are increasing in popularity, and according to Judge (2007) there is a danger of schools increasingly relying on IWB vendors for advice and guidance on IWBs. She also alludes to the development of a “digital divide” as more affluent schools are better able to afford this technology (Judge 2007, p250).

There are no official figures for IWB penetration in the further education sector. VTOS centres which are fortunate to be located within post primary schools, have the advantage of potential access to IWBs. Otherwise funding for IWBs is at the discretion of the VTOS coordinator and most likely would be from the non pay budget. This study will aim to shed some light on how IWBs are funded in VTOS centres.
1.3 VTOS (Vocational Training Opportunities Scheme)

The VTOS Scheme is funded by the Department of Education and Science and delivered locally by the Vocational Educational Committees. The objective of VTOS is to upskill participants, so that they can progress to employment or further education. Preference is given to those unemployed applicants from the construction, retail sector, with less than upper second level schooling. In 2011 there are 99 centres nationally catering for 5,702 participants of whom (52%) were female and (48%) were male (Keogh, 2012). Courses are generally held in VEC schools and adult education centres, and are provided free of charge. Participants may be eligible for meal and travel allowances. Childcare and guidance supports are also available.

VTOS courses are full-time and can last for up to two years, with 30 hours attendance per week. Participants on VTOS can pursue subjects in the Junior or Leaving Certificate programme or modules or awards certified by the Further Education and Training Awards Council (FETAC) at various levels. In order to be eligible for VTOS, participants must be aged 21 or over, and in receipt of Jobseekers Benefit or Assistance, One-Parent Family Payment, Disability Allowance, Disability Benefit or Invalidity Pension for at least six months, prior to joining the programme. People signing for credits and dependant spouses of eligible persons may avail of the programme and receive a payment from the VEC instead of their welfare payment, which is equivalent to the full rate of unemployment benefit. In order to attract long term unemployed, a bonus of €20 per week is payable to participants who have been in receipt of an eligible social welfare payment for at least one year directly prior to starting VTOS (Dept. of Social Protection, 2010).
1.4 Significance of study

Research on IWBs is practically nonexistent in the further education sector in Ireland; this research aims to shed some light on this.

VTOS is a second chance education programme, aimed at preparing adults to up skill for return to the work force or for progression to higher education; consequently, the use of technology in the education of adults is extremely important. IWBs have the potential to expose adults to stimulating educational environments and hence make the learning process more enjoyable and relevant to today’s digital world. IWBs, if used by teachers who are skilled in their operation, and who perceive the IWB as a means of stimulating critical thinking skills, could potentially prepare adults for re-entry to the 21st century work force or progression to further education.

The significance of this study is to identify if IWBs have a role in adult education and if so to outline the benefits and drawbacks of this technology from both the learners’ and educators’ viewpoints. Hence, if managers, teachers, and learners are aware of those conditions or prerequisites which must exist in order that the maximum benefits are obtained from this technology. In that instance, then money spent on this technology will reap the rewards.
1.5 Research Questions

The primary aim of this study is to investigate how IWBs are currently being used by adult educators and adult learners in VTOS centres in Munster. Specifically the research questions of this study are as follows:

1. What are the perceived benefits and constraints of using IWBs in VTOS centres from the adult learners’ and the adult educators’ point of view?

2. How are IWBs used in Adult education within a VTOS centre?

3. What are the barriers to use associated with IWBs in VTOS centres?

4. How important is the role of adequate professional development in the use of IWBs?

1.6 Structure

Chapter two will focus on research relevant to IWB use in the classroom and will investigate areas such as interactivity, professional development and IWB resources. Chapter three outlines the methodology used in the collection of information for this study. The findings are presented in chapter four by the research questions. These are discussed in chapter 5 and compared and contrasted with the relevant literature relating to IWB technology. Chapter six summarises the key findings of this research and issues recommendations for VTOS coordinators, teachers and learners in relation to IWB use.
1.7 Conclusion

This chapter has shown that IWB technology is increasing in popularity in Irish classrooms, despite the lack of government funding and direction; however it remains unclear the extent of IWB use in the further education sector. This study aims to investigate IWB usage in VTOS centres in Munster.
Chapter 2

Literature Review

2.1 Introduction

One of the consequences of the economic downturn is the demand for courses within the Further Education Sector (FES). This literature review will firstly describe the structure of this sector and the proposed changes announced by the Government in 2011. The role ICT has in adult education from a policy perspective will also be explained. The literature review will then proceed to define the term interactive white board and it will review the benefits of IWBs, the different interpretations of interactivity, the nature of change and the barriers to effective ICT integration within schools. The importance of effective pedagogy and the role which targeted professional development plays in changing teachers’ pedagogy when using IWB technology and their choice of IWB resources is also detailed in this literature review.

2.2 Further Education Structure

VTOS is part of the Further Education and Training (FET) sector in Ireland. FET embraces education and training which occurs after second level schooling and which is not part of the third level system. The aim of FET is to provide vocationally learning based on the needs of people for employment and to enhance post-second level school qualifications. Further education and training is a varied and vibrant sector and includes specific features, which are described in the following paragraphs.
FET programmes typically have a vocational focus which reflect national and regional economic needs and also aim to develop personal skills and facilitate social inclusion. Courses are provided by a number of agencies such as second level schools, Vocational education committees (VECs), FÁS, Teagasc, Fáilte Ireland, Bord Iascaigh Mhára, workplace centres, schools, colleges of further education and private institutions.

Awards generally offered by the FET sector are at levels 1-6 on the National Framework of Qualifications and are accredited by the Further Education and Training Awards Council (FETAC). Junior and Leaving Certificate awards are made by the State Examinations Commission (SEC).

Typical educational programmes in the FET sector are Post Leaving Certificate Courses (PLCs), VTOS, Youthreach, Adult Literacy programmes, Back to Education Initiative (BTEI), FÁS courses, courses conducted by BIM, Failte Ireland, Teagasc, workplace centres, and private institutions, labour market activation programmes etc. (FETAC 2005, p6-7).

2.2.1 Solas

Currently the further education and training sector is undergoing major structural changes. In 2011 the government approved the establishment of a new education and training authority, called Solas (Seirbhísí Oideachais Leanunaigh Agus Scileanna). This authority will replace FÁS and there will be a much greater role for the VECs, which will take over the management of many courses currently provided by FÁS. The role of Solas will be to draw on its own expertise and that of the Expert Group on
Future Skills Needs, to help to identify skills shortages, duplication of existing courses and to provide courses more closely linked to the needs of individuals and the requirements of the labour market. Solas will also provide a management structure for staff. This process is at the negotiation phase and a lot of uncertainty remains. However there is the possibility that the further education sector will be better equipped in terms of ICT (Flynn & Michael, July 2011).

2.2.2 ICT and adult education

In 2000 the White paper on adult education acknowledged the role of ICT in adult learning, stating that “knowledge and familiarity with new technologies will be an important dimension of employability in the information society ..., and for the continued growth of the Irish economy”. The white paper also recognised that ICT can improve the quality of learning, as technology is capable of providing “rich, exciting and motivating environments for learning” (Dept of Education and Science, 2000, p99). Technology has moved on since then and today it could be argued that these “rich, exciting and motivating environments”, is one where the interactive whiteboard is part of the learning process.

2.2.3 ForFás

Forfás in 2007 identified a portfolio of skills which are needed for the twenty first century: these are as follows:

- Basic/fundamental skills – to include literacy, numeracy and IT literacy
- People –related skills – to include communications, interpersonal team working
- Conceptual/thinking skills – such as problem-solving, planning and organising, learning to learn skills, innovation and creativity skills, systematic thinking (Forfás 2007, p34).
Correspondingly, if IWB technology is used effectively within a constructivism setting, the above skills can be incorporated into lessons. Adults who return to education on a VTOS programme have the potential to be equipped with the skills required for 21st century within an exciting and motivating IWB classroom.

2.3 Interactive Whiteboard Definition

According to the NCTE (2009) an Interactive whiteboard can be defined as follows:

“An Interactive Whiteboard (IWB) is a large, touch-sensitive (thus interactive) board that, when used with a combination of a computer and digital projector facilitates interactive ICT engagement. It resembles a traditional whiteboard. The computer, connected to the interactive whiteboard, can be controlled by touching the board directly or by using a special pen” (NCTE, 2009).

2.4 Benefits of Interactive Whiteboards

Research has indicated that teachers and learners find that there are many advantages to using interactive whiteboards. These generally fall into three categories: Increased student engagement, more effective visual representation and greater interactivity. Teacher and learners find that IWB lessons are more engaging due to the wide variety of multimedia content which the IWB can support (Beeland 2001, Slay et al 2008, p1334). The IWB allows for a more efficient presentation of multimedia resources (Glover & Miller, 2001). There is less time spend on “a preoccupation with management of resources” (Latham 2002, p7). A wider range of learning styles is supported by the IWB (Glover & Miller 2001, Latham 2002, Levy 2002, Cuthell, 2005b). Modelling of ICT skills is also cited as an advantage of IWBs (Goodison 2002b, p288).
The visual representation which the IWB supports is often cited by learners and teachers as advantageous as it helps to aid students’ understanding of material (Levy, 2002 p15, Slay et al 2008, p1332, Bell 2002, p1). Holmes (2009) highlights the value of visual representation for teaching mathematical concepts. Difficult concepts such as Chinese lettering (Xu & Moloney 2011, p20) and Chemical structures (Dineva & Stoikova 2011, p265) are easier for learners to grasp using the IWB. Many students benefit from repetition, especially those who are absent, those revising for exams, and those who need material presented more than once (ibid).

The interactivity features of the IWB is said to increase understanding and learning (Chuang et al 2008, p661), to support interactive teaching and to stimulate learner thinking but this is dependent on the teachers’ pedagogy (Mercer et al 2010, p207, Tanner et al 2005, p726).

2.5 Interactivity

One of the major benefits put forward for the introduction of IWBs is that as a teaching tool they are highly interactive and therefore students are motivated to learn (Smith et al 2005, p 94, Kennewell et al 2007, p 62, Latham 2002, p7).

However the term “interactive” can be misleading and may have different meanings to different people. Some would argue that there is no general consensus as to what constitutes interactive teaching (Moyles et al, 2003). The DfEE in the UK personify teaching as interactive when “students’ contributions are encouraged, expected and extended” (DfEE 1998b, p8). Alexander (2004) argues that the process of teaching is always interactive as teaching is a sequence of exchanges between teachers and pupils,
or pupils and pupils. Others would argue that whole class interactive teaching has become a meaningless term, with “interaction” covering a whole range of classroom dialogue (Myhill 2006, cited in Kennewell et al 2007, p63).

There have been attempts to define interactivity in terms of teacher control. Tanner et al, (2005) have devised a framework which attempts to define interactive whole teaching. The form of whole class teaching with the lowest level of interaction is the lecture; this is where the lecturer is in control of the development of the lesson.

The next level of interaction encompasses a form of scaffolding. Scaffolding can be described as the intervention of an adult or a more knowledgeable person in the learning process to act “as a vicarious form of consciousness until such time as the learner is able to master his own action through his own consciousness and control” (Bruner 1985, p24-25). The form of scaffolding at this level of interaction involves simple low level funnelling questioning (Bauersfeld, 1988). The teacher is in control of the interaction and plans to bring the learner to a desired destination in their learning and understanding. Research suggests that this is the most common type of interaction, with most teachers’ questions demanding short, factual responses. The third level in Tanner’s framework is based on a less rigid form of scaffolding whereby the teacher uses probing questions to illicit learners’ responses and learners begin to gain some control over the interaction, even though it is somewhat controlled by the teacher.

The forth level is based on a more dynamic form of scaffolding where by pupils and teachers interact more collaboratively in the co-construction of knowledge (Tanner & Jones, 2000a). The objective of this type of interaction is to develop a dialogue around
a challenging issue in which differences in perspective are welcomed and encouraged. The teacher uses focusing questioning to control the direction of the dialogue and draws attention to aspects of pupils’ contributions which are important. Tanner believes that this type of scaffolding requires a high level of skill, confidence and knowledge in the subject area, and that teachers must be able to think on their feet, in response to explanations, conjectures, and strategies posed by pupils.

The highest level on this framework is based on collective reflection (Cobb et al, 1997). This is when teachers deliberately generate a reflective discussion after learning activities so as to encourage reflection on the learning process. Typical activities would include, learners devising their own revision notes, writing their own exam questions, peer and self assessment.

This level of Tanner’s framework has its origins in constructivism. Jonassen et al (1995) argued that constructivist learning environments are based on four concepts; these are context, construction of knowledge, collaboration and conversation. Learning occurs when people are provided with material that fits into a real life context, interact with their peers, collaborate, discuss opinions, form arguments, re-examine their initial ideas, and negotiate meaning. The role of the teacher in a constructivist classroom is more of a facilitator rather than the expert who delivers all the knowledge (Jonassen et al 1995, cited in Vrasidas & McIsaac 2000, p106).
2.5.1 Interactivity as defined by dialogue

Many educators understand interactivity in terms of dialogue and their approach to teaching is to adopt the dialogic approach. The dialogic method to teaching involves “orchestrating classroom talk and activity so that teachers and learners are actively commenting and building on each other’s ideas, together posing questions and co-constructing interpretations” (Alexander 2004, cited in Mercer et al 2010, p198). The IWB has the possibility of contributing to the creation of a “dialogic space” (Wegerif 2007, cited in ibid, p198).

The following is an example of how IWB resources can be orchestrated to facilitate dialogue. Hennessy (2011) describes an English teacher playing an audio recording of a poet reading his own composition in his regional accent; the text and a photograph of the poet were simultaneously displayed. This experience allowed the poem to come alive for the learners and therefore shaped a dialogic space by offering the learners the opportunity to articulate their own opinions and an opportunity for further exploration of ideas (Hennessy 2011, p469).

2.5.2 eTeaching

Kent (2004) believes that the IWB has led to the concept of “eTeaching”. This involves the use of the IWB to improve the art of teaching. Traditionally teaching with ICT involved pre-booking a computer lab and having a group of students view a small computer screen under the guidance of the teacher. This limited the scope which a teacher or learner could direct an investigation into a particular concept.
The introduction of the IWB into the classroom has changed this and many view the IWB as a “digital hub” whereby it can pull together digital resources, such as animations, interactive diagrams, Google maps, web pages, audio and video files, still photographs, etc. These resources are subsequently available for learners to see, interact with and for the teacher to engage with learners in discussion and exploration (Betcher & Lee 2009, p12). Resources developed during lesson time can also be used and revisited at a later time, providing further opportunities for dialogue.

This concept of eTeaching uses digital technology to present a concept, explore implications, places the concept in various contexts, links it with existing knowledge and leads to discussions which probe a learner’s understanding (Kent 2004, p2).

An example of eTeaching in context is as follows: a lesson interpreting weather maps: the teacher accesses a number of satellite and radar images from a meteorology website. The IWB is used to discuss and annotate the images. Based on the student’s learning of weather formations, predictions as to the current weather conditions at various cities could be made. Predictions are checked by accessing real-time images from those cities (Kent 2004, p4).

The IWB as a tool can present new possibilities for a teacher more easily than other technologies. Adopting a dialogic approach to teaching can be challenging, in terms of collection of suitable resources and the interactive demands on teachers during a lesson (Mohon 2008, Warwick et al, 2010, cited in Mercer et al, 2010, p207, Alexander 2004).
2.5.3 Initiation – Response-Feedback

While the above approach of using the IWB is seen as the ideal for stimulating dialogue, this may not be the reality in the classroom. Several authors (Burns & Myhill, 2004; English et al, 2002; Hargreaves et al, 2003; Mroz et al, 2000; Smith et al, 2004) have examined teachers’ understanding of “whole class interactive teaching” in literacy and numeracy classes in the UK where IWB technology is widely used. These authors analysed classroom interaction, interviewed teachers and pupils and concluded that the term interaction as used by teachers, referred to a range of differing levels of communication and that interaction was usually seen as question-dependent and that most teachers interpret “most interactive” as being intense “question and answer sessions” (English et al 2002, p 22). In these sessions, the teacher had control of the content. The focus of the classes was on recitation questioning, which provided predictable answers. Teachers’ questions were rarely used to promote higher order thinking skills (Mroz et al, 2000, p382). It should be noted that these authors did not focus on the use of IWB technology to promote interactivity, but rather on interactivity within an IWB primary classrooms. (Cutrim Schmid 2008a, p343).

A widespread practice found by those authors in classroom discourse, is the IRF sequence (teacher initiation–student response–teacher feedback (Sinclair & Coulthard, 1975). This structure of questioning begins with the teacher (initiation) posing a question, the response phase, is when a student attempts to answer the question, and the final stage is when the teacher provides some form of feedback to the pupil’s response. This three part exchange or IRF structure often consists of closed questions, brief pupil answers which teachers do not build upon.
One of the claims about IWBs is that students are motivated in IWB lessons thereby providing “more opportunities for interaction and discussion” (Becta\(^1\) 2003, p3, cited in Smith et al, 2005). Therefore this should imply a greater participation by students with more student initiated dialogue. However, several studies have reported the dominance of teacher talk, the persistence of IRF as the major form of discussion, the shortness of student answers and the lack of sustained interaction with individuals (Hargreaves et al, 2003, Smith et al 2006, p454).

Understanding interactivity in terms of the degree of teacher control and dialogue, within an IWB class has implications for student learning. Black and William (1998) argue that formative assessment based on probing questioning, leads to improved performance. However others argue that while IWBs may have benefits in terms of interaction and discussion, these interactional or verbal changes have not been translated in learners’ attainment in national tests in the UK (Higgins et al 2005, p68). Similar findings by Smith et al (2004) found that probing questions are rare in English classrooms, accounting for (11\%). Uptake-questioning, whereby a student’s response is included in the ongoing classroom discourse is very uncommon, occurring in only (5\%) of exchanges and with (45\%) of teachers never using this strategy (Smith et al 2004, p408).

Teachers have many demands on their time and utmost in their minds is adherence to the curriculum. Myhill’s (2006) study investigating teacher discourse in whole class teaching, found that interactions were based on teacher control and by curriculum

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\(^1\) Becta was closed in January 2011
content, and that the type of interactions were leading to underachievement, as teacher talk was concerned first and foremost with curriculum delivery and leading students to a predetermined destination (Myhill 2006, p39).

It should be noted that these studies are set against the background of the National Literacy and Numeracy Strategies in the UK. These strategies encouraged a major pedagogic shift in primary education from cross-curricular topic work to a more subject-based curriculum with the focus on whole class interactive teaching to precede pair, group or individual work (Myhill 2006, p20).

Studies have shown that increased student participation in lessons can increase attainment. However many researchers claim that the IWB may make students more passive by reducing teacher-student interaction (Gray et al 2005, Kennewell et al, 2008) and lead to more teacher-centered instruction (Goodison, 2003).

One of the many claims made about IWBs is that lessons move at a faster pace (Latham 2002, p2, Glover & Miller, 2001b). The use of hyperlinks to multimedia files and to the internet facilitates this process. This means that no time is wasted writing on the board as all the resources are prepared in advance and are instantly available. This viewpoint is supported by Hallinan (2009) in her Irish study investigating the benefits of IWB for students in primary school. She noted that children sometimes would like to control the pace of their learning, but this was not possible with IWBs (Hallinan 2009, p 64). Therefore the teacher is in control of the lesson and this contributes to a decrease, instead of an increase in students’ level of active participation (Cutrim Schmid 2008b, p1565). An Australian study by Way et al into
primary teachers’ classroom interaction patterns with IWB technology found that teacher-to-student interactions were the most frequent interaction in every IWB teaching method, except when interactive online games were used. The study also found that the use of pre-prepared screens encouraged teacher control of the lesson resulting in the lowest level of student-to-IWB use and most frequent teacher-to-student interaction (Way et al 2010, p 9).

The degree of interactivity based on teacher control and dialogue, has implications for student attainment. The use of too many factual questions, controlled by the teacher, may result in a student response but not extend it and in the words of Goodwin, educators should be inviting pupils to “tell us what they think” (Goodwin 2001, p71).

2.5.4 Adult Education Theories and dialogue

There is very little research into dialogue and interaction in the Adult education classroom using the IWB. In an adult education setting the focus of teaching and learning is based on adult learning principles.

One of these principles is that adult learners bring a vast array of life experiences and expertise to the classroom; these life experiences are a rich source for learning (Knowles, 1978). Such life experiences can be applied to collaborative and inquiry based learning. Dewey was an advocate of inquiry based learning whereby he believed that adults enjoy learning which is centered on the creation of meaningful real life tasks, in an environment where they are seen as “valued, equal and responsible members of society” (McAnaney et al, 2007, p29). Project based learning is suited to
the adult learner as it allows them to be in control of their learning, and it incorporates adults managing their own time and working collaboratively together (Ibid, p80). Social constructivism emphasises learning through social interaction, Howard Gardener’ theory on multi intelligences supports this view also, when he advocates interpersonal intelligence.

Reflection is important in adult education, as Bruner advocates “thinking about thinking” (Bruner 1996, cited in Ibid p28). Critical thinking advocates keeping an open mind about issues, not accepting instruction as always being correct, developing problem solving skills and learners taking an active role in their learning. The role of the educator is fundamental in this reflection process. They must allow for more open ended questions, time for learners to think before answering and encourage them to expand and develop their answers (Ibid p29).

### 2.5.5 Interactivity and learner response systems

Studies by several authors in the higher education context have noted that learner response systems, voting systems or clickers, which are a feature of IWB technology have the potential to facilitate a more dynamic form of student interaction in lectures. Voting systems have the possibility of encouraging student – lecturer and student – student interaction (Draper & Browne 2004, Cutts & Kennedy, 2005).

Voting systems are hand held devices which are very similar to a remote control. These allow educators to ask learners to vote electronically on questions and or to express an opinion on whether they understand the topic presented. The learner can
vote anonymously and results are displayed immediately on the IWB, thereby providing immediate feedback to the teacher/lecturer (Kearney, 2009). In the Irish context, it could be argued that voting systems have replaced the “Lamha Suas” with the Meara Síos!” (Ibid).

Many studies on voting systems in universities state that the anonymity aspect of them enables students to feel more comfortable responding than if they had to provide a verbal answer (Caldwell 2007, Cutrim Schmid 2007). Fredericken and Ames (2005) note that in classes larger than 40 students, generally only 2 or 3 persons are responsible for (50%) of comments. Therefore the anonymity feature provided by clickers can overcome much of the anxiety students may have about sharing their opinions and therefore are influential tools for facilitating discussion and interactivity. Conversely recommendations presented by Zhu (2007) into the use of clickers in university education, sees advantages of using the anonymity aspects of clickers. The anonymity aspect of clickers can be highly effective for initiating class discussion on sensitive topics which otherwise could lead to silence from students in a lecture hall. Zhu recommends the use of posing controversial questions and offering multiple choice responses. This method has the potential of leading to further discussion and giving learners a sense of ownership of their learning. The lecturer receives a more accurate view of the learners opinions rather than from the most vocal learners, and opinions which otherwise might not be vocalised in a class discussion are given a voice (Zhu 2007, p2).

A note of caution is added by Cutrim Schmid (2007), as the view is that voting systems should be openly discussed by the whole group; students should be willing to
expose their strengths and weaknesses. The implication of these findings is that anonymity, afforded by the IWB technology does not lead to discussion and greater interaction among adults (Cutrim Schmid 2007, p131).

If voting systems are to encourage a high degree of interactivity, several authors have stressed the importance of combining the use of voting systems with the provision of effective follow-up discussion (Stuart, Brown, & Draper, 2004, Draper & Brown, 2004, Cutts & Kennedy, 2005).

However a study of clickers in an introductory management accounting course by Carnaghan and Webb (2006) found that there was a considerable decrease in the number of questions asked by learners when clickers were used. They attributed this to students being less likely to ask clarifying questions when they see a significant number of their peers answering correctly. This study also found that there were positive learning effects for exam questions which were most similar to those covered in lectures which used clickers (Carnaghan and Webb 2006, p27). These authors further recommended that lecturers should pose difficult questions with clicker technology in order to stimulate class discussions and hence improve learning. These researchers found that asking easy questions using clicker technology seems to suppress the subsequent asking of questions. This implies that clicker technology is replicating the IRF discourse patterns whereby the teacher/lecturer is in control of the discussion patterns and learning is superficial. This is further supported by Cutrim Schmid (2008) in their study of foreign language learning among university students. She found that while the voting systems increased interactivity, the type of interactivity was relatively shallow. The interaction pattern of the follow up
discussions which followed the voting system was similar to the IRF sequence. There was no opportunity given to learners to justify their answers, seek clarification or raise issues (Cutrim Schmid 2008, p349). This finding was similar to those obtained by Goodison in 2003 and Hall and Higgins in 2005 in relation to discourse patterns.

Cutrim Schmid identified another impediment to learning associated with voting systems. This is the problem of learners guessing the correct answer (Cutrim Schmid 2008, p348). A strategy to prevent guessing according to Wit (2003) in his study with first year psychology students at the University of Glasgow (Wit 2003, cited in Cutrim Schmid 2008, p350) was to include an option in which learners could admit their ignorance, the input of “I don’t know” choice button.

An Irish study by Surgenor, in 2010 found that the introduction of clickers in university education did not result in the expected benefits. He concluded that “increased discussion and interaction is more likely to be contingent upon effective question design and delivery, scaffolding, and classroom management skills” (Surgenor 2010, p6). This view is further supported by McGowan and Gunderson (2010) whose study investigated clicker use in an introductory statistics course. They provide a note of caution to educators, stating that clickers must be used in a well-planned and thought out manner and questions should be designed to “elicit deeper thought about a concept or to provide a quick check of student understanding” (McGowan and Gunderson 2010, p25).

The potential for greater interactivity which clickers can initiate is dependent on teaching methods which enable learners to actively participate in discussions and
careful attention to the design of questions. Otherwise this technology may encourage non-verbal, anonymous dialogue, expose learners to questions which are not challenging or varied, simplify difficult concepts to a set of multiple-choice responses or encourage guessing among learners. Clickers have the potential to enhance interactivity, and to provide a greater sense of ownership to students’ learning. However they should be used with proven pedagogical principles associated with adult education.

2.5.6 Technical Interactivity

Many of the reports in literature claiming that IWB leads to “enhanced interactivity” refer to “technical or physical interactivity” between students and computer or white board (Greiffenhagen 2000, cited in Cutrim Schmid 2008a, p342, Smith et al., 2005, Beauchamp and Parkinson 2005, Miller et al 2005). Technical interactivity refers to what the technology can do, it is interactive in the sense that it responds easily and quickly to the user’s commands (Mercer et al 2010, p197).

Several authors (Mercer et al 2010, p197, Higgins et al, 2005, Beauchamp & Parkinson, 2005) have noted that technical interactivity refers to the following features:
• Drag and drop (moving and matching objects on the IWB)
• Hide and reveal
• Highlighting
• Spotlighting
• Animation (rotated, enlarging moving objects)
• Annotation
• Tickertape (text moves continuously across screen)
• Indefinite storage and quick retrieval of material
• Feedback
• Automatic handwriting recognition and text formatting features

This technical interactivity facilitates kinaesthetic learning – “the physical act of pointing and activating the screen, whether with a finger, a stylus pen or the mouse consolidates the topic being learned” (Virtual Learning 2003c, p1). Beeland’s (2002) study describes three modalities of learning which the IWB facilitates. He refers to these as visual, auditory and tactile. The latter allows students to physically interact with the boards. The extent to which his modalities are incorporated into lessons, may determine the extent to which students are engaged and motivated to learn (Beeland 2002, p1). However many researchers would argue that this type of technical interactivity only contributes to “surface” “understanding and learning, as learners only carry out mundane activities which have no learning potential as was evident with low level ability students (Moss et al 2007, p41).
Therefore claims of enhanced interactivity may refer to technical interactivity. Interactive technology such as the IWB does not in itself lead to effective learning. A study by Kennewell et al (2008) who analysed the use of interactive technology to implement interactive teaching, concluded that the IWB may be seen as a backward step, as it gives a new momentum to traditional teacher centered approaches and that software which is highly interactive, does not in itself lead to effective learning. It is pedagogical interactivity between the teacher and learners which is more valuable (Kennewell et al 2008, p71, Smith et al, 2005). Pedagogical interactivity which Kennewell refers to in his study is where the teacher uses technology in a way that promotes higher order thinking. This classroom environment allows for “reciprocal opportunities for talk which allows children to develop independence voices in discussion” (Burns and Myhill 2004, cited in Kennewell et al 2008, p63). This environment promotes student autonomy, is conducive to student participation, encourages group work and the teacher is not delivering learning in a transmission mode whereby learners are seen as vessels to be filled up with information (Freire, 1970).

2.6 Pedagogy

Pedagogy can be defined as “any conscious activity by one person designed to enhance learning in another” (Watkins & Mortimore 1999, p3). The introduction of the IWB has the potential to support, extend and transform classroom pedagogy. However there is much debate as to whether this reflects the reality in the classroom. IWB technology is relatively new to Irish education and more specifically in the adult education sector.
Therefore there is not enough longitudinal research to the claim that IWB technology transforms pedagogy.

Many studies have indicated that teachers from all education sectors, primary, secondary and tertiary, need time and opportunity to experiment with IWB technology before it has an impact on their pedagogy (Glover et al 2007, p18, Lee 2010, p138, Cutrim Schmid 2010, p170). In reality it could take several years to change the underlying culture in a school and to get teachers “thinking digitally” (Betcher & Lee 2009, p22). However the degree to which their teaching style is transformed is questionable.

Burden (2002) who drew on Gibson’s (1999) work in the use of technology, identified different stages of IWB use, by educators. The first stage is called the Infusion stage, whereby schools rush out to purchase IWBs, at this stage the technology is generally located in IT rooms and mostly used as a “glorified blackboard with little or no interaction” with learners (Burden 2002, p7). The predominant mode of learning is passive with didactical teaching styles. The second stage of IWB integration is termed the integration stage. The technology becomes embedded within the school and within the curriculum there is a greater emphasis on how the technology can be used to enhance and raise the standards of learning. The transformation stage is characterised by placing an emphasis on using the IWB as a means of knowledge construction rather than knowledge accumulation. At this stage of IWB use, educators view teaching as a journey rather than a destination and the emphasis is on using the IWB to enhance learning through a more enquiry-based approach. The use of the IWB by teachers is strongly correlated with their dominant beliefs and attitudes about the nature of
teaching and learning. Therefore the introduction of the IWB does not in itself 
transform existing pedagogies (Moss et al 2007, p6).

A similar view is put forward by Glover et al (2007) who see three approaches to 
teaching with IWBs. The first approach is termed the supported didactic, whereby the 
pedagogy is dominated by the teacher, who uses the IWB as a visual or illustrative 
support to the lesson. The second approach is termed “Interactive”. The underlying 
pedagogy is that the IWB is used to challenge learners to think by using a variety of 
verbal, kinaesthetic, and visual stimuli. The IWB is no longer a novelty. Teachers are 
improving on their technical rather than interactive IWB skills. Teachers become 
familiar with the technology but are not yet fully conversant in all of its capabilities so 
therefore may frequently make use of adjoining non-IWBs. Resources are shared and 
there is cooperation among teachers willing to teach each other. The third approach is 
termed “Enhanced Interactivity”. The IWB is used as an integral part of most lessons. 
Students respond to the IWB stimuli either as individuals or collaboratively in small 
groups. Teachers show ingenuity in developing resources to meet specific learning 
needs. This stage is also evidenced by considerable teacher pupil interaction. (Glover 
et al 2007, p9 -10). These three stages, put differently could be seen as the teacher 
doing old things in old ways (supported didactic), doing old things in new ways 
(interactive) and doing new things in new ways (enhanced interactivity) (Betcher & 
Lee 2009, p50).

How does a teacher move from utilising a supported didactic approach to the enhanced 
interactive stage? According to (Gray et al 2007 cited in Hayes, 2010, p21), this 
process occurs through a combination of personal experimentation, trial and error and
the gradual accumulation of useful resources. Others would argue that a skilled person with enthusiasm will facilitate changes in how teaching is done. “Interview evidence showed that this was most likely to be a rapid process where there was a coach or mentor within the subject department, particularly if he or she was a ‘missioner’ convinced of the value of the approach” (Glover & Miller 2003 cited in Miller et al 2005 p6). One must not forget the learners in this process, as pupils need to have a range of manipulative skills if they are to take part in lessons and be seen to be technologically competent (Glover et al 2007, p17). Without this technological competency students will not be self-directed learners and able to actively participate in lessons (Hall & Higgins 2005, Hennessy et al, 2007).

Access to IWB technology and regular use is seen by many authors was being extremely important if teachers are to use the IWB in a transformative fashion. Levy (2002) showed that secondary teachers’ progress with IWBs was dependent on easy and frequent access to the technology and that there was no incentive for teachers if they plan a lesson using IWB and then repeat the same lesson with another group in a room without an IWB (Levy 2002, p14). IWBs can only become transformative devices only if they become part of regular classroom activities (Greiffenhagen 2000, cited in Smith et al 2005, p99). Teachers need daily access to IWBs, so that they are able to develop their repertoire of skills and to integrate them into practice (Armstrong et al, 2005).

Possessing excellent IT skills or being very technical minded does not in itself imply these skills will automatically transfer to IWB use. A study completed by Al-Qirim (2011) on the impact of teaching with IWB technology in the faculty of information
technology in a United Arab Emirates University, found that IT lecturers who were experts in the technological area reported difficulties in remembering an IWB feature they had used in previous classes. This raised the issue of how important it was to continuously practice the different IWB features regularly (Al Qirim 2011, p833).

It also raises questions regarding how educators are prepared for change and what are the other barriers they encounter when trying to integrate technology into their teaching. The next few sections will deal with how educators respond to change and the barriers they encounter when trying to integrate technology into their pedagogy.

2.7 Responding to change

The introduction of new technology into any educational environment, whether it is a primary, post-primary, further education centre or a university presents educators with challenges. In order for new technology to be used effectively, it sometimes requires a major change in teachers’ pedagogy and classroom practices. Educators respond to change in different ways, some are very enthusiastic, always willing to try out new ideas, whereas others will adopt a “wait and see attitude”. Diffusion theories help to shed some light on the factors which influence teachers’ uptake of instructional technologies, such as the IWB. Rogers (1995) identified five categories of innovativeness:

1. Innovators: these are the first (2.5%) of individuals in an organisation to adopt an innovation. These individuals are risk takers, have the ability to understand and apply complex technical knowledge and are able to cope with a high
degree of uncertainty. They play an important role in the diffusion process, which is introducing the new idea into the organisation.

2. Early adopters: these are the next (13.5%) of individuals to adopt an innovation. They are respected by their peers and serve as role models to them. They decrease uncertainty about a new idea by adopting it and they provide subjective evaluation of the innovation to those around them.

3. Early majority: These are the next (34%) of people who adopt an innovation. They may deliberate for some time before adopting a new idea.

4. Late majority: is the next (34%) of people who adopt an innovation. Their adoption may be as a result of network pressure from peers. They approach innovation with scepticism and do not adopt until most others do so.

5. Laggards are the last (16%) of individuals to adopt an innovation. They tend to be suspicious of innovations, have no interest in using the innovation, and may express opposition to its use.

Another element of Roger’s diffusion theory applicable to the IWB is that the characteristics of the innovation will influence its rate of adoption by people. These characteristics are as follows:

**Relative advantage:** If the technology is better than what it supersedes, then individuals are more likely to adopt the technology.

**Compatibility:** the degree to which the technology is consistent with a person’s existing values and philosophy on teaching will influence how quickly it will be adopted.
Complexity: This refers to the degree to which the technology is perceived to be difficult to use and understand. While the technology may not be difficult to use, learning how to use it effectively to enhance teaching may be.

Trialability: This refers to the degree to which the technology can be experimented with, and the greater the trialability the quicker the adoption. However this may require substantial investment in time and effort by teachers.

Observability: This refers to the degree to which the results of the technology can be visible to others (Rogers 2005, cited in Rogers & Scott 1997, p4 -5).

Roger’s diffusion theory has implications for school principals, IT coordinators and those who want to initiate change in education. The theory highlights the importance of role models and leaders to guide teachers through the necessary changes that are required to integrate the IWB into teaching. It also infers that teachers need adequate time to be able to experiment with the technology, and that its benefits must be visible to others.

2.8 Barriers to ICT adoption

The introduction of IWB technology into any educational establishment will present barriers in terms of its integration into teaching. Mumtaz (2000) in her review of literature identified three interlocking factors which affect teachers’ integration of ICT. These are termed institution, resources and teacher factors. Institutional factors refer to the school, whereby little time is given to teachers to familiarise themselves with the technology, due to work pressures, timetabling issues or lack of supportive networks. Time is one of the greatest constraints to teacher learning and school change according
to Collinson and Cook (2001, p279). Schools are slow to embrace change (Fullan & Steigelbauer 1991, Cuban, 1993) due to their structure and contentment with familiar methods of teaching. However findings by Sandholtz et al, (1997) in relation to the Apple Classroom of Tomorrow project (ACTO) confirm that teacher beliefs about integrating technology into teaching and learning can be changed. If teachers see firsthand the benefits of integrating technology into learning and if they are supported through collaboration, problem sharing, and resources, then change is possible.

Limited resources within schools are often cited by teachers as an impediment to the integration of ICT into teaching. Resources refer to computers, software, adequate access to ICT, training, ICT specialists, etc. However while these are essential in helping to integrate ICT into teaching and learning, Mumtaz (2000) found that schools can only go so far to facilitate ICT use; the actual take up depends on teachers, feelings, skills, and attitudes to ICT in general (Mumtaz 2000, p337). Ertmer (1999) call these second order barriers, and she defines these as “beliefs about teaching, beliefs about computers, established classroom practices, and unwillingness to change” (Ertmer 1999, p48). Deep rooted attitudes and beliefs are difficult to change and “requires challenging one's belief systems and the institutionalized routines of one's practice” (ibid).

Fullan (1993) argues that our educational system is fundamentally conservative, such as how teachers are trained, how schools are organised, the educational hierarchy, and how the political decision makers view education. This culminates in an educational system which maintains the status quo and that when change is attempted it results in
“defensiveness, superficiality or at best short-lived pockets of success” (Fullan 1993, p3).

Somekh (2008) acknowledges that teachers’ beliefs and attitudes, confidence and competence with technology are extremely important, but she says that teachers are not “free agents” (Somekh 2008, p450) and how they use technology is “dependent on cultural, social and organisational contexts in which they live and work” (ibid). In her study she cites examples of transformative pedagogies with ICT, the ACOT project in USA, Norwegian Pilot (Project: Innovation in Learning, Organization and Technology) and the Enlaces ICT initiative of the Chilean Educational Reform. In all of these projects, schools were well equipped with resources, the focus was on changing learning using ICT tools, both teachers and learners had a high level of ICT skills and they were supported by facilitators. The results of these projects showed that teachers made fundamental changes to their pedagogical practices. Student learning changed; what they learned and the process of learning changed; teacher and student roles and their beliefs about teaching and learning changed. However, these transformations to their pedagogical practices required changes to structural and legislative frameworks such as national tests (ibid p456).

Therefore in the above pilot projects, change came from the bottom up, not from the top down. As a result of the collaborative work of integrating ICT in their pedagogy, teachers’ style of teaching changed, however changes in national assessment had to be made to facilitate this new type of learning and teaching. According to Fullan (1999), complex change can occur. Teachers enter their profession with a vision of helping others, this Fullan termed as a moral purpose, and when combined with the skills of
change agency, such as personal vision-building, inquiry, mastery and collaboration, this will result in teachers “pushing for changes around them, intersecting with other like minded individuals and groups to form the critical mass necessary to bring about continuous improvements” (Fullan 1993, p40).

2.9 Professional Development – The Irish Context

There is general agreement that professional development is essential in the teaching sector due to a number of reasons. Firstly learners and society have higher expectations of schooling than in previous generations; teachers have to deal with an ever increasing diverse range of learners from different backgrounds and cultures; new ideas on teaching and learning are emerging; the introduction of new technologies and curriculum changes. Therefore in order for teachers to adapt to these changes, continuing professional development is essential.

Fullan and Steigelbauer (1991) define professional learning as “the sum total of formal and informal learning experiences throughout one’s career from pre-service teacher education to retirement” (Fullan & Steigelbauer 1991, p326). This definition acknowledges professional development as a continuous process throughout a teacher’s working life. Fullan (1993) further stipulates that if students are to be “continuous learners and effective collaborators” then teachers must also have these qualities (Fullan 1993, p46).

In Ireland, the White paper on education acknowledges the role of professional development and sees it as essential component to manage change.
“The fundamental aims of in-career professional development programmes are to equip teachers with the capacity to respond effectively to major changes in the education system, including changes in curriculum, teaching methodologies, assessment, school organisation and management” (DES, April 1995, p135).

Therefore in order for students and teachers to benefit from IWB technology, then targeted professional development should have the capacity to bring about change in teachers’ style of teaching and learning. The aim of professional development should be to help teachers to come to terms with the need for change and the subsequent demands these changes make on their professional life.

However findings by the OECD and published in 2009 highlights areas of concern for Irish teachers’ participation in professional development training. TALIS (Teaching and Learning International Survey) was conducted by the OECD in 2007 and 2008. It found that (34%) of Irish teachers cited ICT teaching skills as one of their most significant professional development requirement (Shiel et al 2009, p4). It also reported that (43%) of Irish teachers cited conflict with work as a barrier to participating in professional development (ibid p5). The report also noted that Irish teachers were more likely to exchange teaching materials, and set common assessments rather than participate in mentoring or peer observation even though such collaborative practices are seen as being more supportive for effective teaching (ibid, p4).

Therefore it seems that professional development in Ireland is fragmented and in need of clear policy guidelines. There have been attempts to initiate change in teachers’
pedagogy through targeted Professional Development. The Schools IT2000 initiative launched in 1997 was the first major attempt to integrate ICT into teaching and learning. As part of this initiative, short-term in-service courses were offered to all second level teachers. Third level institutions were also encouraged to offer Professional Development ICT courses aimed at teachers to advance their skills. However both of these courses have had very little impact on how ICT is integrated within subjects (McGarr and O’Brien, 2007, Mulkeen 2003).

The TALIS Report on Ireland (2009) found that

“Teachers in Ireland were somewhat less supportive of constructivist beliefs, and somewhat more supportive of direct transmission beliefs than their counterparts in all five comparison countries” (Shiel et al 2009, p6).

Therefore it is argued that teacher’s current attitudes and beliefs about teaching should be incorporated into professional development programmes. The recent introduction of the new syllabus, Design and Communications Graphics (DCG) and the targeted professional development which accompanied the subject highlights this failing. One of the objectives of the new syllabus, DCG which replaced the old subject of Technical Drawing, was to encourage more creativity, design and communication within the subject. However a study by McGarr (2011) notes that the changes in pedagogy practice required for the new curriculum are unlikely to materialise. He attributes this to a failing in professional development programmes which do not directly critique current pedagogical practices and beliefs (McGarr 2011, p128). McGarr (2011) also notes that,

“Many in-service programmes have operated on the belief that through exposure to the practices associated with the new syllabus the pedagogical practices would be incorporated into teachers’ practice” (McGarr 2011, p127).
In other words by changing the syllabi, teachers would adopt a more learner centered approach to teaching. However this failed to occur when the Junior Certificate Programme was implemented in the early 1990s and is unlikely to occur today 20 odd years later (Callan 1997, cited in McGarr 2011, p127). Teachers revert back to what they have been used to and their underlying beliefs and attitudes influence their pedagogical approach.

The above sections have highlighted the importance of professional development in trying to implement change, however changes in beliefs and attitudes to teaching are difficult to implement and the past experiences of the Irish educational system with regard to professional development should be noted by policy makers.

The next section will outline the various approaches to training of teachers in IWB technology as cited by the literature.

2.9.1 Professional Development and IWB technology

In order for educators to utilise IWBs in an enhanced interactive way, it is argued that professional development plays a major role in this transformation. However initial training, provided by IWB vendors is generally short in duration. They use “slick presentations and high-quality prepared materials” and this was very successful in “firing” educators with enthusiasm (Glover & Miller, 2001, p261). However this wanes over time without continued support (Smith et al, 2005, p98) and can lead to didactic teaching approaches (Beauchamp 2004, p345). Buckenmeyer (2010) states that
“When not enough time is provided, teachers often resort to what is already known, and so fail to try new methods to teach students” (Buckenmeyer 2010, p33).

Generally professional development is short term, taken over a set period of time. Afterwards, teachers are expected to return to the classroom and in isolation put into practice what they have learned. However, according to Darling-Hammond (1997), this type of training yields few positive results in the quality of classroom teaching. An Irish study into teachers’ experiences of professional learning, but which was not IWB specific, found that Irish professional development was fragmented, inadequate and failed to support the teacher at school or classroom level. This type of professional development leads to the maintenance of the status quo, rather than developing ideas on “new ways of seeing and doing” (Sugrue 2006, p334-335). These findings imply that in order for pedagogical change with IWB technology to materialise, professional development must be ongoing.

According to Lewin et al, (2009) study on professional development with primary teachers in the UK training which included “use of all the bells and whistles” was not necessary. Teachers require just the basic level of competency in IWB features in order to use the IWB interactively (Lewin et al 2009, p182). Lewin’s study highlights the importance of communities of practice, whereby teachers learn the technical and pedagogical IWB skills through dialogue with other teachers, situated within the school context, and through preparing resources for their own use or use within their own year. This type of professional development has its origins in Lave and Wenger (1991) communities of practice. In Lewin’s study, IWBs were permanently put in classrooms often covering traditional boards and there was the expectation that they would be used routinely in lessons.
2.9.2 Mentoring

While there has been major investment in IWBs in many countries, concern has been raised about the lack of change in pedagogy and subsequently attainment level of students (Kennewell & Higgins 2007, p211). Mentoring is often seen by many researchers as a type of professional development capable of changing how teachers use IWBs.

Miller & Glover (2007) in their study of professional Development experiences of second level mathematics teachers using IWBs found that personal coaching or mentoring was most effective. According to them mentoring facilitates progression from a didactic to an interactive teaching approach. However it should be noted that was a small scale study involving seven schools in the UK (Miller & Glover 2007, p330).

An Australian study by Jones & Vincent (2010) highlights the importance of peer mentoring in professional development. This type of mentoring was used to support second level teachers, to change their pedagogical approach with the introduction of IWBs. Teachers who were mentors were employed to teach half time and the remainder of their time was devoted to developing resources and mentoring colleagues. The difference in this study was that peer mentoring was based on “collegial mentoring”, whereby the person receiving the help (mentee) is the more experienced teacher. Generally teachers resist externally sourced expert mentors, as it implies an inadequacy and teachers become defensive. The advantage of mentoring
was that in this study, the IWB was a new technology to all teachers. The mentoring was sensitive, non-expert and listening support was provided, with a clear understanding that a change in pedagogy was possible. The mentors used the HoPS (Hierarchy of Pedagogical Strategies (HoPS)) framework to measure changes in pedagogy. This framework was adapted from Beauchamp’ 2004, transitional framework. Beauchamp’s framework identified five different stages of IWB use, by which teachers go through. The initial stage is when the IWB is used as a substitute for the Black/Whiteboard. The final stage is the inspirational phase called the Synergistic User, “both teacher and pupils are able to construct meaning and dictate the direction, momentum and scale of the next step in the lesson” (Beauchamp 2004, p344).

This study recognised that there is a cost factor involved in this type of mentoring. However it highlights that peer mentoring is one of the few efficient methods of training teachers to successfully change their pedagogy and impact positively on education (Jones & Vincent 2010, p491).

2.9.3 Adult learning principles and professional development

Teachers are adults, therefore in order to design effective professional development training adult learning principles should be incorporated into training. The andragogy concept put forward by Knowles acknowledges that adults as learners are different from children. Two of the assumptions underlining Knowles work are that adults are self directing and problem centred. Therefore according to Lai (2010) these principles should be incorporated into professional development training for teachers (Lai 2010,
Training in the technical aspects of IWB is essential. However teachers, since they are self directing and problem centred would welcome collaborative opportunities such as web platforms, blogs, wikis and social networking sites which would encourage teachers’ informal learning after the training workshops have ceased (Lai 2010, p520).

A similar view is held by Sandholtz, Ringstaff and Dwyer (1997) who suggest that professional development should support collaboration between teachers, encourage and support teachers in writing and publishing their findings and create support systems outside schools through email and internet where teachers could share their knowledge by mentoring other colleagues (Sandholtz, Ringstaff, & Dwyer 1997, cited in Kitson et al 2005, p253).

### 2.9.4 Professional Development based on a constructivist learning environment

Slepkov (2008) recommends a professional development programme based on constructivist learning activities. He stresses the importance of having professional development training to complement what teachers are doing in the classroom and should match the needs of the teacher at a particular time (Slepkov, 2008). This study was not related to IWB use but was based on the creation of web pages which showcased student learning on a wide range of topics, under the supervision of teachers. These teachers worked alongside their students, learning how to construct web pages. However they had the assistance of an expert on hand at all times.
2.9.5 Professional Development and Sharing of Digital Resources among Teachers

Hedberg’s & Freebody’s (2007), study highlights the importance of access to digital resources when trying to implement change in pedagogy. This Australian Study investigated primary and second level teachers’ use of the interactive whiteboard and use of digital content produced by the Learning Federation over a one year period. These teachers had the backup of curriculum support officers, who enabled them to develop IWB skills and in locating appropriated TLF (Text Layout Format) digital content and helping them to use it effectively. This digital content was supplied by The Learning Federation which provided online curriculum materials free of charge to all Australian and New Zealand schools. The study found that successful classroom use of IT technologies, requires a careful collaboration between teachers, experts, successful experience of teaching with the technology, and involvement in a community which provides continuous support. The result of this project was that “almost all 13 participating teachers had moved to higher level of use of the two innovatory technologies” (Hedberg & Freebody 2007, p3).

Hedberg’s & Freebody’s (2007), study was on a small scale, therefore one cannot imply that pedagogy will change by providing access to good quality resources. According to Gaffney (2010) teachers value resources which can be matched directly to learning outcomes in the syllabus and which are compatible with their teaching style (Gaffney 2010, cited in Maher, Phelps, Urane and Lee 2012, p152, Hedberg & Freebody 2007, p9). “Word of mouth” was also a powerful influence on resource choice and little use was made of communication tools such as blogs, wikis, video

These studies contradict Hedberg’s & Freebody’s (2007) study and imply that providing access to resources will not bring about changes in pedagogy, as teachers will select resources suited to their teaching styles and relevant to the curriculum.

### 2.9.6 Unchanged pedagogy

Others would argue that teachers’ pedagogy does not change, that it is the existing teacher’s philosophy on learning which will determine if the IWB facilitates a more transformative way of teaching (Cuthell 2005 p6, Mohon 2008, p310). If teachers’ existing style is didactic then “changes in pedagogical style are a stage of professional development evolving from prior beliefs about learning, personal discovery and reflection rather than external direction” (Mohon 2008, p310). Therefore IWB use is more likely to be succumbed within an existing teaching style in order to enable lessons to be completed more efficiently, rather than facilitating a social constructivist learning environment. On the other hand if a teacher holds beliefs that teaching and learning is based on constructivism, then once the initial familiarisation period of the IWB is over, the possibilities which the IWB can present are unending. However Mohon cautions that the existing teaching and learning cultures within schools can influence the manner in which IWB are used and this viewpoint is supported by Hennessy et al (2007), who state that “existing pedagogical approaches and thinking
appeared to shape IWB use” (Hennessy et al, 2007, p297) and that teachers were“tweaking existing lesson plans” in order to incorporate more stimulating, exciting andinteractive media rich content (ibid). This study partly attributes this type of pedagogyto the constraints of the curriculum and time pressures (Ibid, p298). This viewpoint isfurther supported by Moss et al (2007) who state “pressure to get throughcurriculum content means that IWB use may decrease thinking time and opportunityfor learner input, resulting in teacher-only operation (Moss et al 2007, cited in Merceret al 2010, p196).

The Irish study by Crowley (2009) confirms the above viewpoints. This studyinvestigated if the introduction of the IWB into a primary school could lead to achange in teachers’ pedagogy. His findings confirmed that the IWB was being used asan extension of the traditional blackboard and that “the teachers existing pedagogicalapproaches and thinking appeared to shape IWB use” (Crowley, 2009, p69). Crowleyalso found that the revised changes to the new primary curriculum and the extra planning which this entailed impacted negatively on IWB use, as its full potential wasnot being realised (Ibid, p72).

Professional development has a role to play in changing teachers’ pedagogy whenusing IWB technology. The previous sections has highlighted that short courses aimedat up skilling teachers in IWB features is unlikely to result in a change in teacherspedagogy. Peer mentoring and professional development programmes which encouragerecontinuous collaboration among teachers are important. Some studies demonstrate that teachers’ pedagogy will not change due to deep rooted beliefs andattitudes regarding pedagogy and curriculum constraints. Access to good quality
digital resources is helpful to teachers in order to help them to adjust to IWB technology, but access to such resources is unlikely to change teachers’ pedagogy.

The next section will discuss IWB resources and how teachers’ selection of resources can impact on interactivity. Design principles relevant to digital resources are also discussed.

2.10 Design of IWB resources – Multimodal, Pace and Interactivity

Moss et al (2007) identified three crucial themes which enable the IWB to transform teaching and revolutionise learning. These are multimodality, pace and interaction. According to Jewitt (2007) these three concepts underpin teachers’ design of texts for the IWB.

2.10.1 Multimodality and the design of resources

Resources using dynamic images, colour, diagrams and different screens facilitate the production of new kinds of texts and can appeal to different types of learners, such as visual learners identified by Gardner. However a study conducted by Moss and other researchers into IWB use by second level teachers in London schools, found that 78% of teachers design and produce their own materials for the IWB (Moss et al 2007, p23). These teacher-made resources often fail to fully exploit the multimodal capabilities of the IWB. The reason for this according to Jewitt et al (2007) is that teachers rely on design principles derived from traditional text books and work sheets. They do not make use of the full range of multimodal resources, and use resources much the same way as with the traditional blackboard, where writing and two dimensional pictures is
merely transferred to the IWB. These types of resources are the easiest to make as
they are consistent with teachers existing pedagogy (Jewitt et al 2007, p308).
Similarly Moss and others (2007) found that commercial software designed for use
with the IWB often replicated traditional text (Moss et al 2007, p26).

If due consideration is not given to the multimodal and multimedia potential of IWB
materials, there is the possibility of the IWB enabling “the worksheet to migrate
comfortably onto the screen, leaving the pedagogy of the worksheet unchanged”
(Jewitt et al 2007, p315).

2.10.2 Pace and the design of Resources

Several authors have stated that IWB lessons move at a faster pace due to the use of
pre-prepared PowerPoint slides and flipcharts (Laham 2002, p2, Glover & Miller 2001,
p264). While there are advantages to this such as less time being wasted on setting up
resources and more time available for discussion and reflection. There is the danger
that these pre-prepared screens could allow for more information to be filled in,
making it difficult for learners to read. Traditionally text design was built up over a
series of blackboards, leaving a trail for learners to see. These IWB screens fragment
information over several screens, and this changes learners’ access to them. However
it could be argued that these resources are available to learners afterwards as opposed
to resources designed traditionally. This is disputed by Hennessy (2011) who states
that access to these resources are underutilized by teachers and students.
Pressure of examinations and the demand of a full curriculum, behavior management, can put pressure on teachers to break down the curriculum into “bite-size portions” on prepared PowerPoint slides. Also these prepared screens allow the teacher to control the flow of the lessons and hence to dominate the lesson (Jewitt 2007, p311).

Overreliance on PowerPoint slides is seen by some authors as inhibiting learning. PowerPoint facilitates “short sentences with no punctuation, bulleted and nested lists, low visual and display resolution, and the chunking of narrative into slide-sized portions” (Tufte 2004, cited in Reedy 2008, p154). Reedy (2008) also highlights that the software used to power the IWB has presentation features similar to PowerPoint. This software is called InterWrite and is much easier to use than PowerPoint. These visual technologies help to contribute to teaching as being essentially presentational in nature and to learn could be interpreted as to observe them (Reedy p146). Jewitt (2008) says that since the pace of the IWB lessons increase due to the ease of movement between the different applications, this raises new questions for how teacher’s time and learner’s time should be managed within class. He implies that time for reflection and discussion should be built into IWB resources (Jewitt 2008, p53).

2.10.3 Interactivity and the design of IWB resources

Teachers have different understanding of interactivity. Therefore according to Jewitt (2007 & 2008), this shapes their design of IWB materials. Technical and physical interactivity could lead to mundane activities being designed into the IWB materials, which Hargreaves et al (2003) called “surface interactivity.” This type of interactivity was evident with materials used with lower ability students (Moss et al 2007, p41).
Designing interactivity into materials means moving beyond seeing students as “passive recipients of preformed information” (Tanner et al 2005, p722), to allowing students to co-construct knowledge through investigation, dialogue, experimentation, reasoning, examination of evidence and use of logic. Use can be made of equipment such as scanners or visualisers to aid interactivity (Jewitt 2008, p54). Moss et al (2007) identified the following resources as having potential to transform teaching and learning:

- The display, editing and annotation of short edited digital clips;
- Real time\(^2\) annotation of existing texts;
- Real time creation, manipulation and processing of texts (Moss et al 2007, p26).

Teachers find that initially a lot of time goes into the preparation of IWB materials, but that over time this diminishes (Barak 2007, Levy 2002). The design of IWB materials is fundamental to learning in the IWB classroom. The multimodal, interactivity, and ease of movement between digital media can impact learning. Teachers need support in the form of time, resources and training in order to design effective texts for IWBs (Jewitt 2008, p53).

### 2.10.4 Drawbacks of multimedia representation

IWBs allow for a wide range of multimedia and multi-sensory resources to be used in lessons. These types of resources consist of written text, graphics, video, animation, sound, diagrams, web pages etc. Such resources can help the learner to understand

\(^2\) Real time refers to the creation of resources/text on the IWB during a lesson

2.10.5 Theories of Multimedia learning

Mayer’s (2001) cognitive theory of multimedia learning is based on three assumptions about how people learn from words and pictures. This theory is based on three assumptions:

1. The human cognitive system consists of two separate channels for representing and manipulating knowledge. A visual and an auditory channel. Pictures enter the cognitive system through the eyes and are processed in the visual channel. Spoken words enter the cognitive system through the ears and are processed in the auditory channel.

2. Each channel has a limited capacity for holding and manipulating knowledge. Therefore if a lot of pictures or visual materials are presented at one time, this channel can become overloaded. The same is true for spoken words or other sounds.

3. Meaningful learning occurs when a conscious effort is spent in selecting, organizing, and integrating the new information with existing knowledge.

This theory incorporates the cognitive load theory (Sweller, 1999) which postulates that multimedia learning is completed under the constraints of limited working memory.
Seufert (2003) conducted a study on three groups of university students who had to learn a complex chemistry topic, which was represented in different formats, ie texts, graphs, pictures. She found that learners with low levels of prior knowledge of a subject, that having multiple representations ie auditory and visual impeded their ability to recall the information, and led to cognitive overload. Learners with low levels of prior knowledge of a subject material, tend to focus on only one representation, often the more familiar one.

Similar conclusions were arrived at by Plass (2003) who conducted a study into learning a second language. This study required learners to read a text in a foreign language; words were annotated with visual and verbal information in the form of pictures, video clips and text translations of the words in English. The learners were required to understand the individual vocabulary and to understand the text. This study found that providing multiple representation of information did not always help learning. In fact, it hindered learning in low-ability students as they experienced a high cognitive load, due to the imposition of visual information. They suggest that students should be able to request information instead of presenting it by default to all learners (Plass 2003, p239). Students learned fewer vocabulary words as they experienced cognitive overload. Multiple representation of information does not help learning, in fact Plass (2003) found that it hindered learning in low-ability students, as they experienced high cognitive overload. (p240).

This study also found that even high ability learners were hindered in their reading comprehension, when they were forced to look up visual annotations of words. The high cognitive overload was caused as learners had to translate the picture into words.
Cutrim Schmid (2008b) carried out research on IWB technology in the teaching of English to international students. She found that while students perceived the use of multimedia as facilitating learning, it also presented several challenges for teachers and learners when integrating the wide range of multimedia resources. She cautions about balancing the amount of “representations” that are given to learners, in order to avoid cognitive overload. She advises that learners should engage with multimedia resources so that the information can be processed more effectively. This allows the learner to have some control over the learning and according to Mayer’s interactivity principle, helps to reduce cognitive overload (Mayer 2002, p68). Cutrim Schmid (2008b) advises against the over use of hyper links (files or pages, prepared in advance which link to resources). If hyper links are used to “spoon feed” students, there is the danger of not allowing enough time for clarification questions (Cutrim Schmid 2008b, p1564).

Morento (2006) states that one of the common mistakes made when teaching with multimedia resources, is to present extraneous materials in a lesson, or to design a learning environment which forces students to engage in extraneous cognitive processing. Teachers can be tempted to add interesting but irrelevant material to their resources such as interesting text, graphics, or music, which Mayer terms “seductive details” (Mayer 2003, p132). This causes learners to concentrate on the extra images or words which are not relevant to the learning task. Mayer termed this the “Coherence effect” (ibid).

Designers of multimedia resources should also pay attention to the “spatial-contiguity principle”, this is that “when corresponding words and pictures are presented near each
other, learners are more likely to be able to hold corresponding words and pictures in working memory at the same time” (ibid p134). Multimedia resources should have words and pictures together rather than on separate slides/screens.

Teachers should also be aware of the “personalization effect”, which implies that students learn better from a multimedia explanation when the words are presented in conversational style rather than in a formal style (ibid, p134). This implies that the use of personal comments and use of personal language such as, “I”, “your” is recommended in designing multimedia resources. Signaling is also another principle according to Mayer, which helps in learning. This principle can “help guide the process of making sense of the passage by directing the learner’s attention to key events” (Mayer 2002, p69). Examples of signaling are words, such as “the first step is … the final step is...” or using a louder voice to emphasise an important point. Signaling also involves the use of section headings and pointer words to help clarify learning. This directs the learner’s attention to the important elements in the multimedia and can facilitate better learning and understanding.

The modality principle is also vital when using multimedia resources. This principle states that deeper learning occurs when words are presented as narration rather than as on-screen text. This principle implies that the use of on-screen text and animation could overload the visual channel, while the use of narration would free visual resources to attend to the animation.

It could be argued that multimedia is not a big issue nowadays as students are constantly interacting with multimedia, either through the internet, facebook, interactive games, etc. However the use of multimedia in the classroom can present
challenges to teachers and learners. Teachers must be careful in the design of their multimedia resources for the classroom. Designing resources with too many visuals, incorporating sound, text and visuals together, or over use of information can cause cognitive overload among learners and hence inhibit learning. Teachers also need to pay attention to those learners with little prior knowledge of a subject, and should have a basic understanding of the design of multimedia resources. The challenge for teachers is to find ways of

- reducing cognitive overload
- to encourage learners to engage actively with multimedia resources so that information can be processed more effectively
- to build in time for reflection and questioning

2.11 Conclusion

IWBs are becoming very popular in Irish classrooms and have the potential to have a significant impact on learning. Research presented in this literature review has outlined the advantages of using an IWB. However these benefits will not result in long term student attainment unless particular attention is paid to interactivity, pedagogy and IWB resources.

The research reviewed relating to interactivity, distinguishes between technical interactivity where by the focus is on the repetitive practice of skills, as opposed to the pedagogical interactivity which stimulates reflection and higher order thinking. Educators must be mindful of not resorting to traditional IRF structure of dialogue
within IWB classes. The type of questioning used in the classroom can foster higher order thinking skills; this was evident with the current research on clicker technology.

The review has also indicated that teachers need time to adapt to IWB technology in order to change their pedagogy. However this is not an easy process and many teachers carry forward their existing teaching methods to the IWB classroom. International and Irish studies have indicated that short training courses will not change pedagogy but rather ongoing professional development with mentoring. This is an expensive form of training, however it is money well spend considering the amount of money being spent on IWB technology.

As the IWB is seen as a “digital hub” for multimedia, teachers must pay attention to their design of resources. They must be careful not to get carried away with designing resources to entertain learners at the expense of bombarding them with too much information in different formats. Likewise the provision of too much information can lead to “spoon feeding” learners which is not conductive to higher order thinking skills. Due consideration must also be given to learners with little prior knowledge of a subject matter and teachers should have a basic understanding of the principles of designing multimedia resources.

This literature review has concentrated on the above points in relation to IWB use generally. There is no literature on using the IWB within a VTOS setting, however it is implied that these findings can be carried forward to a VTOS setting.
Chapter 3

Methodology

3.1 Introduction

There are many benefits to using interactive whiteboards in education. One factor often cited is that IWBs are highly interactive and therefore potentially can provide rich, stimulating environments for learning (Smith et al 2005, Latham 2002). However the literature review in the previous chapter has highlighted that the term “interactivity” has different interpretations. Some people believe interactivity is linked to the technical aspects of the board resulting in mundane or repetitive skills being stimulated (Higgins et al 2005, Beauchamp & Parkinson 2005, Miller et al 2005). Others see the potential of the board to be highly interactive in a way that stimulates problem solving, reflection and higher order thinking skills. This type of interactivity was termed “pedagogical interactivity” and was seen to be the ideal (Beauchamp & Kennewell 2008, Cutrim Schmid 2008). This is the type of interactivity which will be investigated in this study.

The literature review has shown that the pace and control of the IWB lesson and the type of dialogue and questioning used in class influences interactivity and ultimately learners attainment levels. Linked to this process is the choice of resources which teachers use and the manner in which they use them (Jewitt et al 2007, Moss et al 2007). It was found that the most effective resources were those created in real time within the classroom. The review has shown that teachers need to understand basic design principles and in order to use the IWB to its full potential rather than as a means of “jazzing” up lessons.
Educators need adequate time in order to use the IWB to its full potential; the literature review has shown that in order to achieve this ideal level of proficiency, continual professional development rather than short training courses can have an impact on teachers’ pedagogy (Miller & Glover 2007, Jones & Vincent 2010).

3.2 Research Setting

This study was conducted in VTOS centres in Munster which use IWBs. There are twenty eight VTOS centres in Munster catering for approximately 1400 adult VTOS learners. However only six centres use IWBs for their VTOS classes; one VTOS centre in Munster which used IWBs did not wish to be part of this study, two other centres had access to IWBs but did not use them. The other VTOS centres use projectors and desktop or laptop computers instead of IWBs.

Initially an email was sent to all VTOS centres in Munster in February 2012, outlining the research and seeking clarification from VTOS coordinators if IWBs were used in their centres (see appendix A). The researcher also attended an annual conference for VTOS coordinators in March 2012 whereby contact was made with coordinators of centres which used IWBs and who would also allow their centres to be involved in the study (see appendix B). It was felt that by putting a “face to an email”, respondents might be more cooperative. Those centres which did not respond to the initial email, or were not represented at the VTOS conference, were followed up by a phone call to the appropriate VTOS coordinator. Postal questionnaires were sent to centres in April 2012 and in May 2012 a focus group, interviews and an observation was carried out.
3.3 Sampling Group

A sampling frame can be defined as “the listing of all units in the population from which the sample will be selected” (Bryman, 2008, p168). For the purpose of this research the sampling frame was the six VTOS centres in Munster which use IWBs in their classrooms. There are approximately 400 learners, 30 teachers and six VTOS coordinators in this sampling frame. A form of “snowballing” sampling was used to sample the attitudes of the VTOS teachers and learners. This type of sampling allows the researcher to make contact with those likely to assist with research and then to get them to name others who would also help (Bernard, 2000, p179). Contacts made at the VTOS conference in March 2012 facilitated with this sampling process.

Questionnaires were sent to the VTOS coordinators of these centres and these were subsequently distributed to VTOS students and VTOS staff. The type of sampling used in this instant was purposive sampling. The goal of purposive sampling is to sample participants in a strategic fashion so that those who are involved in the research are relevant to the research questions being posed (Bryman, 2008, p458). The VTOS coordinator of these relevant centres knew who to target with these questionnaires.

3.4 Research Questions

IWBs are becoming very popular in primary and second level schools and to a lesser extent in adult education. This study aims to find out if IWBs have a role in adult
education or are these boards perceived to be more beneficial for younger students in primary and post primary schools.

Consequently the study will seek clarification on the following questions:

1. What are the perceived benefits and constraints of using IWBs in VTOS centres from the adult learners’ and the adult educators’ point of view?

2. How are IWBs used in Adult education within a VTOS centre?

3. What are the barriers to use associated with IWBs in VTOS centres?

4. How important is the role of adequate professional development in the use of IWBs?

3.5 Approaches to Researching Education

Verma and Mallick (1999) identified three broad approaches to educational research. These they termed as, historical, experimental and descriptive approaches. The methodology used in this study is descriptive and is clarified as follows:

*The descriptive method in the educational field is not exactly a method, since it embraces many approaches to the collection of data. However each of them has one element in common – each endeavours to depict the present position of a given situation (Verma & Mallick 1999, p77).*

Cohen, Manion and Morrison (2011) identify many educational research methods as being descriptive in nature because such studies investigate:
“individuals, groups, institutions, methods and materials in order to describe, compare, contrast, classify, analyse and interpret the entities and the events that constitute their various fields of enquiry” (Cohen, Manion, and Morrison, 2011, p256).

There are various means of collecting data for descriptive research and according to Verma and Mallick (1999) these include:

- Surveys
- Case studies
- Development studies
- Comparative studies
- Ethnographic studies
- Evaluation studies
- Action research

(Verma & Mallick 1999, p79)

As this study involved VTOS centres of various sample sizes, the author chose surveys and a case study as being most appropriate for the completion of the research. These two methods of data collection complement each other as the case study can reveal information which cannot be obtained through surveys (Ibid, p82).

Surveys have many key characteristics; the most relevant to this study are outlined as follows:

- Collect data at a specific point in time in order to provide descriptive, inferential and explanatory information.
- Gathers numerical data which can be processed statistically
Captures data from multiple choice, closed questions and observation schedules (Cohen, Manion, Morrison 2011, p256-257).

This study uses self-completion questionnaires and semi-structured interviews in order to collect survey data.

A case study was the second method of data collection used for this study. A case study can be defined as “an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context” (Yin 2009, p18). According to Yin, the case study approach “relies on multiple sources of evidence, with data needing to converge in a triangulating fashion” (Ibid). The author, as mentioned in the previous paragraph used teacher and learner questionnaires, focus groups, observation, and semi-structured interviews to improve validity of results. A third dimension to a case study is that it should benefit from the “prior development of theoretical propositions to guide data collection and analysis” (Ibid). The author of this study conducted an in depth literature review of IWBs.

The research questions being asked in this study are predominately “how” and “why” type questions and therefore according to Yin (2009) a case study is relevant (ibid, p10). The author is interested in how the IWB is being used within classes, is it being used as a presentational tool or a highly interactive tool involving teachers and learners in the process of education? The author is also interested in the attitudes of learners and teachers towards the IWB and how professional development or lack of it influences how teachers use the IWB.
According to Yin (2009) the case method approach to research is the preferred option “in examining contemporary events, but when the relevant behaviours cannot be manipulated” (Yin 2009, p11). In this study the contemporary event, is IWBs in adult education, the author has no influence over the behaviour of teachers or students when teaching or learning with these boards.

3.6 Research Instruments

Qualitative and quantitative data was used in this case study. Qualitative research methods “attempt to capture and understand individual definitions, descriptions and meanings of events” (Burns 2000, p388). This study used focus groups and observations to collect qualitative data. Quantitative researchers are concerned with the “collection of facts and studying the relationship of one set of facts to another. They use techniques that are likely to produce quantified and if possible, generalisable conclusions” (Bell 1999, p7). The current study used teacher and learner questionnaires and semi-structured interviews as quantitative data collection methods.

3.7 Questionnaires

A self completion questionnaire was designed for teachers and learners to complete (See Appendix C and D). These were piloted within the researcher’s own education centre. Feedback from the student questionnaires indicated initially that there were too many questions being asked and in some instances learners did not understand some of the wording. Regarding the teacher questionnaires, some of the questions originally consisted of rankings in order of importance from 1 – 12. The author found that this
was confusing to some teachers as many had entered the same number twice or left some statements blank. Consequently these rankings were changed to likert scales. Also the supervisor recommended the inclusion of text boxes in order to capture respondents’ viewpoints more accurately on questions which they strongly agreed or disagreed with. Two hundred and thirty learner questionnaires and 40 teacher questionnaires were distributed to the centres. A total of 117 learner and 25 teacher questionnaires were returned completed. These questionnaires were sent to the VTOS coordinator in the relevant centres. It was felt that the VTOS coordinator was best placed to distribute these questionnaires as they knew the teachers and learners who used IWBs in classes.

Questionnaires were posted to the relevant VTOS coordinator in early April, 2012. In order to ensure an adequate response rate a cover letter (See Appendix C and D) was enclosed with each questionnaire, outlining the research and guaranteeing confidentiality. A stamped addressed envelope was also enclosed to facilitate return of questionnaires. Centres which were late returning questionnaires were followed up with a phone call. According to Mangione, a response rate of 60-69% is acceptable, however from 50-60% is barely acceptable (Mangione, 1995, p60-61). However as non-probability sampling was used in this study, the response rate was less of an issue (Bryman 2008, p220).

Questionnaires were laid out according to recommendations by Dillman, with clear instructions, an attractive layout and did not appear too bulky (Dillman (1983), cited in Bryman, p221). The majority of the questions in the teacher and learner questionnaires were structured closed questions, just requiring a tick to complete. Likert scales were
used for most questions in order to measure respondents’ attitudes; this is a form of “quasi-quantification” (Bryman 2008, p596). A problem with such scales is acquiescence, which is the tendency of some respondents to agree or disagree with statements irrespective of their content. In order to avoid this scenario the wording of some questions were changed so that it would be obvious to the researcher that this was occurring. Some questions asked for more specific information if a student/teacher strongly agreed or disagreed with a relevant issue relating to IWBs. Care was taken so that respondents were not deterred by the prospect of writing too much, when completing the questionnaires (Bryman 2008, p221). Another drawback of questionnaires is that some adult learners may have low levels of literacy or their standard of English may be limited. However these scenarios were minimised as all questionnaires were completed in class under the supervision of the adult education teacher.

3.8 Interviews

“An interview is a verbal interchange, often face to face …in which an interviewer tries to elicit information, belief or opinions from another person” (Burns 2000, p423). There are many types of interviews ranging from the structured interview whereby questions are very specific and offer the interviewee with a fixed set of answers (Bryman 2008, p193).

At the opposite end of the scale is the unstructured interview, which tends to be very similar to a conversation. The interviewer has a set of prompts to guide him/her during the interview (Burgess 1984, cited in Bryman 2008, p438). The type used in this
research was a semi-structured interview and these were conducted with VTOS coordinators. The researcher had a number of questions that were in the form of an interview guide, that is a list of questions and topics that needed to be covered. However there was discretion to probe deeper and follow new leads (Bernard 2000, p91). When conducting interviews the researcher must be aware of the danger of bias. Issues which may bias interviews include the personal characteristics of the interviewer, opinions and expectations of the interviewer and the desire by respondents to give socially desirable answers. However according to Bell (1999) it is easier to acknowledge that bias can occur rather than to eliminate it altogether (Bell 1999, p139). In this study, teachers or coordinators may wish to be seen as progressive in their pedagogical views and up to date with technology. However for this study the respondents were chosen on the basis of their expertise and interest in IWBs. The interviews were digitally recorded and transcribed (See appendix E and F).

3.9 Focus groups

The focus group as a method of research, “is an interview with several people on a specific topic or issue” (Bryman 2008, p473). The focus group is different from the group interview as it typically explores a specific issue in detail, is concerned with how people respond to each other views, and it allows the participants to bring up issues of interest to them (Ibid).

A focus group was conducted with eight students whose classes were taught with IWBs. The focus group was conducted after the collection of questionnaires and the observation. The researcher received permission from the relevant VTOS coordinator
to conduct a focus group and it was the VTOS coordinator of that centre who notified students about the date, venue and aims of the focus group. Participants in the focus group were from the same centre, but were following different areas of study. Prior to participation each member signed a consent form (See Appendix G and H). Tea and coffee facilities were made available to participants on the day. At the start of the focus group each participant was requested to identify themselves and to outline their programme of study. The focus group consisted basically of two questions: What are the benefits of using IWBs in classes? What are the drawbacks of using IWBs? At the end participants were invited to add any extra information which they thought was of importance. According to Silverman (2005), using focus groups based on a single question can overcome the problem of using leading or incomprehensible questions (Silverman 2005, p63). Recording the focus group meeting was done by notes taken by a third party, so that pertinent information would not be missed. These were written up afterwards (See Appendix I).

3.10 Observation

Relying solely on interviews and questionnaires can result in bias and inaccurate research, as what respondents say they do, can be entirely different from what they actually do (LaPierre 1934, p232). A possible solution to these problems is to observe behaviour rather than rely on research instruments. There are two types of observation, participant and non participant observation. Participant observation is qualitative research and is described as

“the transfer of the whole person into an imaginative and emotional experience in which the field worker learned to live in and understand the new world” (Lacey1976, p65 cited in Bell 1999, p157).
These types of observations are unstructured, in that the researchers do not have a preconceived plan about what exactly to observe. The main difficulties related to this type of observation are the potential biases produced. As the researcher becomes immersed in the daily lives or events of the participants they may find it difficult to adopt the role of an objective observer (Bell 1999, p158).

Non participant or direct observation “involves merely watching what happening and recording events on the spot” (Burns 2000, p413). For the purpose of this study which is based on IWBs in adult education, non participant observation was undertaken. According to Yin (2009) this type of observation is suitable for case studies involving new technology as it is an invaluable aid for understanding how the technology is used and any possible problems that may be encountered (Yin 2009, p110).

An observation was conducted on a Leaving Certificate Ordinary Level English class, where the teacher used an interactive whiteboard. The teacher in question had been using the IWB for 2 years and had been referred by the VTOS coordinator of that particular centre. There were 18 adult students present and the observation undertaken was of one hour duration. The IWB was used in this instance as a revision aid for a Leaving Certificate poem. The role of the researcher was to be as unobtrusive as possible, as there is always the possibility of the “reactive effect”, whereby people change their behaviour because they know they are being watched (Bryman 2008, p265). However according the McCall (1984), participants can become accustomed to being observed (McCall, 1984, cited in Bryman 2008, p265). An observation schedule (See Appendix J) was used to record the behaviour of the teacher and that of the class in relation to how the IWB was used. While there are many different types of schedules
available for such recordings, Bell (1999) notes that the type used is a matter of personal preference but that the researcher must be clear about what to record as it is impossible to record everything which occurs in the classroom (Bell 1999, p159-161). The observation schedule was narrative, broken down into periods of time and focused on the subject matter, various digital media used and the interaction between the teacher and learners, learners and teacher, and learners to learners. The schedule also noted any problem solving and reflection experiences observed during the process of observation.

3.11 Triangulation

Triangulation can be defined as “the use of two or more methods of data collection in the study of some aspect of human behaviour” (Cohen, Manion, Morrison 2011, p195).

Bell (1999) further stipulates that triangulation involves:

“Cross-checking the existence of certain phenomena and the veracity of individual accounts by gathering data from a number of sources and subsequently comparing and contrasting one account with another in order to produce as full and balanced a study as possible” (Open University Course E811, 1988, p54, cited in Bell 1999, p102).

In this research, the author used a type of triangulation called “methodological triangulation”, this is where different methods of data collection are used on the same object of study (Cohen, Manion, Morrison 2011, p196). In the current study, postal questionnaires were used to collect data, but it was supplemented by an observation study, a focus group and semi structured interviews.
3.12 Reliability and Validity

In order for research to be reliable, “it must demonstrate that if it were to be carried out on a similar group of respondents in a similar context, then similar results would be found” (Cohen, Manion, and Morrison 2011, p199). Bell (1999) notes that there are a number of “devices for checking reliability”, but generally this is tested at the time when the instrument is being piloted and questions are being worded (Bell, 1999, p104). The author of this study used the “alternate forms method” or also known as the “equivalent forms” in this research. Cohen, Manion and Morrison (2011) explain this as follows:

“If an equivalent form of the test or instrument is devised and yields similar results, then the instrument can be said to demonstrate this form of reliability” (Cohen, Manion and Morrison 2011, p200).

This measure of reliability was used at the pilot stage of the questionnaire. The author distributed the learner and teacher questionnaires for completion by the pilot group. On the same day the same questionnaires were distributed to the same people, however the order and some of the wording of the questions were changed.

In order to increase reliability in relation to the interviews conducted for this research, care was taken so that each interviewee understood the interview questions in the same way. This was achieved by careful piloting of the questions with the authors’ co-workers. Cohen, Manion and Morrison (2007) refer to this as “stimulus equivalence” and argue that bias and inaccuracies can occur if interviewers change the sequence of words or emphasis certain words during an interview (Cohen, Manion and Morrison 2007, p354)
Validity is an important element in effective research, although it is a more complex concept than reliability. Validity “tells whether an item measures or describes what it is supposed to measure or describe” (Bell 1999, p 104). In this research both qualitative (interviews, focus groups, observations) and quantitative (questionnaires) methods used by the author addressed internal and external validity.

- Internal validity tries “to demonstrate that the explanation of a particular event, issue or set of data that a piece or research provides can actually be sustained by the data (Cohen, Manion and Morrison 2011, p183).

- External validity “refers to the degree to which the results can be generalized to the wider population, cases, settings, times or situations (Ibid, p186).

Every effort was made to maintain the validity of the study through the piloting the research tools and seeking the advice of other researchers on question content and suitable approaches. Regarding the focus groups and observation, care was taken not to allow anecdotal evidence to provide a false impression as according to Bryman (2008) “particular striking statements by someone … may have more significance attached to it than might be warranted in terms of its frequency” (Bryman 2008, p599). A form of “quasi-quantification” was also used in the questionnaires to provide some form of measurement of respondents’ attitudes.
3.13 Limitations of the Sample Group

The sampling used in this research was “snowballing” sampling, however one of the main drawbacks of this form of sampling, is external validity. In other words, the results cannot be generalized to a population (Bryman 2008, p415). However according to Bernard

“the credibility of research results comes from the power of the methods used in measurement and sampling. Good measurement is the key to internal validity, and representative sampling is the key to external validity. Well done non-probability sampling is actually part of good measurement. It contributes to credibility by contributing to internal validity” (Bernard 2000, p180).

LeCompte and Goetz (1982) state that qualitative researchers should be encouraged to produce a “thick description”, which is “rich accounts of the details of a culture” (LeCompte & Goetz 1982, cited in Bryman 2008, p378). According to Lincoln and Guba (1985) this can provide others with a type of database, which can be referred to in making judgments about the generalisability of findings to another setting (Lincoln & Guba 1985, cited in Bryman 2008, p378). This study used questionnaires whereby teachers and learners were encouraged to add extra information. Many respondents recorded their viewpoints on these questionnaires, also the focus group, which was informal allowed learners to voice their opinions. These data collection methods helped the researcher to collect “rich accounts of the details of a culture”, which can be applied to other VTOS centres.

Bernard (2000) further stimulates that if researchers want their conclusions to be credible and to be extended beyond the research group, that the study should be
repeated one or two more times with non probability samples or to use probability samples (Bernard 2000, p180). Yin (2009) refers to this process as “replication logic”, whereby findings from a case study are replicated to a second or third setting (Yin 2009, p44). Due to time constraints this process was not completed by the author of this study.

Another technique to improve credibility or internal validity is to seek participants’ views on the researcher’s findings, by issuing draft findings and allowing the participants to comment on these. Again due to time limitations this process was not followed. According to some researchers there are difficulties with this process as participants may be reluctant to be critical (Hobbs 1993) and the results may be meaningless to them also (Skeggs 1994, p86).

3.14 Overall Limitations of the study

The adult education sector is currently undergoing some major changes. Nationally Senior Traveller Training centres are in the process of being closed and some of their resources have been passed to VTOS centres. This was evident with one centre in Munster, which had just inherited two IWBs but had not started to use them. Another centre was moving to new premises and was receiving two interactive whiteboards but had not used them as of May of this year and was awaiting training.

These centres were not part of the study; however it would be interesting to meet with them further down the line to ascertain the perceived learning and teaching benefits of IWBs.
The largest VTOS centre in Ireland which has an enrolment of 200 students was part of this study. It is unclear if the inclusion of this centre has any impact on the outcome of the study. Some could argue that large centres have access to more resources and funding for training, however a facet of adult education is the prevalence of part-time teachers and lack of funding.

3.15 Ethics

“Ethical research involves getting the informed consent of those you are going to interview, question, observe or take materials from. It involves reaching agreements about the uses of this data, and how its analysis will be reported and disseminated. And it is about keeping to such agreements when they have been reached” (Blaxter et al 1996b, p146, cited in Bell 1999, p39).

Informed consent is one of the most basic ethical principles in research. At all stages during this research, ethical issues were considered and implemented by the researcher. Prior to conducting the research, email and telephone contact had been made with all VTOS coordinators in Munster to initially identify those centres which had IWBs. Those centres which had IWBs were then given full details of the research and given the promise of anonymity. Anonymous questionnaires which were sent out were coded so that centres, teachers or learners would not be identified. These questionnaires consisted of a cover letter outlining the research and guaranteeing confidentiality. Verbal permission was sought from the chairperson of the Association of VTOS coordinators in order to speak at their annual conference. Prior to conducting observations and the focus group, permission was received from the relevant VTOS coordinator. Similar procedures were followed in relation to the conducting of interviews. Throughout the research phase all data was stored securely by the author.
3.16 Conclusion

The methodology approach used in this research was called descriptive research. This approach used survey data and a case study to collect data. Quantitative and qualitative tools were used in order to add credibility, reliability and validity to the study. The literature review helped to formulate the research questions for the case study. Quantitative data was obtained from teacher and learner questionnaires, and qualitative data was collected from semi-structured interviews, one focus group and one observation. The next chapter will present the findings of this case study.
Chapter 4

Findings

4.1. Introduction

This chapter will present and examine the findings from the research study conducted in six VTOS centres in Munster. These findings are derived from 117 VTOS learner questionnaires, 25 VTOS teacher questionnaires, two interviews conducted with VTOS coordinators, a focus group conducted with VTOS learners and an observation of a VTOS class teacher using the IWB during an English lesson.

The statistical package “Qualtrics” was used to input the information from the questionnaires, and to draw up tables and graphs. These findings are presented by the research questions posed in chapter 1, namely VTOS teachers/VTOS coordinators responses to the research questions and VTOS learners’ responses.

4.2 Source of funding for IWBs in VTOS centres

Unlike second level schools, there is no specific provision of funding for ICT in adult education. Funding for IWBs is at the discretion of the VTOS coordinator and generally comes from the VTOS budget. One VTOS coordinator, when asked by the researcher, where funding was obtained replied as follows:

“It was funded through the VTOS budget. We had some money left over last year and that was what I decided to use it on”. (VTOS coordinator 1)
Another coordinator when asked where funding was received replied:

“One was through the VTOS budget, the other was a shared centre thing, you know between the other programmes, PLCs, and various others” (VTOS coordinator 2).

The decision to invest in IWBs within VTOS centres seems to rest with the Coordinator and with some influence from VTOS teachers as expressed by a VTOS Coordinator as follows:

“There was a bit of budget left and we said lets get something tangible and also what happened was that once the first one went in, the demand came for other teachers” (VTOS Coordinator 2).

The most popular IWBs used in centres are Smart boards with Smart Notebook 10 being the most popular software.

4.3 Findings by Research Questions – VTOS Teachers/VTOS Coordinators

VTOS teachers and coordinators responses from the study are presented in the following sections. These are presented by the research questions outlined in chapter 1.

4.3.1 The perceived benefits and constraints of using IWBs from the adult educators’ point of view

This study found that teachers cited many benefits to using IWBs in teaching adults. These are listed in the table on the next page.
Table 1: Benefits of IWBs cited by teachers

<table>
<thead>
<tr>
<th>Benefits of IWBs</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>No Idea</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>IWBs helps to hold the adult learners’ attention</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>74%</td>
<td>26%</td>
</tr>
<tr>
<td>IWBs provide more opportunities for discussion</td>
<td>0%</td>
<td>14%</td>
<td>5%</td>
<td>73%</td>
<td>9%</td>
</tr>
<tr>
<td>IWBs allow me to support a wider range of learning styles</td>
<td>0%</td>
<td>0%</td>
<td>5%</td>
<td>68%</td>
<td>27%</td>
</tr>
<tr>
<td>Learning in a VTOS centre is more enjoyable when an IWB is used</td>
<td>4%</td>
<td>0%</td>
<td>4%</td>
<td>65%</td>
<td>26%</td>
</tr>
<tr>
<td>IWBs enhances the adult learners’ ICT skills</td>
<td>0%</td>
<td>27%</td>
<td>0%</td>
<td>59%</td>
<td>14%</td>
</tr>
<tr>
<td>Adult learners are more motivated when IWBs are used</td>
<td>0%</td>
<td>10%</td>
<td>14%</td>
<td>52%</td>
<td>24%</td>
</tr>
<tr>
<td>VTOS learners grades have improved</td>
<td>0%</td>
<td>9%</td>
<td>41%</td>
<td>27%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Ninety five percent of teachers agreed that IWBs support a wide range of learning styles. All teachers agreed that IWBs hold the learners’ attention and 91% agree that IWBs make learning more interesting and enjoyable. Seventy six percent of teachers agreed that adult learners are more motivated in an IWB class. A comment from a VTOS coordinator highlights these views:

“The main benefits of having IWBs are that you can make your whole subject an awful lot more interesting for a student. It doesn’t have to be boring, reading from a book, and that you ask a question, they just answer you back, they can now come up and actually interact with the stuff themselves” (VTOS Coordinator 1)

Teachers agree (82%) that IWBs provide more opportunities for discussion and interaction. As one art teacher commented:

“In a visual medium, images, galleries etc can be visited, reviewed and discussed more easily as part of a group” (Questionnaire Teacher).
Another teacher commented that the IWB encourages more mobility:

“I am able to be mobile and move around the classroom and have more interaction with my students” (Questionnaire Teacher).

Seventy three percent of teachers agreed that the IWB helps to improves learners’ ICT skills and 50% of teachers feel that learners’ grades have improved, however 41% were unsure or had no idea if this was an accurate statement.

4.3.2 IWB usage within a VTOS centre

This study found that in general IWBs are a new technology in VTOS centres as can be ascertained from figure 1 below, which shows that only 5% of teachers have been using the IWB for more than 2 years.

Figure 1: Length of time teachers using IWB
IWBs are mostly used for whole class and instructional teaching (Figure 2). Maths, IT and Business teachers use the IWBs more frequently than other teachers.

As can be seen from the above chart, teachers mostly use the IWB for whole class and instructional teaching. Some teachers use the board for small groups or for individual learners. This could be as a result of smaller classes or one-to-one tuition, rather than the board being operated by the learner.
The frequency which teachers use the IWB varies, 58% of teachers use the board once a week and only 8% of teachers use the board in all of their lessons. Twenty one percent of teachers use the board in at least one lesson per day and 17% use the board 2-3 times per week.

The further education sector is a very diverse sector catering for wide range of learners interests. This is reflected in the subjects/modules in which the IWB is used by VTOS centres in this study. The IWB is used across a wide range of subjects including Leaving Certificate and FETAC modules. The most popular subjects in which the IWB is used are Maths, IT, Business (53%). This could indicate the availability of the IWB within these classrooms. English/Communications accounted for (19%). Art,
Craft, Photography accounted for (14%). Other (French, Guidance, Home Economics, Literacy, Biology) accounted for 14% of usage by teachers. When teachers were asked if they had to pre book IWB facilities, 79% indicated that it was not necessary to book the IWB, this could indicate that IWBs are mostly located in IT rooms, whereas 21% had to book IWBs. This study also asked teachers if they agreed that IWBs should be in all classrooms and 91% of teachers agreed with that statement.

The most popular type of software used by teachers is what came with the IWB such as Smart Notebook. Teachers also indicated that they used PowerPoint, YouTube and websites. A note of caution was added by a VTOS coordinator in relation to teaching with PowerPoint, and videos and is expressed as follows:

“You could end up that having your kids watch some images is teaching”

(VTOS coordinator 2)

4.3.2.1 Popular IWB Features used by Teachers

The following table on the next page indicates the most popular features used by teachers. These are described in the next section.
Table 2: Most popular IWB features used by teachers

<table>
<thead>
<tr>
<th>Type of IWB feature</th>
<th>Never</th>
<th>Hardly ever</th>
<th>Some lessons</th>
<th>Most lessons</th>
<th>Every Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigate the internet from IWB</td>
<td>4%</td>
<td>0%</td>
<td>43%</td>
<td>39%</td>
<td>13%</td>
</tr>
<tr>
<td>Media clips</td>
<td>4%</td>
<td>4%</td>
<td>58%</td>
<td>25%</td>
<td>8%</td>
</tr>
<tr>
<td>Drag/ match techniques</td>
<td>38%</td>
<td>21%</td>
<td>29%</td>
<td>13%</td>
<td>0%</td>
</tr>
<tr>
<td>Highlight and annotate</td>
<td>38%</td>
<td>29%</td>
<td>33%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Hide and Reveal techniques</td>
<td>43%</td>
<td>39%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Translating handwriting to text.</td>
<td>75%</td>
<td>17%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

The most popular IWB features used by VTOS teachers are navigating to the internet (43%) and using media clips (58%). Highlighting (33%), dragging and matching (29%) and hide and reveal features (17%) are also popular with teachers for some lessons. Translating handwriting to text is rarely done in the VTOS classroom.
4.3.2.2 Least popular features used by VTOS teachers

This section outlines the least popular features used by VTOS teachers.

**Table 3: Least popular features used by VTOS teachers**

<table>
<thead>
<tr>
<th>Type of IWB feature</th>
<th>Never</th>
<th>Hardly ever</th>
<th>Some lessons</th>
<th>Most lessons</th>
<th>Every Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voting systems</td>
<td>96%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>On-line tests/opinion polls</td>
<td>75%</td>
<td>8%</td>
<td>13%</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>Electronic flipchart</td>
<td>67%</td>
<td>17%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Video conferencing</td>
<td>74%</td>
<td>22%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Presentation of student work to a wider audience</td>
<td>67%</td>
<td>13%</td>
<td>17%</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Allowing learners to write on the IWB/tablet and to work collaboratively.</td>
<td>42%</td>
<td>29%</td>
<td>29%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Issuing of IWB notes to students who missed a lesson</td>
<td>50%</td>
<td>17%</td>
<td>17%</td>
<td>17%</td>
<td>0%</td>
</tr>
<tr>
<td>Saving IWB notes and using again VTOS Classes</td>
<td>25%</td>
<td>25%</td>
<td>33%</td>
<td>17%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Features which could facilitate collaboration and discussions with a wider audience or within a VTOS class such as voting systems (96%), online tests (75%), electronic flipcharts (67%), video conferencing (74%) and presentation of learners work (80%) are never used by teachers.
Providing students with the opportunity of working together in groups and using the IWB or individual tablets is rarely done by teachers, as indicated by 71% of teachers. The facility of allowing students access to IWB lesson notes is only used by 17% of teachers in most lessons. This has implications for those adult learners who are unable to attend a class.

4.3.2.3 ICT Equipment used in conjunction with the IWB

The following table shows the ICT hardware used by teachers in conjunction with the IWB. The table is arranged by order of what hardware is never used by teachers.

Table 4: ICT equipment used with the IWB

<table>
<thead>
<tr>
<th>Hardware used</th>
<th>Never</th>
<th>Hardly ever</th>
<th>Some lessons</th>
<th>Most Lessons</th>
<th>Every lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slate/Tablet</td>
<td>95%</td>
<td>0%</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Voting Pads</td>
<td>95%</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>learner laptops</td>
<td>86%</td>
<td>5%</td>
<td>10%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Visualiser</td>
<td>81%</td>
<td>0%</td>
<td>19%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Printer</td>
<td>50%</td>
<td>0%</td>
<td>25%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>IWB pencils</td>
<td>24%</td>
<td>5%</td>
<td>57%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Teacher laptop</td>
<td>19%</td>
<td>14%</td>
<td>33%</td>
<td>14%</td>
<td>19%</td>
</tr>
<tr>
<td>School network</td>
<td>19%</td>
<td>5%</td>
<td>52%</td>
<td>0%</td>
<td>24%</td>
</tr>
<tr>
<td>Speakers</td>
<td>5%</td>
<td>0%</td>
<td>43%</td>
<td>19%</td>
<td>33%</td>
</tr>
<tr>
<td>other (please specify)</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

The above table indicates that learner laptops, visualisers, voting pads and tablets are extremely rare in VTOS classrooms. The most popular IWB equipment used with the IWB are speakers, IWB pens, school network, teacher laptops and printers.
4.3.2.4 Teachers’ attitudes in terms of teaching

The following table outlines teachers’ positive attitudes to teaching with an IWB and is discussed below:

Table 5: Teachers’ positive attitudes in terms of teaching with the IWB

<table>
<thead>
<tr>
<th>Positive attitude of teachers in terms of teaching with an IWB</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>No idea</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>IWBs allow for a more efficient delivery of multimedia resources, thereby increasing the pace of the lesson</td>
<td>0%</td>
<td>9%</td>
<td>5%</td>
<td>77%</td>
<td>9%</td>
</tr>
<tr>
<td>IWBs provide more opportunities for discussion</td>
<td>0%</td>
<td>14%</td>
<td>5%</td>
<td>73%</td>
<td>9%</td>
</tr>
<tr>
<td>IWBs help to promote greater group work</td>
<td>5%</td>
<td>14%</td>
<td>23%</td>
<td>55%</td>
<td>5%</td>
</tr>
<tr>
<td>The IWB has improved my teaching</td>
<td>0%</td>
<td>9%</td>
<td>23%</td>
<td>45%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Eighty six percent of teachers feel that IWBs are a very efficient method of teaching, as portrayed by a teacher as follows:

“I am more prepared. I can time my lesson more easily. I don’t waste time writing on the board and wiping it clean. I can introduce media links, keeping my lessons right up to date” (Questionnaire Teacher).

Eighty two percent of teachers feel that the IWB allows for more opportunities for interaction and discussion in class. However it is possible that this type of interaction is teacher directed. As indicated earlier, 71% of teachers stated that they rarely use the IWB for group work with their learners; however 60% of teachers agree that the IWB can promote more group work, but it is unclear from this study the true extent of this.
From the observation studies conducted by the researcher very limited group work was observed, merely “chatting to students next to themselves to ascertain views”.

Teachers also believe that the IWB has improved their teaching, as 68% agreed with this statement. However the degree to which teaching is transformed is questionable. The following comments help to portray these views.

“It has brought the subject to life! It allows me to go deeper into a poem. It is a fantastic resource” (Questionnaire Teacher).

“Easier to explain a specific point, demonstrating is better than explaining (Questionnaire Teacher).

“Yes it has changed it, broadened it really” (Questionnaire Teacher).

4.3.2.5 Teachers’ negative attitudes towards the IWB

The following table on the next page outlines VTOS teachers’ attitudes to the IWB which could be interpreted as being negative.
Table 6: Negative attitudes of VTOS teachers towards the IWB

<table>
<thead>
<tr>
<th>Attitude of teachers in terms of teaching with an IWB</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>No idea</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I use the IWB mainly as a presentation tool?</td>
<td>0%</td>
<td>14%</td>
<td>9%</td>
<td>55%</td>
<td>23%</td>
</tr>
<tr>
<td>When I use an IWB, I spend more time preparing for the lesson</td>
<td>0%</td>
<td>14%</td>
<td>5%</td>
<td>50%</td>
<td>32%</td>
</tr>
<tr>
<td>IWB allows for greater teacher control of lesson</td>
<td>0%</td>
<td>27%</td>
<td>23%</td>
<td>45%</td>
<td>5%</td>
</tr>
<tr>
<td>The IWB encourages a didactic style of teaching</td>
<td>0%</td>
<td>27%</td>
<td>36%</td>
<td>36%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Seventy eight percent of VTOS teachers agreed, that they are using the IWB as a presentation tool: One teacher commented as follows:

“Before the IWB, I used the OHP for my class; therefore I feel that I have made the transition easily, therefore not much change really” (Questionnaire Teacher).

Half of the teachers surveyed felt that they had better control of the lesson when an IWB is used. This can mean that they control the pace and direction of lessons and also that those learners are easier to manage. Using and IWB also increases teachers’ preparation time, as indicated by 82% of teachers.
4.3.3 Professional development

This study found that most VTOS teachers had received a basic level of training in IWB features which was provided by the vendors or work colleagues. However, subject specific training had not been provided to the vast majority of teachers. This study also found that lack of time was a constraint to teachers in using the IWB effectively. Teachers require more time to develop resources, to peer teach, to network with other teachers, and time to attend training.

4.3.3.1 General Training

The vast majority of VTOS teachers (78%) have had general training in IWBs, provided by the company who installed the product. Twenty-two percent of teachers are self-taught and 17% received training from a work colleague. Only 1% attended a specific course on IWB training at an Education Centre. Some centres rely on the goodwill of teachers as demonstrated as follows:

“What we did afterwards was that colleagues didn’t go to lunch and stayed and played with it, and I would recommend...I have a 10 year old son and a 13 year old daughter at the time, I brought them into the centre one evening and I said show me and they did” (VTOS Coordinator 2).

Students were not asked a specific question regarding training in IWBs. However, one student commented as follows:

“To my knowledge most teachers and students are not trained for using the IWB” (Questionnaire Student).
4.3.3.2 Subject Specific Training

Ninety five percent of VTOS teachers have not had subject specific training on IWBs. One VTOS coordinator who is an IT specialist, when asked who would provide subject specific training, commented as follows:

“Possibly I will have to end up doing some of it myself, I am self taught” (VTOS coordinator 1).

It appears that it is at the individual teacher’s discretion to source subject specific training as commented as follows:

“The maths teacher I know has gone and networked with people...she has personal contacts” (VTOS Coordinator 2).

4.3.3.3 Training Requirements of VTOS Teachers

This study asked teachers the following question: “What do you think is your greatest training need in the use of the IWBs?” Twenty three percent of teachers indicated that their greatest need for training was “time”. Time to develop materials, time to self teach, time for training, time to network with others. The following comments from teachers illustrate these viewpoints.

“time is a big issue, I understand that if I spent more time using the IWB I would benefit greatly, however finding the time to do this is most difficult” (Questionnaire Teacher).

“More time is needed to put aside for training as a lot of the aspects of the IWB have passed me by as I can’t use them and I can’t seem to figure them out myself” (Questionnaire Teacher)

Eleven percent of teachers indicated that they needed training in the creation of resources. Eleven percent indicated that they needed training to help use the board interactively. Just fewer than six percent (5.8%) needed training in how to involve the
students more and the same percentage wanted training so that they could appear confident. Twenty three percent of teachers required training for their own subject (subject specific training). Twenty one percent of teachers stated that they needed training in upgrading their skills, how to use software and full training on all IWB features. The following pie chart illustrates the above points.

![Greatest Training need for VTOS Teachers](chart.png)

Figure 4: Training requirements of VTOS teachers

4.3.4 Resources

Fifty eight percent of teachers find it difficult to source IWB resources, or more specifically they find it difficult to source Leaving Certificate IWB material. Forty two percent of VTOS teachers did not find it difficult to source resources, as perhaps they create their own, as indicated by 71% of teachers who prepare their own resources. Thirteen percent of teachers share colleagues resources and 13% also use commercial programmes.
4.3.5 Challenges to using the IWB

This study found that the greatest challenges for teachers in using the IWB were not having received adequate training and the lack of IWB availability in most classrooms. The following table outlines the most common challenges faced by VTOS teachers.

**Table 7: Teacher Challenges associated with using the IWB**

<table>
<thead>
<tr>
<th>Challenges associated with using the IWB</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>No Idea</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have not received enough training to fully use all of the IWB functions</td>
<td>0%</td>
<td>9%</td>
<td>0%</td>
<td>48%</td>
<td>43%</td>
</tr>
<tr>
<td>IWBs are not present in all classrooms</td>
<td>13%</td>
<td>9%</td>
<td>4%</td>
<td>43%</td>
<td>30%</td>
</tr>
<tr>
<td>Lack of technical support in my centre</td>
<td>9%</td>
<td>48%</td>
<td>9%</td>
<td>30%</td>
<td>4%</td>
</tr>
<tr>
<td>Not enough time to prepare/access IWB resources</td>
<td>5%</td>
<td>36%</td>
<td>14%</td>
<td>32%</td>
<td>14%</td>
</tr>
<tr>
<td>Lack of confidence in my ability to use the IWB effectively</td>
<td>14%</td>
<td>45%</td>
<td>0%</td>
<td>36%</td>
<td>5%</td>
</tr>
<tr>
<td>Lack of suitable resources prevent me from using the IWB effectively</td>
<td>9%</td>
<td>55%</td>
<td>5%</td>
<td>27%</td>
<td>5%</td>
</tr>
</tbody>
</table>

The lack of adequate training in the IWB features is seen by VTOS teachers as the greatest challenge to using them, as 91% of teachers agreed or strongly agreed with this statement. Linked to this is teachers’ confidence in using IWBs, as 41% of teachers feel that they lack this confidence.
The unavailability of IWBs in all classrooms was cited by 73% of teachers as a challenge. The following quote exemplifies this:

“When I need to go to the safe, get the laptop, connect it. Afterwards the laptop must be returned to the safe. This can take 15 minutes at either side of class which can be very off putting and means a lot of rushing with no tea break! Lack of a stationary PC at the IWB, one has been purchased but is awaiting installation” (Questionnaire Teacher).

Forty six percent of teachers feel that they do not have enough time to access or prepare IWB resources and thus see this as a challenge to using the IWB. On the other hand 41% of teachers disagreed with this statement. Thirty two percent of teachers cited that they find the lack of suitable resources as a challenge to using the IWB. This could imply that there is a difficulty in finding Irish resources suitable for the further education sector or suitable for the Leaving Certificate curriculum. Conversely 64% disagreed that they find sourcing resources difficult. However this could be due to the fact that it is mostly IT teachers who use the IWB in VTOS centres.

Issues such as lack of technical support (34%), problems with interactive pens (19%), sunlight/ shadows (28%) calibration/projector issues (23%) were not seen by teachers to be major challenges in using IWBs. As commented as follows:

“If they are used properly, I don’t see any disadvantages” (VTOS Coordinator 1)
4.4 Findings by research questions – VTOS adult learners views

The next section will present the findings of this study from the viewpoint of the VTOS adult learner.

4.4.1 Perceived benefits of using IWBs from the adult learners’ point of view

This study found that the main benefits of IWBs for adult learners relates to interest and motivation. The following table outlines statements which represent adult learners’ viewpoints regarding the advantages of using IWBs for adults.

Table 8: Benefits of IWBs for adult learners

<table>
<thead>
<tr>
<th>Benefits of IWB for adult learners</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>No Idea</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The IWB makes learning more interesting</td>
<td>1%</td>
<td>3%</td>
<td>5%</td>
<td>78%</td>
<td>13%</td>
</tr>
<tr>
<td>The IWB increases my motivation to learn in class</td>
<td>2%</td>
<td>5%</td>
<td>17%</td>
<td>66%</td>
<td>10%</td>
</tr>
<tr>
<td>I have access to excellent materials from IWB lessons to study</td>
<td>2%</td>
<td>21%</td>
<td>27%</td>
<td>47%</td>
<td>3%</td>
</tr>
<tr>
<td>The Multimedia features help me to remember what I learn</td>
<td>1%</td>
<td>9%</td>
<td>15%</td>
<td>67%</td>
<td>9%</td>
</tr>
<tr>
<td>The use of the IWB by teachers helps me to improve my ICT skills</td>
<td>2%</td>
<td>17%</td>
<td>24%</td>
<td>51%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Ninety one percent of adult learners agree that learning with IWBs is much more interesting, as one learner stated “using an IWB gets everyone’s attention” (Questionnaire student). Their motivation to learn is also increased (76%) when an IWB is used. Seventy six percent of adults enjoy the multimedia features of IWBs and adults very much enjoy the visual aspects
of the boards. The following are quotations from learners which support this.

“I think it is a really good idea to learn something when you can see and listen, and not just listen” (Questionnaire student)

“The visual side of the IWBs are a benefit because a lot of people like myself follow them better than books” (Questionnaire student).

“I like IWBs for Art because it is clearer on the screen, the colours are better than the book” (Focus Group, student 6).

“I think the data on the IWB is more up to date for Geography, rather than in the text book” (Focus group student 5).

“I find the interactive whiteboards very clear and easy to understand. I found it really helped with my communications, payroll and ECDL” (Questionnaire Student).

Adults also believe that the use of the IWB by the teacher helps to improve their own ICT skills, approximately 57% of adults agreed with this. As an adult learner said:

“I think the IWB is a great idea, they make learning much easier, plus makes students more confident in computers” (Questionnaire student).

However 73% of teachers believe that that the IWB helps adults to improve their ICT skills. This figure is much higher than what students themselves believe.

Adults also appreciate the availability of class notes from IWB classes being made available to them. Half of the adults in this study stated that class notes were available to them; however it is unclear if these are available through email or an online platform. One learner stated:

“Notes from Biology class are available to me from the Moodle platform and the images are very useful to help me to understand” (Focus group learner no 4)
This correlates with the teacher findings whereby teachers 34% of teachers provide access to notes for students for some or most lessons. On the other hand 50% of teachers never provide access for learners.

4.4.2 IWBs usage in a VTOS centre – the adult learners viewpoint

This study found that IWBs are used only in some lessons, 73% of learners stated this; this correlates with the teacher findings that IWBs are a new technology to VTOS centres. Similarly, IWBs are most common in the teaching of IT, Business, Maths and English/Communications. These findings also correlate with those of the teacher questionnaires.

Frequency by which IWBs are used – The VTOS Learners’ views

![Frequency by which IWBs are used – The VTOS Learners’ views](image)

Figure 5: Frequency by which IWBs are used in a VTOS centre – the VTOS learners’ views
4.4.2.1 VTOS learners’ positive views on using the IWB

The following table outlines VTOS learners’ views on how IWBs are used in class and these are discussed in the next section.

**Table 9: VTOS learners’ positive views on using the IWB**

<table>
<thead>
<tr>
<th>VTOS learners viewpoints</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>No idea</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The IWB encourages more active participation and discussion in class</td>
<td>0%</td>
<td>9%</td>
<td>11%</td>
<td>70%</td>
<td>11%</td>
</tr>
<tr>
<td>VTOS learners are encouraged to use the IWB and interact with the board</td>
<td>3%</td>
<td>15%</td>
<td>31%</td>
<td>50%</td>
<td>3%</td>
</tr>
<tr>
<td>VTOS learners’ work is shared with the whole class via the IWB</td>
<td>6%</td>
<td>21%</td>
<td>17%</td>
<td>54%</td>
<td>2%</td>
</tr>
<tr>
<td>The IWB allows the teacher to present a wide variety of information</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
<td>75%</td>
<td>19%</td>
</tr>
<tr>
<td>The teacher has greater control over the lesson when an IWB is used</td>
<td>1%</td>
<td>14%</td>
<td>28%</td>
<td>52%</td>
<td>5%</td>
</tr>
<tr>
<td>Teachers are more organized when they use the IWB</td>
<td>1%</td>
<td>8%</td>
<td>23%</td>
<td>59%</td>
<td>9%</td>
</tr>
<tr>
<td>I believe learners are more attentive in IWB lessons</td>
<td>1%</td>
<td>12%</td>
<td>26%</td>
<td>55%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Eighty one percent of VTOS learners believe that IWBs encourage more active discussion and participation in class. This was very evident during an observation conducted by the researcher of a Leaving Certificate English class whereby the media images used provoked dialogue among the learners. Fifty six percent of VTOS learners also agreed that their work is shared with the whole class via the IWB. However, the manner in which this is done is not clear. The teacher stills seems to control the flow of the lesson as 57% of learners agreed that the teacher has greater control over lessons and 61% of learners agreed that learners are more attentive during IWB lessons.
Ninety four percent of learners agree that teachers are able to present a wide variety of information. Sixty eight percent of learners agreed that teachers were more organised for IWB lessons. Fifty three percent of learners indicated that they are encouraged to interact and use the board. However during the observation students did not interact with the board. A comment from one learner agreed with this “the teacher is the only one who uses the IWB as students are not allowed”. Similarly a comment from a VTOS coordinator as follows, “the student can actually come up and touch the screen to clear an item to see what the answer themselves” indicates that the type of interaction is rather mundane.

4.4.2.2 VTOS learners negative views concerning IWBs

The next section will discuss VTOS learners’ negative views regarding the IWB. These are presented in a table and discussed further. The views of the adult learner regarding training are also discussed.
Table 10: VTOS Learners Negative views concerning IWBs

<table>
<thead>
<tr>
<th>VTOS learners viewpoints</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>No idea</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would prefer traditional learning with text books and the ordinary whiteboard</td>
<td>12%</td>
<td>41%</td>
<td>16%</td>
<td>25%</td>
<td>6%</td>
</tr>
<tr>
<td>IWBs can be boring</td>
<td>7%</td>
<td>54%</td>
<td>15%</td>
<td>22%</td>
<td>3%</td>
</tr>
<tr>
<td>IWB lessons are at a faster pace than normal lessons</td>
<td>2%</td>
<td>16%</td>
<td>23%</td>
<td>55%</td>
<td>4%</td>
</tr>
<tr>
<td>I find it difficult to keep up with the teacher in an IWB lesson</td>
<td>5%</td>
<td>72%</td>
<td>10%</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>I believe the IWB is used too much</td>
<td>9%</td>
<td>74%</td>
<td>11%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>I believe teachers teach the same whether an IWB is used or not</td>
<td>1%</td>
<td>27%</td>
<td>22%</td>
<td>45%</td>
<td>5%</td>
</tr>
</tbody>
</table>

A quarter of learners indicated that they were bored during IWB lessons and 50% of learners indicated that they felt that teachers taught the same whether an IWB was used or not. Similarly 31% of learners indicated that they would prefer learning with textbooks and an ordinary whiteboard.

“Our interaction with the IWB is nonexistent and sometimes the tutor may as well be using the regular board and chalk” (Questionnaire student).

These viewpoints also correlate with the teacher findings whereby 78% of teachers indicated that they used the IWB as a presentational tool.

The pace of IWB lessons are faster and this was agreed by 59% of learners. Importantly this was not seen to be an issue with 77% of learners who felt that the fast pace of an IWB lesson did not impede their ability to keep up with the lesson.
Learners were not asked their opinion regarding training for teachers; however the general consensus among students was that teachers were not adequately trained to use the IWB. The following are students’ comments relating to training issues.

“It appears to me that not many of the teachers are fully able to operate the whiteboards and this wastes a lot of time in class while the system is being set up” (Questionnaire student).

“To my knowledge many teachers and students are not trained for using IWBs” (Questionnaire student).

### 4.4.3 Challenges to IWB – Adult learner view point

VTOS learners did not cite many challenges to using the IWB. Only 16% of learners said that there were technical difficulties with IWB, resulting in them breaking down and valuable class time was lost. However findings from the focus group and some learner comments indicate that learners would like to see more teachers using them for a wider range of subjects and that the learners themselves should be more involved with IWBs. The following comments from students illustrate these points.

“I have been 2 years here and no one has ever shown me the workings of the IWB, I love technology” (Questionnaire student).

“IWBs are very good in English and Geography, but I don’t know why we don’t use them with other subjects” (Questionnaire student).

The following disadvantage of IWBs as cited by a student would illustrate and agree with the teacher findings that certain features of the IWB are not being used to their full advantage.

“IWB discourages students from developing their writing, spelling, grammar, and punctuation in class” (Questionnaire student).
4.5 Conclusion

This chapter has presented the findings from questionnaires, observation, interviews relating to VTOS centres in Munster and their use of the IWB. The study has found that the IWB is a new technology to VTOS centres. In general both teachers and learners enjoy using the IWB for class and find that learning and teaching with IWBs are very motivational and enjoyable. The majority of teachers have had general training in its use, however this type of training is inadequate and is reflected in the manner in which teachers are using the board. Learners who are the most important element in the learning process would also like to be more actively involved in the use of the boards.
Chapter 5

Discussion of Findings

5.1 Introduction

This chapter will discuss the research findings from chapter 4 and link them to the discussions drawn from the literature review in chapter 2. These will be discussed according to the research questions.

5.2 The perceived benefits of using IWBs in VTOS centres from the adult learners’ and the adult educators’ point of view

As a result of this research, both teachers and adult learners generally enjoy using IWBs in the classroom. Adult learners in this study have stated that learning with IWBs is much more enjoyable (91%), they are more motivated (76%) and the multimedia and visual features enable them to learn better (76%). These results are consistent with findings from the literature review (Beeland 2001, Slay et al 2008, Levy 2002, Bell 2002).

Most adults return to VTOS in order to improve their ICT skills. The use of the IWB according to adult learners (57%) helps them to improve their ICT skills; again this is consistent with finding from Goodison (2002b) who agree when teachers use the IWB, they are creating an additional benefit to learners as they can:
Adults appreciate having access to class notes for revision after an IWB class. The current study found that this facility was provided to about half of the adult learners in the study. When teachers were asked the same question, 67% of them indicated that they never or hardly ever provide access to IWB notes for learners. Hennessy (2011) has noted that teachers can act as “gatekeepers” of resources, as the IWB notes created during class are generally not accessible to the students after class (Hennessy 2011, p478).

VTOS teachers also agree that there are many benefits to using IWBs. Ninety five percent of them feel that teaching with an IWB helps to support a wide range of learning styles; this is consistent with the literature (Glover & Miller 2001, Latham 2002, Levy 2002). Ninety one percent of teachers feel that learning is more enjoyable and 76% feel that learners are more motivated; this is also consistent with the literature (Levy 2002). VTOS teachers (86%) also feel that IWBs are a very efficient way of teaching with multimedia resources as exemplified by the following statement:

“I don’t waste time writing on the board and wiping it clean. I can introduce media links, keeping my lessons right up to date” (Questionnaire Teacher)

The above statement is also consistent with literature findings (Glover & Miller 2001, p264).
VTOS teachers (82%) and VTOS learners (81%) also feel that the IWB provides more opportunities for discussion. However, the literature is inconclusive in relation to this aspect. Many agree that the IWB, due to its visual, multimodal and interactive features, can stimulate discussions (Kent 2004, Betcher & Lee 2009, Levy 2002). However, others feel that the IWB allows the teacher to teach in a transmission mode, and encourages the typical IRF structure whereby the teacher initiates a question, the learners respond, and the teacher provides short feedback which rarely extends to higher levels of interaction (Hargreaves et al 2003, Smith et al 2006). Likewise, other authors believe that teachers can control the direction of a lesson by having all their PowerPoint slides with media links prepared in advance; hence, students can become more passive, and there is less student-to-teacher interaction (Gray et al 2005, Kennewell et al 2008, Goodison 2003). Certainly, in this study 57% of learners felt that the teacher has greater control over IWB lessons and 50% of teachers felt the same also. Interestingly, in this study 25% of learners felt bored in IWB classes. Throughout the observation which was conducted in this study, the teacher most certainly controlled the class through the use of PowerPoint slides and by her physical positioning beside the IWB. Smith et al (2005) concurs that IWB technology can help to maintain the teacher as a position of authority as it affords the teacher to stay at the front of the class.

5.3 How are IWBs used in Adult education within a VTOS centre?

The next section will discuss the length of time IWBs have been used by teachers in VTOS centres, interactivity and resource design.
5.3.1 Length of time VTOS Teachers have been using IWBs

This study found that IWBs are an underutilised technology within VTOS centres as only 5% of teachers have been using them for more than 2 years and 64% have been using them less than a year. According to the research the length of time teachers have been using IWBs influences the degree of how they are used. Burden (2002) identified 3 stages of IWB use. The first stage is the infusion phase, where typically the IWBs are located within IT rooms and are used as a “glorified blackboard” (Burden 2002, p7). The current study suggests that most VTOS centres are at the “infusion phase”. The following findings of this study support this viewpoint: the most popular subject which the IWB is used are Maths, IT and Business (53%), which could imply that these subjects are taught in the IT room. Only 8% of teachers use the IWB for all their lessons implying that IWBs are not present in all classrooms. Seventy eight percent of VTOS teachers admitted that they used the IWB as a presentation tool.

Glover et al (2007) have also put forward an approach to teaching with IWBs whereby the initial phase is dominated by using the IWB as a visual support to a lesson. This study found that the most popular software used by VTOS teachers was PowerPoint, YouTube, websites and Smart Notebook, thus indicating that the IWB is mostly being used as a visual medium.
5.3.2 Interactivity

Interactivity is often associated with constructivist theories. Constructivism views learners as central in the learning process and where the teacher is seen as a facilitator of learning rather than the expert. There are different interpretations of interactivity. However Tanner et al (2005) have put forward the notion that interactivity should involve the following:

“Learners must engage with the teaching in some meaningful manner, bringing something of themselves to the exchange and not merely acting as passive recipients of preformed information” (Tanner et al 2005, p722).

Tanner et al (2005) devised a framework for ordering the different levels of interactivity, using a scale of learner control. The lowest level of interactivity is the lecture, where the learner has little control over the direction of the lesson. At the higher end of interactivity, the learner is in control of the process. The learner interacts with their peers, discusses opinions, forms arguments and the teacher is seen as a facilitator of knowledge accumulation rather than the expert. According to Hennessy (2011) and Kent (2004) the IWB can be used to orchestrate interactivity within the classroom, as it can act as a digital hub to pull all the digital resources together for both the teacher and learner to engage with and discuss, explore and extend dialogue.

Technical and physical interactivity is generally seen by many researchers as being at the lower end of the scale of interactivity. The current study found that teachers understood interactivity in these terms as exemplified by the following quote:
“It means that they can display stuff up in the screen and the student can actually come up and touch the screen to clear an item to see what the answer is” (VTOS Coordinator 1)

The most common IWB features used by VTOS teachers were navigating to the internet (43%), using media clips (58%), drag and matching (29%), highlighting and annotating (33%). These features according to many authors are seen at the lower end of interactivity, often being used to reinforce learning or mundane activities (Moss et al 2007, p41, Smith et al 2005, Beauchamp & Parkinson 2005). The current study found that just over half of the learners were encouraged to use the IWB (53%). However the nature of this interaction is unclear but most likely to be at the lower end of the interactivity rating, considering the IWB features which teachers use. The following statements from learners also indicate that the IWB is predominately used by the teacher or not used at all.

“Our interaction with the IWB is nonexistent and sometimes the tutor may as well be using the regular board and chalk” (Questionnaire student)

“I have been 2 years here and no one has ever shown me the workings of the IWB, I love technology” (Questionnaire student)

Features which encourage dialogue and extend it outside the classroom were rarely if ever, used by VTOS teachers in this study. These are voting systems, video conferencing, tablets or slates. However discussion and dialogue can be encouraged by other methods rather than these high tech devices. However 71% of VTOS teachers said that they rarely use the IWB for group work with learners. Eight percent of teachers indicated that they never present students’ work to a wider audience.
On the other hand 82% of teachers and 81% of learners indicated that the IWB provided more opportunities for interaction and discussion within class. However the quality of these interactions was not measured in this study. It was noted in the observation conducted for this study that the digital images which were orchestrated by the teacher helped to promote discussion among learners even though the discussion was short in duration and controlled by the teacher.

The pace of the lesson is also an indicator of the level of interactivity and dialogue within a lesson (Moss et al 2007, p44). The use of prepared screens and PowerPoint slides can increase the pace of IWB lessons and allow the teacher to be in total control of the lesson. This study found that 59% of learners felt that the pace of IWB lessons were faster, however 77% of them felt that this did not impede their ability to keep up. The observation conducted by the author support this viewpoint that pre-prepared screens and PowerPoint slides do increase the pace of the lesson, however it is dependent on the teacher’s teaching style; whether the quick pace of the lesson frees up more time for quality discussion or reinforcement of previous learning. Again in the observation conducted the quick pace of the lesson facilitated the teacher in attaining curriculum goals, namely revision of a Leaving Certificate poem within the allocated class time. This is consistent with findings from Myhill (2006).
5.3.3 Design of Resources

The introduction of the IWBs into VTOS classrooms should present teachers with new questions about how to design resources. However the reality in VTOS classrooms is that 71% of teachers create their own resources. This is consistent with Moss et al (2007) study into secondary teachers use of IWBs in London (Moss et al 2007, p23) who found that 78% of teachers design and produce their own resources thereby indicating that there is no change in their pedagogical approach (Ibid, p23-24).

Moss et al (2007) also believe that most commercial programmes replicate traditional resources and worksheets (Ibid, p26). The current VTOS study found that only 13% of VTOS teachers use commercial resources; this is much lower than findings from Moss et al (2007) which found that 42% teachers in that study used commercial resources.

Jewitt et al (2007) highlights difficulties with teachers creating their own resources. Teachers generally use design principles which are based on traditional text books and work sheets and do not make full use of all the IWB multimodal features. In other words, teachers replicate their existing resources such as those used on the traditional board or computer screen onto the IWB and thus the “IWB enables the worksheet to migrate comfortably onto the screen, leaving the pedagogy of the worksheet unchanged” (Jewitt et al 2007, p315).
Designing higher forms of interactivity into resources is according to Jewitt (2008) essential. Moss et al (2007) identified that resources which are created within class and with learners and which make use of editing, annotation, animation of digital clips and texts are the ideal (Ibid, p26). However this VTOS study found that student interaction with the IWB is mostly at the lower end of interactivity and only 53% of learners indicated that they interact with the board. The use of tablets or slates which encourages collaboration among learners is never or hardly ever used by 71% of teachers.

5.4 Professional Development

The literature suggests that Professional Development plays an integral part in how the IWB is used. This study found that 78% of VTOS teachers had general training in IWBs. This training was provided by the suppliers of the IWBs. According to Glover & Miller (2001), this type of training is very successful in “firing” educators with enthusiasm (Glover & Miller 2001, p261), but this enthusiasm decreases over time without continued support and results in teachers failing to find innovative teaching methods (Smith et al 2005, p98). This type of short term professional development fails to build the technical effectiveness among teachers in order for them to fully utilise the IWB. This results in teachers using the IWB in an instructional manner rather than developing new ways of teaching (Beauchamp 2004).

Education centres have a role to play in offering on-going professional development to VTOS centres, as they understand pedagogy and the influence of ICT on
education. This VTOS study found that 78% of teachers admitted that they were using the IWB as a presentation tool, indicating that there was no change in their teaching style. Half of VTOS learners felt that teachers taught the same whether an IWB was used or not and 31% of learners preferred learning with text books and an ordinary whiteboard.

5.4.1 Peer Mentoring

Bandura (1997) advocates that learners need to have frequent opportunities to practice a new skill. This study found that 73% of teachers stated that IWBs were not present in all classrooms and they saw this as a challenge to using them effectively. Therefore according to DeSantis (2012), professional development programmes should capitalise on Bandura’s theories and develop training programmes which allow teachers to master the IWB skills within their classrooms (DeSantis, 2012, p53). Professional Development should also incorporate collaborative elements. According to Buckenmeyer (2010) professional development does not have to be formal but rather teachers should work collaboratively together and use trial and error approaches (Buckenmeyer 2010, p33, Winzenried et al 2010, p548). Peer mentoring is a form of collaborative learning and according to Jones & Vincent (2010), Australian teachers who used peer mentoring were better at using the IWB. A similar study by Miller & Glover (2007) and Winzenried et al (2010) also confirms this viewpoint. The main advantage of peer mentoring is that support is available just in time to allow for a quick resolution to problems which may arise.
The importance of school leadership and the development of mentoring strategies so that schools can better obtain their educational objectives is extremely important (Drago-Severso & Pinto 2006). The present VTOS study found that only 17% of VTOS teachers received training from a colleague, implying that VTOS coordinators have a major role to play in supporting mentoring within a VTOS centre. Unfortunately, the OECD report (2009) into learning and teaching in Irish secondary schools confirms that Irish teachers are more likely to exchange teaching materials rather than participate in mentoring (Shield et al 2009, p4).

Much of the literature on peer mentoring refers to teacher training (Jones & Vincent 2010, p483) where the more experienced teacher mentors a beginner teacher. One of the constraints of mentoring as seen by teachers is the existence of a more experienced person mentoring a less experienced person and according to Jones & Vincent (2010) teachers can be very defensive about their teaching approaches. However when IWBs are introduced into schools, they are a new technology to all teachers and therefore the element of defensiveness is reduced. In this instance the peer mentors are learning together with the mentees.

In order for peer mentoring to be successful, the availability of time is a major component to its success (Byrne et al, 2010, p226). Staff must have time built into their timetables or schedules in order that peer mentoring can be successful. Similarly the attitudes of mentors is important in building the confidence of the mentees and they should be seen as sensitive and ideally be researchers as well as teachers, as they should have an understanding of how IWB technology can effect change in teachers’ pedagogy (Jones & Vincent 2010, p490). Caution must be
exercised also against a form of peer mentoring which Hargreaves & Davis (1990) term as “contrived collegiality”. This is peer mentoring which is implemented and monitored by administrators, is formal and not teacher centered. This type of mentoring can result in an erosion of trust (Hargreaves & Dawe 1990, p239). Informal peer mentoring based on collaboration with other VTOS teachers and coordinators within a VTOS centre would be suitable, along with input from the adult learner at a later stage.

5.5  **Barriers to use of IWB in VTOS centres**

The greatest barrier to IWB use cited by VTOS teachers in this study was lack of training. This was stated by 91% of VTOS teachers. Teachers feel that they need ongoing training on how to use all the aspects of IWB technology and also 95% of teachers have not had training in their specific subject area. Linked to training is confidence; 41% of VTOS teachers stated that they lack confidence in how to use IWB effectively. Other barriers to IWB use are discussed in the following paragraphs.

5.5.1  **Time**

According to the literature, availability of time is extremely important for teachers to learn new technology. Time is needed by teachers to learn how to use new technology such as the IWB and to integrate this technology into their daily teaching (Sandholtz, Ringstaff & Dwyer, 1997). Equally, it can take teachers quite some time to come to terms with technology (Franklin et al 2002). Buckenmeyer (2010) cautions that if inadequate time is provided to teachers, then they will fail to
experiment with new teaching methods and thus resort back to old teaching methodology (Buckenmeyer, 2010, p33).

This study found that 23% of VTOS teachers indicated that time was an impediment to using the IWB effectively. VTOS teachers indicated that they needed time to develop resources, time to self teach, time to network with others and time to attend training. Also 41% of VTOS teachers indicated that they had a lack of confidence in their ability to use the IWB effectively.

Teaching in VTOS centres is dominated by part-time teachers with limited hours and who very often work across many disciplines, such as mainstream education and adult education. These teachers generally have little time to interact with other teachers. This viewpoint is supported by Goodlad (1984). Little (1987) further implies that teachers are not expected to share their knowledge about what they know or learn to others. However according Fullan (1993) in order to bring about change and new teaching approaches, collaboration is necessary and so also is time.

A study by Collinson & Cook (2001) identified that it can be very difficult for teachers to have the same scheduled time off as other colleagues and where this is available, there are many demands on their time such as class preparation, administration tasks, consultation with parents or employers etc. Similarly teachers can have a lack of knowledge as to when other teachers have free time as master schedules are rarely handed out to teachers. Killion (2000) recommends that where a school provides more opportunities for informal and individual teacher learning, the outcomes are better as this type of learning is teacher directed and job related
This implies that the VTOS coordinator has a major role to play in facilitating the availability of time for VTOS teachers to learn about the IWB, although this can be difficult due to the limited availability of hours. As part of this process the learners in VTOS centres should also be involved to some degree in training with the IWBs. This VTOS study found that VTOS learners want to be involved in using IWB technology, rather than teacher only operation.

### 5.5.2 Technical Support

Another important element to new technology adoption by teachers is adequate and timely technical support. If this is not present, then teachers will become frustrated and revert back to old methods (McKenzie 1999, cited in Buckenmeyer 2010, p33). The current study found that 34% of VTOS teachers stated that lack of technical support was a constraint to them using IWB technology. Difficulties with bulbs blowing, problems with pens and calibration problems were cited by VTOS teachers.

### 5.5.3 Attitudes towards technology

Teachers’ attitudes towards technology according to Ertmer (1999) can influence IWB adoption by teachers. Deep rooted attitudes and beliefs are difficult to change and teachers need to see instances where technology is effective; ongoing professional development can facilitate this process (Ertmer 2005, p37). Building teachers confidence through successful experiences with small changes to their
methodology can help to change attitudes and beliefs (Bandura 1997). This current study found that VTOS teachers were positive regarding IWBs; however the majority (78%) of them admitted that they were using them as a presentation tool. This could imply a lack of motivation to change, but more than likely is due to a number of factors such as lack of ongoing training, not having access to IWBs in all classrooms, not having adequate time to learn about the IWB technology and IWBs being a new technology in VTOS centres.

5.5.4 Access to IWB technology

According to Lewin et al (2009) in order for IWBs to be successfully embedded within education, they must be permanently installed in all classrooms, where teachers and students have access to them. However the reality is that this is seldom the case due to funding constraints. Lewin et al also recommend that IWBs should be installed at the same time and that the expectation exists that teachers will use them as part of normal class routine (Lewin et al 2009, p181). However in reality this is seldom the case due to funding restrictions. This study found that 58% of VTOS teachers only use the board once a week and only 8% of teachers use them for all lessons. Ninety one percent of VTOS teachers agreed that IWBs should be installed in all classrooms. Lack of access to IWB technology is a disincentive for VTOS teachers to change their teaching methodology. According to Levy (2002), if teachers plan a lesson using the IWB and repeat it again with another group in a classroom without an IWB, then there is no incentive for them to change.
5.5.5 Resources

All the VTOS centres in this study either follow the Leaving Certificate curriculum or the FETAC accreditation system. Fifty eight percent of VTOS teachers in this study cited that they find it difficult to source IWB resources. This finding could imply that VTOS teachers find it difficult to source Irish resources suitable for the further education sector and also Leaving certificate IWB material. The literature suggests that teachers value resources which can be directly matched to the curriculum (Gaffney 2010, cited in Maher, Phelps, Urane & Lee 2012, p152, Hedberg & Freebody 2007, p9). The literature also suggests that little use is made of blogs, wikis, video conferencing (Maher et al 2012, p153). The current study concurs with this viewpoint.

A major theme recurring throughout the literature is the extra time it takes teachers to prepare resources for IWB lessons (Barak 2007, Levy 2002). The current study found that 82% of teachers said that they spend more time preparing lessons with IWBs and 46% indicated that they did not have enough time to prepare or access IWB resources. In light of this it should be assumed that teachers would share resources however only 13% of VTOS teachers share colleagues’ resources. Studies by Moss et al (2007) found that 45% of London secondary teachers shared colleagues’ resources (Moss et al 2007, p27).
5.6 Summary

VTOS teachers and learners generally enjoy using IWB in VTOS classes. However this study has found that IWBs are a new technology within VTOS centres; consequently teachers are at the initial phase of adoption of IWBs into their teaching methodology. There is an urgent need for ongoing professional development for VTOS teachers and this study recommends a form of peer mentoring to facilitate this process. VTOS teachers also need to see best practice with IWBs so that they can be motivated to use them to achieve higher forms of interactivity. The VTOS coordinator and school management have an important role to play in this process and most importantly in relation to the allocation of time, sourcing of subject specific training and networking with other centres to observe best practice. Funding for extra IWBs should also be investigated as the literature suggests that it only when IWBs are embedded within schools then the extra educational benefits can be realised.
Chapter 6

Conclusion

6.1 Introduction

IWBs are considered by many as one of the most innovative instructional technologies in education (Betcher & Lee, 2009, Winzenried et al 2010, Kent 2006, Haldane 2007). As a result of this the IWB is becoming an increasingly popular piece of digital equipment in the VTOS classroom despite the lack of government policy guidelines and funding. The current study has found that the IWB within the VTOS classroom is an underutilised technology as only a minority of teachers have been using them for more than 2 years; however its capabilities are underutilised and VTOS teachers are using the IWB mainly as a presentation and visual tool. This is mainly attributed to certain findings which will be discussed in the following paragraphs.

6.2 Lack of Ongoing Professional Development

Initial training provided by the vendors of IWBs is not sufficient to develop teachers’ skills and leads to teachers maintaining their existing pedagogy with the IWB. The recurrent theme found in this study was that the lack of ongoing professional development was seen as a major obstacle by the majority of VTOS teachers to using the IWB effectively. Also the majority of VTOS teachers have not had training with the IWB for their own subject area. Education centres around the country have a role in helping to solve these issues.
6.2.1 Informal peer mentoring

The use of peer mentoring as a form of ongoing professional development is only used by a minority of VTOS teachers. The available research suggests that this is one of the best approaches to training with the IWB. The main advantage being that support is available on site when the teacher requires it and the teacher is in control of the direction of this training. However the mentor must have an understanding of how IWB technology can affect change in teachers’ pedagogy for this type of training to be successful. Other issues such as availability of time, funding and knowledge of subject area may also act as a constraint to this approach.

6.3 Interactivity

The IWB is an excellent tool to orchestrate interactivity within the classroom as it can pull together all the digital resources so that the teacher and learner can engage with, discuss and extend dialogue to much higher levels. Unfortunately this study found that many teachers understood interactivity in terms of technical interactivity. However the majority of VTOS teachers do realise that the IWB can facilitate more opportunities for discussion and interaction in class. Teachers must be mindful also of the over use of PowerPoint slides as these can increase the pace of lessons and reduce the time for interactions between students to teacher and student to student. The quick pace of lessons should allow more time for discussions and reflection rather than facilitating teachers to achieve curriculum goals. The creation of resources jointly by teachers and learners within class time will also help to increase interactivity.
6.4 Availability of time

Just under a quarter of VTOS teachers indicated that time was an impediment to using the IWB effectively. VTOS teachers need time to develop resources, time to self teach and to network with other teachers and time to attend training. Teachers must accept some responsibility for their own career development and devote more of their own free time to becoming more effective teachers. There is a role to play by VTOS coordinators and college management to allocate time better within timetables. However this study acknowledges that this can be difficult due to the prevalence of part-time teachers with limited hours.

6.5 Access to IWB technology

Just over half of VTOS teachers use the IWB once a week; however the majority of them indicated that IWBs should be installed in all classrooms; this would indicate that most VTOS teachers have a positive attitude towards IWB technology. This study has found that lack of continuous access to IWBs is a disincentive for VTOS teachers to changing their pedagogy and to using the many IWB features.

6.6 Resources

The majority of teachers in this study create their own resources. However care must be exercised so that the IWB does not facilitate “the worksheet to migrate comfortably onto the screen, leaving the pedagogy of the worksheet unchanged” (Jewitt 2007,
Teachers must design higher forms of interactivity into their resources and ideally these should be created within class and with input from learners. The majority of adult learners want to be involved in using IWB technology rather than being passive recipients of information.

Just over half of VTOS teachers indicated that they find it difficult to source resources relevant to the Irish education system for adult learners. This was a barrier to the use of the IWB. Also VTOS teachers are less likely to share resources with each other.

6.7 Technical Support

Lack of technical support is also seen as a constraint to using the IWB. Most VTOS centres rely on the IT teacher to fix technical problems such as calibration difficulties, problems with bulbs and pens, and updating software.

6.8 Recommendations for IWBs in VTOS centres

1. VTOS centres should provide for ongoing IWB training for VTOS teachers and not just rely on IWB vendors to provide the initial training. Links should be established with local education centres and teachers associations to improve training for VTOS teachers as this is essential for effective IWB use. Teachers must see best practice with IWBs so that they can be motivated to use them to achieve increased levels of interactivity within VTOS classes.
2. VTOS centres should encourage a culture of sharing IWB resources through an intranet system. Many VTOS teachers create resources in isolation thereby resulting in a duplication of work. If teachers share resources there is a better collaborative culture within centres which can also foster peer mentoring.

3. VTOS centres within regions should investigate the possibility of creating resources collaboratively as many VTOS teachers indicate that they need to create resources specific to their own subject areas and relevant to the adult learner.

4. Peer mentoring should be further investigated within VTOS centres and a collaborative environment should be encouraged.

5. VTOS centres should explore the possibility of training adult learners in IWB technology. The full advantages of IWB technology cannot be realised without input from learners within class. Adult learners have a keen interest in all types of technology.

6. It is imperative that all adult learners have access to IWB resources created during class time for revision and further reflection on learning.

7. Solas which is the new agency charged with overseeing the further education sector, should invest more in ICT within the further education sector and acknowledge the role IWBs have in the delivery of education to adults.
6.9 Suggestions for further research

6.9.1 Research into IWBs at a later stage

There are major structural changes occurring within the further education sector with the new authority, Solas, the reduction in the number of VECs and their replacement with Education Training Boards. One of the aims of Solas is to prevent the duplication of courses and to identify skills shortages of the future. A greater emphasis will be needed on developing higher order critical skills and the IWB if used to its full potential has a major role to play in this process. It will take time for these structural changes to occur and also there is the possibility of greater access to ICT and training for teachers in the further education sector.

It may be beneficial to conduct research into the use of IWBs in VTOS centres two to three years further down the line when these structural changes have occurred and when IWBs have been embedded further within VTOS centres. At that stage it is envisaged that further use will be made of individual tablets or slates thereby giving the adult learner more opportunities to interact with the IWB.

6.9.2 Peer mentoring with IWBs in VTOS centres

A finding from this study and one which is consistent with findings from the OECD (2009) TALIS Report suggests that Irish teachers are unlikely to participate in mentoring. The relevant research into IWBs has indicated that peer mentoring is one of
the most efficient methods of training teachers to change their pedagogy and impact positively on education. Peer mentoring with the use of IWBs has the distinctive advantage of offering training and support to teachers just when they need it. Further research into peer mentoring with IWBs within a VTOS centre would help to ascertain the conditions which would help make this process a popular form of professional development in Irish schools.

6.10 Conclusion

The use of the IWB is at the infusion phase within VTOS centres in Munster. The potential exists that this technology can be used to teach in fundamentally different ways if certain criteria are met. Unfortunately many barriers exist that prevent IWBs from being used to their full potential and the IWB is seen as a modern day presentation tool by many VTOS teachers and learners. While this study has focused on IWBs in VTOS centres in Munster, the results may be different if this research was conducted in other areas.


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³ Becta was closed in January 2011, this reference is cited in Smith et al (2005)


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Appendices

Appendix A: Screen shot of email sent to VTOS Coordinators
Appendix B: Flyer given out to VTOS coordinators at Annual conference
Appendix C: Cover letter and questionnaire to VTOS teachers
Appendix D: Cover letter and questionnaire to VTOS students
Appendix E: Transcript of interview with VTOS Coordinator 1
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Appendix G: Focus Group consent form
Appendix H: Focus Group Protocol
Appendix I: Transcript of Focus Group
Appendix J: Observation lesson write up
Appendix A

[Image]

From: Leasha Foley [mailto:leashafoley@hotmail.com]
Sent: 22 January 2012 19:14
To:

Subject: Interactive White Boards

Dear VTOS Coordinator,

My name is Leasha Foley, and I am a Business Tutor on the VTOS programme, based in:

I am in the process of compiling research into the interactive white board as used within VTOS centres in Munster. This research is being conducted as part of my Masters in Digital Media Development for Education, for the University of Limerick.

Your cooperation would be very much appreciated. I would be grateful if you could let me know firstly, if your VTOS centre has an interactive whiteboard for use by VTOS Teachers and learners.

Thanking you in advance.

Leasha Foley
Appendix B

Flyer given to VTOS coordinators at annual conference

VTOS coordinators in Munster

My name is Leesha Foley and I am currently in the process of completing a Masters in Digital Media Development for Education. My area of interest is interactive whiteboards. I am trying to gather as much information as possible on how they are used in adult education within VTOS centres.

I would be grateful if you could indicate if your centre has an interactive whiteboard and if so if your centre would be willing to be involved in the research.

All information collected will be the strictest of confidence and your centre will not be identified.

Name:

Centre Name and location:

Our centre has an IWB:
Yes ☐ No ☐

Our centre would be willing to be involved in this research:
Yes ☐ No ☐
Dear VTOS Teacher,

I am in the process of completing a Masters in Digital Media Development for Education, at the University of Limerick. My area of interest is Interactive Whiteboards. I am trying to gather information on VTOS teachers’ attitudes to interactive whiteboards, the challenges they face and how IWBs are used in adult education.

I would be most grateful if you could complete the attached questionnaire, and return it to your VTOS coordinator before Friday 4th May. It should take no longer than 10 minutes to complete. All information will be treated in the strictest of confidence and no information which would identify you or your centre will be published.

If you require any further information, please do not hesitate to contact me.

Thanking you,

Yours faithfully,

Leesha Foley
VTOS Teachers’ attitudes towards the Interactive Whiteboard

General Information:

Note: IWB = Interactive Whiteboard

1. How long have you been teaching adults in a VTOS Centre?
   ○ Less than one year ○ 2 – 5 years
   ○ 5- 10 years ○ Greater than 10 years

2. Are you male or female? Male ○ Female ○

3. Please tick the level you teach at?
   ○ Leaving Cert. ○ Fetac 5
   ○ Junior Cert. ○ Fetac 6
   ○ Fetac 1 – 3 ○ Other (please specify)
   ○ Fetac 4

4. Please indicate your subject area?
   ○ Art/craft/design ○ Horticulture
   ○ Business ○ Drama
   ○ Childcare ○ ICT
   ○ Performing Arts ○ Other (please specify) _______

5. How do you rate your ICT skills?
   ○ Poor ○ average ○ good ○ very good ○ Excellent
6. Please indicate your level of ICT training.
   ○ Self taught
   ○ In-house training
   ○ ECDL
   ○ Advanced ECDL
   ○ Graduate Diploma in ICT
   ○ Masters in ICT
   ○ Other (please specify) ________________________________

7. What is your age profile?
   ○ 21 – 30   ○ 31 – 40   ○ 41 – 50   ○ 51 – 60   ○ 61+

8. Please state the type of Interactive Whiteboard you use?
   ○ ________________________________
   ○ Not sure of name/type
9. How often do you use the IWB?
   ○ I use the IWB in all of my lessons
   ○ I use the IWB at least in one lesson per day
   ○ I use the IWB occasionally (2 – 3 times per week)
   ○ I rarely use the IWB (once a week)
   ○ I never use the IWB

10. Please list the subjects/modules in which you use the IWB.

   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________

11. How long have you been using IWBs for VTOS classes?
   ○ 6 months
   ○ Less than 1 year
   ○ 2 years
   ○ More than 2 years

12. Are IWBs available for you to use with all of your VTOS classes (permanent access)?
   ○ Yes    ○ No

13. Do you have to pre-book interactive whiteboard facilities?
   ○ Yes    ○ No
14. How confident do you feel using IWBs in VTOS classes?

- Very confident
- Fairly confident
- Nervous

15. How do you use the IWB for teaching?

- Whole Class teaching
- Didactically (instructional)
- Small groups
- Individual Learners

16. How do you use the IWB during a lesson?

- Introduction to lesson
- Whole Lesson
- Summarise the lesson
- Other (please explain)

17. Please name the software you use in combination with the IWB
18. Which of the following IWB features do you use?

Highlight and annotate
Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Drag and match techniques
Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Navigate the internet from the IWB
Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Promote group working by getting learners to write directly on to the IWB/tablet and to work collaboratively on tasks
Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Connect to video conferencing systems.
Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Electronic flipchart
Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Hide and Reveal techniques
Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Allow notes to be stored and made available to students who missed a lesson
Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○
Present student work to a wider audience.

Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Media clips (sound files, video clips, photographs etc)

Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Save IWB notes and use for future reference with VTOS classes

Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Run on-line tests and opinion polls and display instant feedback to the group.

Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Automatic handwriting recognition/translating hand writing to text

Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Voting systems to see if my learners understand topics already covered.

Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson ○

Other techniques not mentioned above (please specify)
19. ICT Equipment used in Conjunction with the IWB

Please indicate which you the following you use with the IWB

**IWB Pens**

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<th>Frequency</th>
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<tr>
<td>Never</td>
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<td>Hardly ever</td>
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**Teacher laptop**

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**School network**

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**Printer**

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**Visualiser**

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**Learner laptops**

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**Slate/Tablet**

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**Voting Pads**

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**Speakers (Sound system)**

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**Other (Please state)**

________________________________________________________________________
VTOS Teachers training/access to resources in relation to IWB

20. Have you had general training in the use of IWBs?

○ Yes ○ No

21. Who provided the training to you in relation to IWBs?

○ Company/business who installed the IWB
○ Attended course on IWB (please specify provider) ____________________
○ Work Colleague
○ Self taught
○ Other (Please specify) ____________________________________________

22. Have you had subject specific training in the use of IWBs?

○ Yes ○ No

23. What do you think is your greatest training need in the use of the IWB?


24. Do you find it difficult to source resources for the IWB?

○ Yes ○ No

If yes, please explain:


25. What resources do you use with the IWB?

○ Prepare my own resources ○ Use internet websites
○ Use colleague’s resources ○ Use commercial programmes
(a) I believe IWBs make learning in a VTOS centre more enjoyable and interesting.
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(b) The IWB helps me to hold the adult learner's attention
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(c) IWBs help to increase the interaction and participation of learners
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(d) My adult learners are more motivated when I use the IWB in lessons
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(e) I believe that as a result of IWBs my VTOS learners' grades have improved.
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(f) IWBs can cause cognitive overload to VTOS students (too many multimedia links, thereby adult learners not able to follow what is on the IWB)
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(g) The effectiveness of the IWB depends on the Interactive white board skill level and confidence of the VTOS Teacher rather than on the subject knowledge of teacher
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(h) Adult learners learn better with tradition methods rather than with IWBs
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree
Q 27. Teachers’ attitudes in terms of teaching

(a) When I use an IWB in the VTOS classroom, I spend more time preparing for the lesson.

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(b) Using IW Bs allows me to support a wider range of learning styles as I am able to draw on a wide variety of resources which appeal to the multi-sensory capacity of adult learners.

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(c) I use the IWB mainly as a presentation tool?

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(d) All classes should have an IWB

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(e) The IWB has improved my teaching

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(f) Do you believe that the IWB has changed your style of teaching? Please explain?
(g) IWB allows for greater teacher control of lesson

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(h) IWBs allow for a more efficient and professional delivery of multimedia resources, thereby increasing the pace of the lesson.

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(i) The materials produced in my classes are reused at a later stage

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(j) IWBs provide more opportunities for interaction and discussion

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(k) IWBs help to promote greater group work

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(l) IWBs help to improve the adult learner’s ICT skills

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(m) The IWB encourages a didactic style of teaching

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree
28. Challenges associated with the use of IWBs

(a) I have not received enough training to fully use all of the IWB functions
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(b) IWBs are not present in all classrooms
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(c) There is a lack of technical support in my centre
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(d) There are problems with Interactive pens (battery, availability)
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(e) I do not have enough time to prepare and access IWB resources
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(f) The novelty aspect of IWBs will wear off as adults become used to this technology
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(g) The cost of purchasing and maintaining bulbs, pens etc is expensive
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(h) Strong lights from the bulbs, shadows and sunlight
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree
(i) Screen freezing, calibration difficulties, projector connectivity
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(j) IWBs make students more passive in the VTOS classroom
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(k) I have a lack of confidence in my ability to use the IWB effectively
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(l) The lack of suitable resources prevent me from using the IWB effectively
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(m) VTOS learners have a negative attitude towards learning with the IWB
○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

(n) Are there any other challenges which you encounter when you use the IWB?
Please feel free to comment on any aspect of the use of Interactive Whiteboards.

Thank you most sincerely for taking the time to complete this questionnaire. All information gathered will be treated in the strictest confidence and no information will be published which will identify you or your centre.

If you would like further information, I can be contacted at

leeshaefoley@hotmail.com

or (086) 0549259.
Dear VTOS Learner,

I am in the process of completing a Masters in Digital Media Development for Education, at the University of Limerick. My area of interest is Interactive Whiteboards. I am trying to gather information on VTOS learners’ attitudes to interactive whiteboards, and how they are used in adult education.

I would be most grateful if you could complete the attached questionnaire and return it to your VTOS coordinator/VTOS teacher as soon as possible. It should take no longer than 5 minutes to complete. All information will be treated in the strictest of confidence and no information which would identify you or your centre will be published.

If you require any further information, please do not hesitate to contact me.

Thanking you,

Yours faithfully,

Leesha Foley
leeshaefoley@hotmail.com
(086) 0549259
VTOS Learners’ attitudes towards the Interactive Whiteboard

General Information:

Note: IWB = Interactive Whiteboard

1. Are you male or female? Male ○ Female ○

2. What programme of study are you pursuing?
   ○ Leaving Cert.  ○ Fetac 4  ○ Fetac 5
   ○ Junior Cert.  ○ Fetac 6
   ○ Fetac 1 - 3  ○ Other (please specify)

3. What is your age profile?
   ○ 21 – 30  ○ 31 – 40  ○ 41 – 50  ○ 51 – 60  ○ 61+

4. Please state the name of the course you are undertaking?

5. How do you rate your ICT skills?
   ○ Poor  ○ average  ○ good  ○ very good  ○ Excellent
The Impact of IWBs as perceived by VTOS Learners

6. Interactive White Boards are used for all my VTOS Classes
   ○ Never ○ Hardly ever ○ Some lessons ○ Most Lessons ○ Every Lesson

7. Please state the subjects/modules in which an Interactive White Board is used.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

8. Interactive White Boards are used by teachers.
   ○ To introduce the lesson          ○ for the whole lesson
   ○ to summarise the lesson          ○ Other (please explain)

9. The IWB increases my motivation to learn in class
   ○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

10. The IWB makes learning more interesting
    ○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

11. The IWB encourages more active participation and discussion in class
    ○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

12. VTOS learners are encouraged to use the IWB and interact with the board
13. VTOS learners’ work is shared with the whole class via the IWB

14. I have access to excellent materials from IWB lessons to study

15. The multimedia, multi modal features (visual, auditory etc) of the IWB help me to remember what I learn.

16. The IWB allows the teacher to present a wide variety of information

17. I would prefer traditional learning with textbooks and the ordinary whiteboard

18. The IWB can be boring sometimes

If you strongly agree or agree with this statement can you elaborate further:
19. IWB lessons are at a faster pace than normal lessons
○ Strongly disagree  ○ Disagree  ○ No idea  ○ Agree  ○ Strongly agree

20. I find it difficult to keep up with the teacher in an IWB lesson
○ Strongly disagree  ○ Disagree  ○ No idea  ○ Agree  ○ Strongly agree

21. I believe the IWB is used too much in VTOS classes
○ Strongly disagree  ○ Disagree  ○ No idea  ○ Agree  ○ Strongly agree

If you strongly agree or agree with this statement can you elaborate further?

22. Some activities could be done much better without the IWB
○ Strongly disagree  ○ Disagree  ○ No idea  ○ Agree  ○ Strongly agree

If you strongly agree or agree with this statement can you elaborate further?

23. I believe that teachers' lessons are better prepared and more organised when they use the IWB
○ Strongly disagree  ○ Disagree  ○ No idea  ○ Agree  ○ Strongly agree

24. I believe teachers teach the same whether they use an IWB or not
○ Strongly disagree  ○ Disagree  ○ No idea  ○ Agree  ○ Strongly agree
25. I believe that VTOS learners are more attentive in lessons with an IWB

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

26. IWBs often break down and valuable class time is wasted as a result

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

27. The teacher has greater control over the lesson when an IWB is used

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

28. The use of the IWB by teachers helps me to improve my ICT skills

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree

If you strongly agree or agree with this statement can you elaborate further?

29. If I miss a lesson I have access to the IWB lesson content from home through the centre’s virtual learning platform (Moodle).

○ Strongly disagree ○ Disagree ○ No idea ○ Agree ○ Strongly agree
Please feel free to comment on any aspect of Interactive Whiteboards which you think might be relevant to this research.

Thank you most sincerely for taking the time to complete this questionnaire. All information gathered will be treated in the strictest confidence and no information will be published which will identify you or your centre.

If you would like further information, I can be contacted at

leeshaefoley@hotmail.com

(086) 0549259
Appendix E

Interview with VTOS Coordinator 1

Q1. How many students does your centre cater for?
A1. It caters for 30; the centre is split up between 2 main courses, Horticulture and Business Studies

Q2. Does your centre cater for dispersed students?
A2. No not generally!

Q3. Is your VTOS centre part of a second level or PLC centre?
A3. No, although it shares a building with a PLC centre

Q4. How many interactive whiteboards are in your centre?
A4. We have 2, one in the computer room and one in the general studies room?

Q5. How long have interactive whiteboards been in your centre?
A5. Three or four months

Q6. What type of interactive whiteboards are they?
A6. They are interactive whiteboard projectors which project onto a standard whiteboard but you still have the full interactivity that you would have normally plus the fact that you can wireless connect a laptop to that projector or your little ipad, so you can walk around the room and control everything.

Q7. Do students have tablets?
A7. No not yet anyway, so everything is in control by the tutor

Q8. Why did your centre decide to invest in IWBs?
A8. I had one in my computer room and it was coming to the end of its life where the bulb was about to go. It was going to cost me probably €400 to put a new bulb in so I opted then when there was a bit of money to spare to at the end of last year to purchase two, that is to get a second one for another room. They worked out at about €3400 for the two of them.
Q9. What was the factor which influenced you in the choice of them?

A9. *My choice was influenced by .. I would have been aware of the technology, as I am the IT person in my centre and I liked the fact that they had the wireless facility for your laptop that you could control it from anyway around the room, plus the fact that they are what you call ultra short throw projectors that means that they are only 16 inches out from the whiteboard and yet when you are standing there you are not in your own shadow.*

*It was funded through the VTOS budget. We had some money left over last year and that was what I decided to use it on.*

Q10. Do you believe that staff in your centre have adequate training in the IWB?

A10. *No, we had general training from the people who supplied the white board but it was just in the general setting up and running of it, and I am trying to work on sourcing some proper training for them at the moment.*

Q11. Where do you think you will find that training?

A11. *Possibly I will have to end up doing some of it myself. I am self taught, I have 33 years of experience with IT.*

Q12. Do you believe IWBs are being used to their full potential in your centre?

A12. *Definitely not, we’ve just starting with them so*

Q13. How long do you think it would take for people to use them?

A13. *Well two other members of staff are using them in the general studies room.*

Q14. What subjects do they use it for?

A14. *One subject is Communications and Work Experience and the other person does Health and Safety and my own subjects would be all IT*

Q15. Do you think that teachers’ pedagogy has changed with the introduction of IWBs?

A15. *Yea because they are now looking at new ways of delivering information to the student in an interactive way rather than the old way of chalk and talk.*

Q16. When you say interactive what do you mean?

A16. *It means that they can display stuff up in the screen and the student can actually come up and touch the screen to clear an item to see what the answer is themselves so that is what it changes*

Q17. What are students’ attitudes towards the IWB?
A17. Still they are a little bit nervous about actually coming up and touching it but still very interested and very, you know they really want to find out what it is all about

Q18. Can you profile the type of VTOS teacher that would be enthusiastic about IWBs?

A18. Well all of my teachers are interested in it, they are all interested in technology that is going to make it more interesting for students, so far they are all interested.

Q19. Do you see any barriers?

A19. No so far they are all pretty... two, three members of staff in my centre would have been previously past students and they are all interested in moving on

Q20. Do you think that comes from yourself and being enthusiastic as a VTOS coordinator and that spilling over onto your staff?

A20. Can I say, unfortunately, yes?

Q21. What do you think are the main benefits to have IWBs

A21. Well the main benefits of have IWBs are that you can make your whole subject an awful lot more interesting for a student, It doesn’t have to be boring, reading from a book, and that you answer a question they just answer you back, they can now come up and actually interact with the stuff themselves.

Q22. Do you think there are any disadvantages to using them?

A22. If they are used properly I don’t see any disadvantages because while you are actually delivering a class you can have a video downloaded onto your laptop so you don’t even need a video recorder, it can all be done, everything in the one area and done at the one time.

Thank you very much for helping me with this interview,

No problem at all
Appendix F

Interview with VTOS Coordinator 2

Q1. How many VTOS students does your centre cater for?
A1. We are over quoted, we have 29, but we are a 20 place centre.

Q2. Is it a core VTOS centre?
A2. Yes it is a core VTOS centre

Q3. Do you have any dispersed students?
A3. No dispersed students

Q4. Is your VTOS centre part of a PLC centre or a second level school?
A4. No we share space with an adult education centre

Q5. Who do you share with?
A5. We share with Youthreach and PLC and Adult Ed. and BTEI and night class, the whole range really use the space.

Q6. How many IWBs are there in your centre?
A6. In the VTOS, there are 2

Q7. What rooms are they located in?
A7. One in the IT room and one in the general purpose room and general teaching room

Q8. How long have IWB been in your centre
A8. 2 maybe 3 years, one 3 years, one 2 years, I think!

Q9. What type of IWBs are they? Or do you know the names?
A9. No that’s gone! Star comes to mind, one might be a star and one might be a Hitachi, but a I don’t know Hitachi what, sorry!

Q10. Why did your centre decide to invest in them?
A10. Am.. there was a trend about them, people had seen them and were enthusing, there was money around, there was possibilities during various bits of upgrading and restructuring, go to the VEC and go down to them for
whiteboards and then another one went in because at the end of the year there was a bit of budget left and we said let's get something tangible and also what happened was that once the first one went in, the demand came from other teachers, so you know!

Q11. What were the factors which influenced you in the choice of IWB?
A11. Aha

Q12. Had you seen them in other centres before or what made you go for a particular type?
A12. Oh, it was a mixture of cost and in one case it wasn't my decision which one I went for, the other where I had a choice, the other one was part of a whole consortium thing. Where I had a choice, it was because of local recommendations for a local company, the local primary schools said talk to this guy, he is good, no bullshit! and he had a deal at the time?

Q13. How was the decision reached, was it your decision?
A13. It was primarily my decision; I consulted with IT and other people about it.

Q14. You said the purchase was funded through your VTOS budget?
A14. One was through the VTOS budget, the other was a shared centre thing, you know between the other programmes, PLCs and various others.

Q15 Do you believe that staff in your centre have adequate training in the use of IWBs
A15. No, but, I have no idea what adequate training is? Ok I think as in, am I off the point here

No, ok, keep going

Right a training man in a suit came in and he can do this and he can do that, and he can do this and he can do that and he was meaning to do this in primary school and he upped a bit to secondary and then there was a certain since that Adult Ed., ok literacy, to act a bit like primary, so you know!

So the training came from the provider?

Yea, but what we did afterwards was that colleagues didn't go to lunch and stayed and played with it and I recommend, I have a 10 year old son and a 13 year old daughter at the time, I brought them into the centre one evening and I said show me and they did.
Q16. I am interested in if there was any subject specific training for specific subjects?

A16. No, the maths teacher I know has gone and networked with people I know and she is probably using it to its highest advantage, she is the one who most uses it interactively.

Because she has links with other organisations?

No it’s because she has personal contacts

Q17. Do you believe that interactive white boards are being used to their full potential in your centre?

A17. No

Why?

Long pause,

Because of lack of training

I wouldn’t say it is that simple, I would say it is in the same way I probably judge it, I don’t use the mobile phone in my pocket to the full potential, all I want, I would definitely say by my kids standards, I never touch the games, I never use SMS or whatever they have, so am.. I think there is an awful lot more we can do, I am not sure what that is, and that is to do with age profile, interest profile, curriculum, have they a specific lesson plan, training would be part of it.

Q18. Do you think teachers’ pedagogy has changed since the introduction of IWBs?

A18. At Adult and Further Ed., level I actually believe that there might be a dangerous kind of PowerPoint teaching actually, with the IWB, now that is not purely interactive though, but in the old days, make the overhead project work, balance it on a book, there was a bit of work involved, now give me a subject, I have it on my memory stick anyway, with a bit of research, the university of New Orleans has PowerPoint on that, so bang bang, bang, we can throw that out, on the other hand I have seen some really good lessons, you know an intro. of, like a world quality 7 minutes video, a worksheet, a class discussion, so I suppose pre white board, there are not many in VTOs, but the teach from the top, sheet, book, the dull lesson, doing a slightly different dull lesson now as well.

Is it the same way of teaching?

Yes, I think so; sorry that is not a very clear answer
Q19. What are VTOS student attitudes towards the IWB?

A19. Love it and especially really interactive stuff. I have seen people getting involved in level 3 maths, people getting involved in quizzes, involved in competitions, that kind of random number generator game play stuff.

Q20. Can you profile the VTOS teacher who is really enthusiastic with IWBs?

A20. Yea, funny enough, I don’t think it is the teckies, I think the IT teachers are teaching quite a narrow course, often creatively but it is a quite a narrow course they just go click and there’s your Excel. Literacy and Communication people, people at that kind of level, Maths people and because I have quite a small centre, I don’t know if it is age general but I suppose ... I have a Maths teaching female colleague, under the age of 35, so I don’t know if age and gender are in there, but I also know the same woman, she also has the best phones, she also was the first to have her own laptop and brought her own laptop to work, so there is an age profile. I don’t know if there is a gender profile, teckie profile, yea, not in the same way. IT teachers, not all of them are Teck! Teck! Teaching IT in VTOS, we might have secretarial with computers and whow! There tecki! I have 2 IT guys one of them is more creative than the other, shall we say!

Q21. What are the main advantages of having IWBs in your VTOS?

A21. Large screen, internet transmission to your class it is just fantastic, you can demonstrate so much so fast even 5 minutes at the end of class, you know, some point comes up, I don’t know! Where exactly is Burundi? Google map, image, boom!

Q22. Are there any disadvantages?

A22. You could end up thinking that having your kids watch some images is teaching, having your kids, staff, kids adult, students, whatever, shall we watch it on the screen, sorry this isn’t very scientific! But I have a sense that we are now ... the “YouTube clip”, I think we are now, people are highly skilled at tuning out of moving image, so now guys I am going to show you a fascinating clip of ... “women in the media” ...we are going to move on to a piece of work, the guys go ‘I’m watching telly, in the same way as I sit down to watch Coronation Street, text my friend, make some tea, surface level!!

People can switch off, overload?
I have seen the other side of it. I have seen the History lesson that starts with a clip from Gladiator, then, modern Rome, then, a close up of the Coliseum, and now lets talk about this...

I suspect that, I read stuff somewhere, where a trained teacher and an expert teacher, and the expert has almost moved on to the area of expert tuition of respond, feedback and probe and they are doing that at in a way that you can’t always catch in a lesson plan. I think some expert teachers can probably integrate their IT or whiteboard into that. But

I think the less confident, somewhat stilted, somewhat wooden teacher, not that there are any of those in VTOS, then the board then becomes a prop for that.

Sorry not a very clear answer.

Thank you very much
Appendix G

Consent form for participant in focus group

I am willing to participate in a focus group to discuss why adult learners like or dislike interactive whiteboards lessons.

I understand that the focus group will have a person who will be taking notes, and that all information will be treated in the strictest confidence.

Signed: ______________________________

Date: ______________________________
Appendix H

Protocol for focus Group

Thank you for agreeing to take part in this focus group. The aim of this research is to find out VTOS learners views of interactive whiteboards, specifically the benefits and constraints of using them in adult education.

A transcriber will be in attendance to take notes during this focus group. All information will be treated in the strictest of confidence and anonymity is assured. Please understand that you do not have to answer any question you do not want to.

Thank you for your cooperation

Leesha Foley
Appendix I

Focus Group

Date: 10th May, 2012

What do you like about IWBs when they are used in class?

Student 1  Classes are very lively and very interesting

Student 2  You learn more from images than from speech, I just love the visuals and YouTube clips, they help me to understand better

Student 3  Lessons are faster; it is a more efficient method of giving a class

Student 4  Notes from Biology Class are available to me from the Moodle platform and the images are very useful to help to understand

Student 5  I like IWBs for Art because it is clearer on the screen, the colours are better than the book

Student 6  I think the data on the IWB is more up to date for Geography, rather than in the text book.

Q2. What are the disadvantages of IWBs?

Student 6  I think in order to use these boards cleverly, teachers must use discussion more, just like our English teacher does!

Student 3  Sometimes there are technical problems, but another teacher comes or we get the caretaker and he helps.

Student 2  We should have more of them and we should be able to use them also. I can’t see why all the other teachers don’t use them, especially when they are in the room where the IWB is.

Extra Information

Student 2  I feel we should be able to use them more if we want to, after all we are adults!
Appendix J

Observation: 8th May, 2012

Class: Leaving Certificate English – Revision of Poem – What were they like?  
Poet: Denise Levertov

Students: 18 International Adult Students (Poland, Somalia, Sudan, Bolivia,  
Algeria, Lithuania, Latvia, Turkey, Russia)

Technology Used: Interactive Whiteboard

<table>
<thead>
<tr>
<th>Time intervals</th>
<th>Observation</th>
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| 0 – 5 minutes  | Class commenced by teacher asking students to chat to each other about what they knew about Vietnam and the War.  
Students were observed to be actively speaking to those next to them. It was observed that none of the class was from Vietnam, if this had been so, it would have proven to have been a very interesting exercise. |
| 5 – 10 minutes | Students volunteered their answers.  
Some did not know exactly where Vietnam was, so the teacher showed it to them on Google map via the IWB. |
| 10 – 15 minutes | Teacher explained the context of the poem and it was shown on the IWB.  
As this was a revision class, the teacher asked if they had remembered it?  
The poem was new to 2 students as they had been absent previously.  
The blinds on the window had to be closed and lights turned off due to the strong sunlight and some students not being able to see the IWB  
The iconic photo of Vietnamese children running from the NaM bomb was displayed. The teacher linked this to the first line of the verse. Students were invited to comment.  
Some students had seen the iconic image, and this created a discussion among the class about the NaM bomb and its consequences. |

The first verse of the poem was displayed on the IWB using a
PowerPoint slide. This was read by the teacher, who explained each line and its significance. Teacher included notes at the side of the PowerPoint clips to provide further explanations of words. The teacher made it clear to the learners that the PowerPoint notes would be made available to them via email, and that they didn’t need to write everything down.

*It was observed that students appreciated having access to the PowerPoint slides, and as a result listened more intently, got involved in discussions and asked questions.*

The second verse was displayed using prepared PowerPoint slides and notes were also included on the slides. Certain words were highlighted, these had the extra notes.

*Some students did not understand the words, “illuminate” and “ornament”. These were explained by the teacher.*

The teacher invited further questions from the group. As there were no further questions, a YouTube video of the poem to music (Only Time by Enya) with war images was shown to the class.

*Observation: there was total silence, the music and imagery brought the poem alive for students. Some learners had to get tissues.*

The teacher then allowed an extra 5 minutes for quiet reflection. *This allowed learners to “gather themselves together” and it provided the space for them to reflect on the poem. It was noted that all present were quiet, there was no talking to their peers, just some writing notes.*

This video clip is available at the following link:
http://www.youtube.com/watch?v=9qGmjjesTbmM&feature=related

The remainder (10 minutes) of class was spent giving homework to the students, and the relevant exam question was displayed on the IWB.

**Good points observed during lesson:**

- As this was a class of international students, English was not their first language. Visual images were used to explain unfamiliar words in the poem. These visual images also provided a strong stimulus for discussion

- PowerPoint notes were made available to learners via email for revision

- At all times learners appeared very interested and engaged by
the imagery, music of the lesson. This was demonstrated by learners asking questions.

- Time for reflection was built into lesson

**Where improvements could be made to lesson**

- At all times the structure of the lesson was controlled by the teacher
- Slides had too much text included on them
- Students were seated at all times and did not move about
- Students did not interact with the IWB

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**What Were They Like?**

Did the people of Viet Nam
use lanterns of stone?
Did they hold ceremonies
to reverence the opening of buds?
Were they inclined to quiet laughter?
Did they use bone and ivory,
jade and silver, for ornament?
Had they an epic poem?
Did they distinguish between speech and singing?

Sir, their light hearts turned to stone.
It is not remembered whether in gardens
stone gardens illumined pleasant ways.
Perhaps they gathered once to delight in blossom,
but after their children were killed
there were no more buds.
Sir, laughter is bitter to the burned mouth.
A dream ago, perhaps. Ornament is for joy.
All the bones were charred.
it is not remembered. Remember, most were peasants; their life
was in rice and bamboo.
When peaceful clouds were reflected in the paddies
and the water buffalo stepped surely along terraces,
maybe fathers told their sons old tales.
When bombs smashed those mirrors
there was time only to scream.
There is an echo yet
of their speech which was like a song.
It was reported their singing resembled
the flight of moths in moonlight.
Who can say? It is silent now.

Denise Leverto