

MAC05: Project Report submitted in part  
fulfillment for the award of MA  
Education, Innovation and Enterprise,  
2011 - 2013

Chris Medwell

June 2013

UNIVERSITY CENTRE DONCASTER  
SCHOOL OF HUMANITIES, EDUCATION  
AND SOCIAL SPORT SCIENCES

**The impact of tablet technology in a post 16 Special Educational Needs  
Department: An insight into Learner Participation and Engagement.**

### **Abstract**

Tablet technology is causing a stir in educational settings around the globe, this paper aims to ascertain the views and opinions of learners with learning difficulties and disabilities (LDD) as well as the staff within a small department that specializes in teaching learners with a range of additional needs. The paper will synthesise the relationship between pedagogy and technology while drawing on some of the key issues in education, accessibility and inclusion. Investigating a range of applications and teaching strategies the paper will track the journey of both learners and staff in implementing e-learning technology and the learner experience.

#### *Keywords*

*Technology, e-learning, m-learning, accessibility, inclusion, tablet technology, action research, participatory research, mobile applications*

## Contents

<b>Context and Background</b>	<b>Page 1</b>
<b>Literature Review</b>	<b>Page 8</b>
• Education Theory	Page 8
• E-learning and m-learning	Page 10
• Technology, accessibility and inclusion	Page 14
<b>Project Focus: Aims, Objectives and Research Questions</b>	<b>Page 20</b>
• Project aim	Page 21
• Project objectives	Page 21
• Key research questions	Page 23
• Intended outcomes and products	Page 24
<b>Project Methodology and Approach</b>	<b>Page 25</b>
• Data collection, recording and analysis	Page 27
• Identifying participants	Page 27
• Data collection and analysis techniques	Page 29
<b>Presentation of Data and Analysis</b>	<b>Page 30</b>
• Department and use of e-learning	Page 30
• Classroom observations	Page 35
• Learner opinions and views	Page 42
• Staff perspectives	Page 48
• Limitations	
<b>Conclusions, Recommendations and Implications</b>	<b>Page 53</b>
<b>Products, Processes and Solutions</b>	<b>Page 57</b>
<b>Evaluation</b>	<b>Page 59</b>
<b>References</b>	<b>Page 60</b>
<b>Appendix</b>	
• Overview of Foundation Studies	
• McKinsey 7S Model	
• Sample Interview Transcripts	
• Observation reports (Sample)	
• Learner work – Train exercise & iMuscle exercise (sample)	
• eLP development	

## Context and Background

The following report will present the findings of a small scale research project based in a small special educational needs (SEN) provision within an unnamed further education college in a town in northern England. The department is under the umbrella of 'learner inclusion' and this is one of the key contemporary issues that will be explored during this project. For the purpose of this report, the department will be referred to as. 'Foundation Studies'. The author of the report works as a full time teacher within the department, teaching across a variety of subjects and across academic levels.

Foundation Studies is a provision for learners with learning difficulties and disabilities (SLDD), these include profound, severe, multiple and moderate difficulties and disabilities. The department provides entry-level qualifications in independence, personal and social development, social skills and employability. Progression routes for learners include voluntary and paid employment, independent and supported living and accessing mainstream education within College A or another provider.

Staff	Learners
Senior Manager - Assistant Principal	46 Entry Level 1
Manager (Head of Inclusion)	51 Entry Level 2
5 Full time teaching staff	9 Entry Level 3
6 Part time teaching staff <ul style="list-style-type: none"><li>• 1 on .5 contract</li><li>• 2 teach 9 hours p/w</li><li>• 1 teaches 7.5 hours p/w</li><li>• 2 teach 2.5 hours p/w</li></ul>	*NB though these are the numbers of learners enrolled onto each level for 12/13, they won't all be participating in the research.

## Subjects offered

Personal Development	Drama
Social Skills	Ceramics
Art	Joinery
Media	Motor Vehicle
Sport	Construction
ICT	Catering
Dance	Daily Living Skills

A detailed breakdown of Foundation Studies can be found in the **Appendix 1**.

Topping and Maloney (2006) argue that inclusion is society valuing diversity and people overcoming barriers. This is then set into concepts and boundaries and described as a tricky business (Topping and Maloney, 2006, p 2). Boundaries include *Special Education and Disability, Social Inclusion and Political Agendas, Legislative change and Human Rights*. This research project will include all of these concepts and boundaries and also bring technology and eLearning into the equation. Banes and Seale (2002) argue that the terms 'accessibility' and 'inclusion' are buzzwords that many people in further and higher education use but few really understand in depth. The purpose of this project is to highlight the close relationship that accessibility and inclusion share with technology and the role that technology plays in creating accessible and inclusive classrooms.

Special education has been the focus of many reports and legislations dating back to Warnock (1978) who recommended the need for an adaptation of courses and resources in further education institutions to accommodate learners with special educational needs. Warnock (1978) argued that the learners' difficulties should be recognized and accommodated and that on leaving school at 16, learners should be helped to use their abilities to the utmost (Warnock, 1978).

Further reports include Thompson (1996), whose report on inclusive learning was the result of a three-year inquiry into the educational needs of adults with learning difficulties and/or disabilities in England. The Thompson report followed an act of Parliament in 1992 surrounding the funding of learners in further education. Thompson (1996) discussed the notion of inclusive learning and argued that inclusive learning places the responsibility for providing appropriate education with teachers and managers rather than problematising the student as one with a deficit (Thompson, 1996, p1). Thompson (1996) discusses the need to make available options accessible, rather than simply offering access to what is available. It is this notion that drives the values of the project that will be undertaken by the author. Learners are offered opportunities within the department but not all teaching, learning and assessment strategies are fully inclusive and accessible to all. The idea of blended learning, e-learning and m-learning offers a multisensory, accessible and inclusive education experience for learners with learning disabilities and difficulties.

Legislation has also had an affect on special education; the Disability Discrimination act (1995) meant that further education establishments had to address the legal implications of discrimination. The legislation defined discrimination as where a disabled student is placed at a 'substantial disadvantage' in comparison to someone who is not disabled (Disability Discrimination Act, 2005, 28B). The act was further strengthened by the Special Educational Needs and Disability Act (SENDA, 2001) which directly applied to education. The Equality Act (2010) has since replaced the Disability Discrimination Act and SENDA and the college that this report focuses on has duly updated its Equality and Inclusion policies.

The report will look at inclusion, accessibility and technology. A further issue that will be explored is the learner voice and the ethics of research and learners with learning difficulties and disabilities. The culmination of the project will investigate individual learning plans (ILP) and tracking targets. The drive for inclusion is paramount in the classroom environment, the question that this paper will raise is why online learning environments such as eILPs

and Virtual Learning Environments (VLEs) don't always mirror the accessibility and inclusion policies that classrooms do.

Technology has played a major role in how we teach, the development of computers, laptops and interactive whiteboards has added to the teacher's toolkit over the past 20 years. The latest technology causing a buzz in classrooms is the use of mobile technology, in particular tablet technology. While there are numerous options, this project will look at Apple's iPad as a tool for teaching, learning and assessment. Apple released the first generation iPad in 2010 and twenty-eight days later claimed that they had sold one million units (Apple.com, 2010). Fast forward three years and two generations later Apple have sold 22 million iPads in the first financial quarter of 2013 (Apple.com, 2013). When that very first iPad was sold in 2010, could practitioners and professionals in an education context have envisaged that a consumption device could change teaching and learning? More so that it could provide an inclusive and personalized educational experience for learners with special educational needs (SEN) and learning difficulties (LD).

The Oxford Dictionary defines innovation as the process of innovating, which in itself is defined as a new idea, process or product. While this project isn't the first of its kind, it will join a growing list of exploratory research projects providing literature into how effective tablet technology is within an educational context. The intention is to ascertain the how much technology is used within the department, and the attitudes and opinions of both staff and learners. Having been a member of staff within the department for over five years the author is aware that technology is used sparsely and ineffectively, this is the main reason that this project relates to innovation and enterprise.

There are many different issues and contexts that this project will touch upon. The main focus is the relationship that technology has with creating inclusive and accessible learning environments. The project will be looking at pedagogical approaches and whether teaching staff have to adapt their teaching style to embed and embrace the latest technology; or whether the technology should naturally embed itself almost invisibly as part of the



teachers toolkit much like the humble pen. Legislation will also be brought into context, as the learners that this project focuses on are vulnerable. It is important that the project does not lose its focus, which is the role that technology has to play in SLDD learning.

The project also covers a number of pedagogic, assessment and leadership and management aspects. Often consumables are not created for pedagogic intentions; this is certainly the case of tablet technology. Technology evolves at a rapid pace and research into the pedagogic innovation is often playing catch-up. The research will look to ascertain whether members of the teaching staff in a small department are willing to change their pedagogical approach in order to embrace emerging technologies. It will be the task of the author, to try and demonstrate the potential of such technological teaching tools to a number of full time members of teaching staff. The technology will also be implemented in the author's own practice and the adaptation (if applicable) of the authors own pedagogy will be reflected upon.

It is important to highlight the importance of 'learning' and almost de-emphasise 'teaching' at this point. While the project aims to discover how teachers can change their practice with the assistance of technology, it is mainly focusing on how technology can impact on the learning experience of SLDD learners. The notion that learning is everywhere will be embraced during the project; m-learning will be a major theme throughout the research and subsequent report.

During the research element of the project, tablet technology will be required to be implemented in some of the classes. The bulk of the research will take part in the author's own practice, however other full time members of staff will need to adopt the technology in their sessions. As a result of this, leadership strategies will need to be implemented during the initial stages of research. As the author is relatively new to the profession, and much younger than many colleagues it is important to get the leadership strategies correct. Diagnosing the need for change is key to identifying the strategies needed to implement

change. The McKinsey 7S model will be followed to identify where and how the tablet technology can be effectively implemented.

In 1977, Waterman, Peters and Phillips assembled a task force to review organisational effectiveness and in particular, the relationship between structure and organisation. After working with their client base, they formulated a new framework for organisational thought (Waterman *et al* 1980). This became known as the McKinsey 7S Framework. They argued that effective organisational change is the relationship between seven elements, which are in turn placed into two categories, hard and soft. The seven elements are then placed into a diagram, all elements are connected which Waterman *et al* (1980) state that the interconnectedness is intentional and that it is almost impossible to make progress in one area without the others being affected. The McKinsey 7S diagram has been specifically adapted for Foundation Studies in College A (**Appendix 2**) A full breakdown of how the seven elements have been adapted can be found in **Appendix 3**. A leadership team will be created for the implementation process. During the implementation, Kotter's 8 Step model will be utilized.

A stakeholder analysis will be undertaken to identify the stakeholders and participants that will be involved. Eden and Ackerman (1998) define stakeholders as:

People or small groups with the power to respond to, negotiate with, and change the strategic future of the organization' (Eden and Ackermann 1998: 117)

Three main stakeholders have been identified and analysed using Mendelow's Stakeholder Analysis. The main stakeholders are identified as *Tutors, ICT Support Staff and Learners*. Other stakeholders that will be playing some role in the project are *Learning Support Staff (LSAs) and Middle/Senior Management*. Interviews, questionnaires and observations will be used to research and ascertain the views and potential uses of tablet technology in classes. It will be Tutors and Learners who will be the participants during the research; tutors will also be involved in the

implementation and the subsequent training once the project has reached its completion. There are five full time members of the teaching team in Foundation Studies (including the author), added to these are six part time staff. The part time staff team range from teaching one session per week, to teaching a .5 contract. ICT support staff are also key stakeholders as they control and monitor the networks and ultimately whether the implementation will be successful and reach its potential. College A has a Central ICT Support service that support the whole college, there aren't individual departmental liaison officers so often they are overworked and sometimes difficult to communicate with. While no research will be undertaken with the ICT support team, they will be central to the success of the project. Ultimately, one of the key concepts and focuses for the project is that of learner voice and SLDD learners. It is important to keep the learners informed at all times and form a guiding team of learners and staff in the future to continue the implementation.

## Literature Review

Due to the vast amount of issues surrounding this project, the literature review will aim to cover a number of educational and social contexts. The areas that will be covered have been selected due to their relevance and to raise key points that will be taken and transferred into the research project that will follow. The studies and literature that is included in this review stem from an extensive search of both print and online books and academic articles. An initial search on the e-library and then a further search on Google Scholar formed the basis of literature to be reviewed. Key terms such as *technology*, *inclusion*, *accessibility*, *special education* and *e-learning* were used in order to ascertain relevant articles and books in order to undergo the literature review.

### *Education theory*

It is important to understand how technology relates to theories of education, the research project will focus on whether teachers will adapt their practice in order to embed and embrace the technology that is available, in particular tablet technology.

Henderson and Yeow (2012) argue that while most educational approaches are based on a constructivist approach, technology in education is built on a behaviourist perspective. They continue to discuss the notion that only recently educational technology has supported a constructivist approach (Henderson and Yeow, 2012). It is the constructivist theory that forms the basis of this project. Learning theories by Dewey (1916), Piaget (1972) and Vygotsky (1978) state that people learn through experience and construct their own meaning. Petty (2004) argues that constructivists teach for understanding, requiring new learning to be built on existing learning. The notion that educational technology has been built around a behaviourist theory can be true in the sense of individual desktop PCs and computer based testing, but the wide use of the Internet and interactive games in educational settings encourages peer working and collaboration.

A search on Bloom's Taxonomy and applications (apps) on the Internet brings up hundreds of images and educational blogs based on the taxonomy of learning through apps. The term Blooms Digital Taxonomy has been coined as a revised way of understanding how learners learn. Many professionals have submitted their own variations of this digital taxonomy as a way of sharing their knowledge and experience of apps and how they can be used within sessions. Limitations of the digital taxonomy seem to be that apps are not rigid and that they can fit under more than one of the cognitive demand skills required for learning.

Lave and Wenger (1990) developed the concept of situated learning, which is included in constructivist-based models of e-learning (Mason and Rennie 2007). Lave and Wenger (1990) argue that social interaction is a critical component of situated learning; the social interaction when using the tablet technology will form a major part of the learning process during the research to be undertaken. Mayes and de Freitas (2007) also discuss situated learning in terms of e-learning, they agree that vicarious learning (Mayes *et al* 2001, Mayes and de Freitas 2007) is the concept of learners learning through relating to others, they continue to state that much of classroom based learning is vicarious and there are obvious ways that this can be enhanced by 'computer-mediated communication'.

Johanassen *et al* (2003) state that educational technologies have been dated back to century books and century chalkboards. Indeed, the pen, computer and overhead projector have all been new at some stage in their development. It is important from a personal point of view that technology becomes almost invisible in that it 'fits' into a class rather than be forced into practice. Johanassen *et al* (2003) argue that 'programmed instruction' was the first true educational technology in that it was the first to be made specifically for educational use. It is this point that needs to be highlighted and taken further. The debate that consumption and commercial technology finds its way into the hands and classrooms of educators has been ongoing and will continue to be raised. Many of these technologies are described as fads and many don't revolutionise learning, a view shared with Murray and Olcese

(2011) who stated that in 2011 the iPads weren't quite ready for education. Baum (2011) speaking in *Learning and Leading with Technology* stated that improvement isn't revolution and that the approach to teaching is exactly the same as 50 or 100 years ago.

### *E-learning and m-learning*

With the argument of learning being identical to that of 50 years ago in mind it is worth going on to discuss e-learning and its possible successor m-learning. For this part of the literature review a mix of research papers and books have been used. 'E-learning: The Key Concepts' by Mason and Rennie has been chosen along with other literature including Littlejohn and Pegler 'Preparing for Blended E-learning'. Following from the educational theory perspective it is appropriate to start with e-learning and pedagogy. Beetham and Sharpe (2007) have edited a book that contains some important articles on how pedagogy may need to be rethought as we progress into the digital age. Complimenting this is a piece of academic writing by Nitin Upadhyay (2006) who discusses mobile learning or m-learning as a new paradigm in education. Finally, other articles that have been chosen include Jisc Techdis articles aimed to guide providers who are moving toward an m-learning model and how to add value to learners with m-learning.

Mason and Rennie (2006) argue that e-learning takes on different definitions and emphasis dependent on where they are read. They state that some focus on content, some definitions focus on communication and some focus on technology. It is important to identify what the emphasis is on in terms of the project that will follow. As a result of reading this statement, one of the initial research questions to the teaching team will be their interpretation of what e-learning means. From a personal perspective, the use of tablet technology places an emphasis on all three points. Mason and Rennie (2007) discuss the different terminology that is associated with the word e-learning; they mention 'web based learning', 'open learning' and 'flexible learning'. Mason and Rennie (2007) argue that:

These substitutions of the word 'electronic' reflect a realisation that it is not the electronic nature of elearning which captures its true value, but rather the opportunity to integrate working, learning and community in the workplace or university. (Mason and Rennie, 2007, p xxii)

Mayes and de Freitas (2007) argue that there aren't specific models of e-learning, more that existing models of learning have undergone 'e-enhancements' (Mayes and de Freitas, 2007). Mayes and de Freitas (2007) discuss learning as a cycle and discuss Kolb (1984) they invite the e-learning designers to consider what technologies are most effective at the different stages of the cycle. Fowler and Mayes (1999) attempted to link and map various technologies to the different stages of the cycle and distinguished between the technology of presenting information (primary), supporting active learning tasks and feedback (secondary) and the application of the new learning (tertiary) (Mayes and de Freitas 2007 p 21). These three stages can be compared to Bloom's Taxonomy (1956) and Fowler and Mayes (1999) argue that secondary courseware could include the word processor in that a learner is transferring knowledge and creating content, this is where content creation apps available on an iPad or other tablet prove invaluable.

Whalley *et al* (2006) discuss the term 'The Digital Revolution'; they discuss the creative power that new technology (computers in this instance) has to offer. Within this they look at editing software, image manipulation and sound and music creation, these tools they argue could transform a tutor in further education into a creative learning entrepreneur working at the cutting edge of e-learning strategy! (Whalley *et al* 2006 p 39) While this may be slightly tongue-in-cheek, the message is quite simple. With the advancement of technology, these tools become cheaper and aren't simply in the hands of professionals in the industry. They discuss the utilisation of a digital camera as a cost effective way of digitising the classroom, other pointers include video editing software and sound recording. It is important to raise these issues as tablet technology converges these tools into one portable device.

The work by Whalley *et al* (2006) has been reviewed due to its close link with further education, there is a huge difference in the way learners aged 16 and

above learn and act, one of the key questions during the research will be if there are age-appropriate apps for learners who are older than 16, but have learning difficulties or disabilities. Whalley *et al* point tutors towards Jisc who provide support and guidance as well as resources specifically to further education providers. Whalley *et al* (2006) provide a toolkit for implementing e-learning into FE for practitioners who may be finding using technology in their classes difficult.

With the term 'Digital Revolution' in mind it is worth referring to Prensky's 2001 article 'Digital Natives, Digital Immigrants'. Prensky (2001) opened the article by arguing that

Our students have changed radically. Today's students are no longer the people our educational system was designed to teach. (Prensky. M, 2001)

The interesting part about that point is that Prensky recognised that learners had changed and the way the education system was designed would no longer meet their needs, this was twelve years ago and the advancement in access to technology in those twelve years has been phenomenal. The use of smartphones and tablets has changed the way people communicate and learn. An Ofcom study in 2011 showed that 27% of adults and 47% of teenagers owned a Smartphone, and that 59% had acquired them between 2010 and 2011. Ofcom described the years between 2000 and 2011 as 'the digital decade' and found that 76% of houses in the UK have internet connection compared to just 25% in 2000 and nine out of ten people in the UK (91%) own a mobile phone compared to 36% of people in 2000. This highlights the rise in access to technology over the twelve years since Prensky recognised the change in how learners can learn.

Prensky argues that the generation that are in the education system at this point are the first to have grown up surrounded by digital technology; including the internet, smartphones and digital music. Prensky (2001) defines this generation of learners 'Digital Natives'; they are all "native speakers" of the digital language of computers, video games and the Internet. (Prensky, 2001).



Bennett *et al* (2008) have differing views about the term 'digital natives' and whether describing a whole generation of people as native to technology is generalising. In their 2008 work Bennett *et al* argue that:

...though such calls for major change in education are being widely propounded, they have been subjected to little critical scrutiny, are undertheorised, and lack a sound empirical basis. There is thus a pressing need for theoretically informed research.

Bennett *et al* (2008) argue that the assertions are put forward with little empirical evidence and based on common sense beliefs, they go on to argue that the work has been cited by numerous further publications, often uncritically. Bennett *et al* (2008) argue that the claims for a digital native generation are based on two assumptions. The first assumption is that the digital native generation possess sophisticated knowledge of the skills required for information and communication technologies, the second claim is that digital natives have different preferences and styles of learning than those that were born outside of this period. Bennett *et al* (2008) cite research by Kvavik, Caruso & Morgan, 2004 into how young people in post compulsory education access and use technology, they found that while a high proportion of respondents owned technology fewer showed the level of skills that may be expected from digital natives. A further point that is raised by Bennett *et al* (2008) is that ownership and access is dependent on domestic affluence, ultimately suggesting that technology skills and experience are far from universal across the generation that has been dubbed 'the digital natives'.

A third issue that raised questions about Prensky's (2001) assumptions is the fact that according to Bennett *et al* (2008), respondents felt frustrated about use of the internet at schools and that participants felt their internet use was curtailed at schools yet this showed no evidence of disengagement or dissatisfaction at school. Bennett *et al* (2008) argue that the results show that technology plays a different role both in and out of educational surroundings and that learners are not clamouring for technology.

Moving on from the digital natives debate, it is worth mentioning the new term surrounding learning with technology – mobile learning or m-learning. Mason and Rennie (2006) describe m-learning as the latest buzzword however Upadhyay (2006) goes as far as saying that m-learning is a new paradigm in education. Upadhyay (2006) argues that m-learning relies on the pedagogical theories and strategies of the behaviourist and constructivist learning groups. Upadhyay (2006) states that features of mobile learning include urgency of learning need, the interactivity of the learning process and the integration of instructional content. Even though this paper was released 4 years before the first generation iPad, these points are very relevant when discussing iPads in education today.

Melhuish and Falloon (2010) argue that mobile devices offer five affordances for education:

- Portability
- Affordable and ubiquitous access
- Situated learning
- Connection and convergence
- Individualised and personalised experiences

These five points are very similar to the points raised by Upadhyay (2006) and again are very important to how the research will be undertaken in the research project that will follow. Melhuish and Falloon (2010) researched how the first generation iPad could work in an educational situation, the research project that will follow aims to take forward the research by Melhuish and Falloon of three years ago.

### *Technology, accessibility and inclusion*

For this part of the literature review a look back into the history of technology research in special education and some of the historical criticisms of technology in special education. As a starting point it is worth defining disability and accessibility. Seale and Cooper (2010) took a definition from the

IMS Global Learning Consortium who provide an education specific definition of disability and accessibility. (Seale and Cooper, 2010)

...the term disability has been re-defined as a mismatch between the needs of the learner and the education offered. It is therefore not a personal trait but an artefact of the relationship between the learner and the learning environment or education delivery. Accessibility, given this re-definition, is the ability of the learning environment to adjust to the needs of all learners. Accessibility is determined by the flexibility of the education environment (with respect to presentation, control methods, access modality, and learner supports) and the availability of adequate alternative-but-equivalent content and activities. The needs and preferences of a user may arise from the context or environment the user is in, the tools available (e.g., mobile devices, assistive technologies such as Braille devices, voice recognition systems, or alternative keyboards, etc.), their background, or a disability in the traditional sense. Accessible systems adjust the user interface of the learning environment, locate needed resources and adjust the properties of the resources to match the needs and preferences of the user. (Taken from IMS Global Learning Consortium (2004) IMS Access For All Meta-data Overview)

Seale and Cooper (2010) discuss the concepts of adaptation and flexibility that IMS Global Learning Consortium emphasise in their definition of accessibility and disability, the focus being on the needs of the learners and e-learning materials should be adjusted to meet the learners needs.

In ascertaining an historical perspective of technology and special education an article by Woodward and Rieth (1997) gave an in-depth insight into research literature and how the technology was used and received by educators and researchers. Woodward and Rieth (1997) state that research on the use of technologies for students with disabilities has grown since the 1970s, they argue that the range and depth of research available simply did not exist in the 1970s or early 1980s and that the literature available at the time concentrated on and reflected on an interest in the microcomputer and its impact on education, not only this but according to Woodward and Rieth (1997) the research covered all education in public schools without specialising on special education.

Much like the hype surrounding tablet technology and m-learning, Woodward and Rieth (1997) state that writings on technology in special education literature were enthusiastic about the potential, the microcomputer generated enthusiastic writing followed by skepticism (Woodward and Rieth, 1997;

Cuban 1986; Ellis and Sabornie 1986; Okolo, Bar and Rieth 1993; Woodward 1993).

The microcomputer is the focus of research throughout the 1980s with Computer Aided Instruction (CAI) the innovating technology of the decade. Woodward and Rieth (1997) synthesise a vast array of meta-analyses based around technology research in special education. One of the research papers they review is McDermott and Watkins' (1983) study of a CAI basic skills program, 205 students with learning disabilities took part in a project that compared performance of CAI versus textbooks. There were no significant effects between the two mediums and according to Woodward and Rieth (1997) special educators blamed low quality programs and software.

Contrasting with the findings of McDermott and Watkins (1983) Woodward and Rieth cite the results a research paper conducted by Trifiletti, Firth and Armstrong (1984) where learners with mild disabilities learnt twice as much as those who used text based mediums such as textbooks and worksheets.

A further article by Clark (1983) was reviewed, Clark seemed strongly against the use of CAI and microcomputers in special education. Clark (1983) argued that different mediums do not influence learning and that technology is a vehicle to deliver instruction, the contents of the vehicle always remain the same. Clark (1983) compared the use of the microcomputer in the 1980s to the use of radio as a learning tool in the 1950s and television in the 1960s, there did not appear to be much difference in the outcomes of learning.

Another pertinent point raised by Clark (1983) was that of the novelty effect. This is reflected in today literature based on the hype of current technology as a learning tool. Clarke (1983) argued any increased attention or engagement was due to a novelty effect, once a learner has grown used to a particular technology, the novelty effect disappears and gains tend to diminish (Clarke 1983) and learners become familiar with the technology. Although this research was undertaken thirty years ago, this point will still be raised in the research that will follow.

Woodward and Rieth (1997) discuss the evolution of CAI and how practitioners used other technologies as a teaching tool. Discrete variables were added to the software providing instant and strategic feedback, as a result CAI lead to higher 'on task' rates and student engagement. This contrasts with the opinion of Clark who in 1983 was skeptical about technology in education. Woodward and Rieth (1987) refer to a paper compiled by Graham and MacArthur (1988) who used a word processor to improve clarity and cohesiveness for learners who had difficulty with literacy. This is reflected in the work by Hofmeister (1984) argued that using technology in education should be described as evolution rather than revolution. Again this point is emphasised as this will be the values of the project undertaken in College A.

Hofmeister (1984) discussed the birth of the information age and predicted two scenarios of how technology could improve the lives of learners with learning disabilities and difficulties. Hofmeister used the microcomputer to aide spelling and grammar and also discussed text-to-speech as an assistive technology for learners with poor communication skills. Hofmeister (1984) also discussed the use of artificial intelligence and simulation as a tool for teaching, comparing classroom sessions to the simulations used for aviation training as a way of training without the expense or situations that are inaccessible.

Edyburn (2001) argues that two powerful forces work together in the drive to accessible and inclusive technology, innovation and policy. Edyburn (2001) highlights the introduction of the first Apple computer in 1977 an accessible device called the Adaptive Firmware Card (AFC) was developed, the AFC enabled learners to operate a computer using a switch or alternative keyboard.

Secondly, Edyburn (2001) argues that policy and legislation plays a major role in the development of technology and accessibility, this is reflected in the Equality Act (2010) and previous legislation in the Disability Discrimination act (1995) and Special Educational Needs and Disability Act (SENDA, 2001). Edyburn (2001) argues that a significant number of people with disabilities still do not have access to technologies that could benefit them in some way.

Another point that is raised by Edyburn (2001) is that the special education community often find that technology is inaccessible straight out of the box and that modifications and additions provide accessibility for special education. This is reflected in the review produced by Foley and Ferri (2012) who discuss the Kindle as an assistive technology. Kindle could read textbooks aloud and provide access to the visually impaired with text-to-speech, Foley and Ferri (2012) argue however that the Kindle was inaccessible due to its complicated user interface. Foley and Ferri (2012) discuss the symbolic meaning of assistive technology and how they carry markers that symbolise disability. They describe the iPad and iPod as mass-market technology and highlight the nature of 'fashion accessories' such as the iPad but compare the iPad to specifically produced assistive technologies such as the assistive communication device (AAC) that retails at \$6000. Foley and Ferri (2012) argue that assistive technology is built around assumptions so The AAC is 'toughened' in the assumption that a disabled person may be rougher than an able bodied person. They argue that the iPad can provide the same functionality at the fraction of the cost and not carry the symbol of disability.

Finally, Jane Seale has produced a number of articles based around accessibility, inclusion and disability. Seale focuses mainly on learners in higher education but some of the points can be transferred to further education. Revisiting the digital natives debate, Seale (2010) discussed 'Digital Agility' and argued that learners were extremely familiar with technology and had high levels of confidence in using technology and in their own ability. This reflects the work by Woodward and Rieth (1997) who discussed motivation as a factor in the use of technology.

In a separate paper Seale and Cooper (2010) argued that although accessibility and inclusion in special education was high on legislative and institutional agendas there is a lack of knowledge about how to make e-learning accessible. Seale and Cooper (2010) argued that accessible e-learning is often difficult to use by teachers and when teachers with a technical knowledge and background struggle with implementing and designing

accessible e-learning and technology, how are those professionals with less technical ability ever going to adopt technology in their own practice. This will form one of the research questions as the project aims to ascertain the level of knowledge and confidence in College A Foundation Studies.

Seale and Cooper (2010) also raise the issue of the relationship between pedagogy and accessibility. Seale and Cooper (2010) cite Kelly *et al* (2004):

At the heart of any e-learning experience is the pedagogy that drives it, the learning outcomes, the content, which illustrates those learning outcomes, the context in which the content is presented and the activities a student completes to aid his/her understanding of the learning outcomes (*Kelly et al., 2004*).

It is the learning outcomes that will drive the project and ultimately the learner journey becoming more accessible and inclusive for learners in Foundation Studies at College A.

## **Project Focus: Aims, Objectives and Research Questions**

Following the completion of the literature review it is important to be clear on the focus and topic of the research project that will follow.

The project focus will cover three main areas, *inclusion and accessibility*, *technology* and *special education*. While these areas are very broad and could constitute a project individually, collectively they interconnect and will be taken into consideration when collecting and analysing the data that is generated during the research process.

The following report will synthesize the relationship between technology and pedagogy in a SEN context. In particular, the project aims to ascertain the views and opinions of learners with additional needs and teaching staff during a short initial period of implementing tablet technology.

The focus will be accessibility and inclusion and how the use of new and emerging technologies can provide an accessible and inclusive experience for learners with differing learning difficulties and additional needs.

Life Skills at College A is a profitable department within the institution. Success rates are well above the benchmark figure set by the college. Accompanying this, retention and achievement are also well above benchmark. Over the past two years, success rates figures have been 95% (10/11) and 93% (11/12) with predicted success rates even higher for 12/13 at 96% Table 1 shows the retention, achievement and success rates for the past three years with the predicted data for 2012/13.

**Table 1**

Year	Retention %	Achieved %	Success %
09/10	94	85	80
10/11	97	98	95
11/12	93	100	93
12/13 (Predicted)	96	100	96



*“Meeting learner needs and aspiring to excellence”* (College A Mission Statement, 2012)

When identifying the drivers for change and project focus, it is important to understand the values of the organisation. The mission statement for College A states that the organisation aspires to excellence. As a lecturer in the college, the main responsibility is to ensure that learners achieve and their educational experience is a positive one that will ultimately lead to some form of progression.

The current assessment strategies within the department are paper centric; learners are formatively assessed throughout sessions with a final summative assessment undertaken through worksheets at the end of each unit or module. All assessments are worksheet and paper based, and though this method is successful and has been used within the department for a number of years, it doesn't necessarily match the College's mission statement.

Accompanying the organisation's mission statement is the E-Learning Strategy (2007 – 2010). The strategy is currently out of date and as yet, an update has not been published. It is still worth taking the strategy into consideration when discussing the need for change. One of the points within the values section of the strategy states that e-learning is developed in order to “Motivate individuals and stimulate enthusiasm for learning” Within the subsection *Managing the E-Learning Strategy* the college states the need to meet and exceed the requirements of external inspectorates such as OFSTED. The Institute for Learning (IfL) have produced a document suggesting how e-learning may fit into the common inspection framework (CIF) that Ofsted work towards. Within this document, IfL use the Ofsted criteria of how well e-learning adds to the personalising of learning and the learner experience.

### *Project aim*

The aim of the research project is to identify how tablet technology, in this case the iPad and iPad Mini impacts on teaching and learning in a special education environment. In order to achieve the project aim a number of objectives have been set out.

### *Project objectives*

- To collect the views and opinions of teachers and learners about how tablet technology has impacts on their sessions.
- To explore whether tablet technology creates a more inclusive and accessible classroom.
- To measure the level of engagement and participation in classrooms.
- To explore how tablet technology differs from the use of other technology and traditional methods.

In meeting the project aim, the intention is to collect and analyse the views and opinions of teachers and learners about how using tablet technology has made a difference in classes. Many of the teaching staff in the department have had little experience with technology in their sessions so it will be beneficial to ascertain their views and experience and be able to share successes or limitations with each other. It is also important to collect and explore the views and opinions of the learners, the ultimate aim is to improve their experience and journey during their time with Foundation Studies at College A. Often due to the learning difficulties and disabilities the views of the learner aren't taken into consideration. Many of the 'Student Feedback' surveys issued at the end of term aren't appropriate or inclusive for SLDD learners and while the learner voice is embraced in Foundation Studies, the learners have little input into how their sessions are taught.

The second objective is to explore whether using tablet technology in a special education department actually creates a more inclusive and accessible classroom. The interactivity of the iPad will essentially give all

learners access to the technology of a computer, calculator, dictionary and interactive whiteboard. The portability aspect will also be explored in terms of inclusion and access, the research will try to explore whether teaching outside the classroom environment has any impact on the learner experience and learner journey.

Thirdly, and closely linked to the previous objective is to measure the level of engagement, participation and motivation of learners. Learners often complain about the sheer amount of worksheets and written assessments involved in completing their qualification. This objective is also linked to the first in that learners views and opinions will be ascertained, results will also be directly linked to observations.

Finally, tablet technology is being bandied about as a revolutionary tool for teachers and learners, another objective of the project will be to explore how iPads compare and contrast to traditional classroom technology and other methods of teaching and learning such as flashcards and matching pairs exercises.

### *Key research questions*

Key research questions that will inform the research are as follows:

- How can tablet technology impact on the teaching and learning experience of both teachers and learners?
- Does the use of tablet technology create or promote a more inclusive and accessible classroom?
- Does tablet technology have any impact on engagement, participation and motivation of learners with learning difficulties and disabilities?
- Is tablet technology an alternative to desktop computers/laptops or will the technology work in cohesion with traditional classroom technologies?

### *Intended outcomes and products*

At the end of the project it is hoped that members of the teaching team in Foundation Studies will have had *some* experience of using e-learning technology, particularly tablet technology. The opinions and views collected from both learners and teachers will inform what technology, platforms, strategies and apps have been successful. This data will then produce the agenda for a staff development session for all staff including the part time members of staff who will have limited access to the procedures and trials that will be a major part of the project.

A further outcome will be the development of an electronic individual learning plan that will be based either on mobile web technology or mobile application technology.

## **Project Methodology and Approach**

Hitchcock and Hughes (1995. 21 cited in Cohen *et al* 2010) argue that ontological and epistemological assumptions have a huge impact on the methodology a researcher will undertake. Added to this Cohen *et al* (2011) state that the values and beliefs that we hold (axiology) affect the researchers methodological considerations and in turn, data collection methods.

As the author will carry out the majority of research and generate the majority of the data to be analysed an action research methodology will be adopted. Kemmis (1988) states that Kurt Lewin first coined the term 'action research' in 1944. Kemmis (1988) discusses Lewin's notion of emphasising the importance of participants and their involvement in all stages of the research process.

Denscombe (2010) describes action research as hands-on and that it is usually associated with small-scale research projects. McNiff (1988) argues that the social basis of action research is involvement while the educational basis is improvement. McNiff (1988) argues that it is an approach to improving education through change and that it is participatory, importantly, McNiff (1988) emphasises that it is research with rather than on. Elliot (1991) argues that the fundamental aim of action research is about improving practice rather than being used to improve knowledge Cohen *et al* (2011) cites Hopkins (1985) in trying to define action research, defining it as rigorous disciplined enquiry with the aim to understand, improve and reform practice. Another viewpoint is that action research is reflective (Cohen *et al* 2011 citing Kemmis and McTaggart 1992). From a personal point of view, action research has been adopted for a similar reason to the definition provided by Denscombe (2010) and McNiff (1988) though personal reflection will take place throughout the research process.

When discussing the action research model it is worth noting that the majority of the techniques involved will be drawn from the interpretivist paradigm. Kemmis (1988) argues that action research does not have a distinguishable

set of research techniques; diaries, audio recordings and interviews are all mentioned as techniques employed by action researchers, Kemmis argues that generally the research techniques and data analysis methods resemble those employed by the interpretivist researchers.

This point is an appropriate juncture to discuss the issues that surround researching with participants who have learning difficulties or disabilities. A literature review was undertaken into disability research. Kiernan (1999) discusses the origins and issues of people with learning difficulties participating in research. Kiernan (1999) states that social sciences traditionally based research around natural sciences such as biology and physics, research 'on' people rather than research with people. Cohen *et al* (2011) discuss axiology and argue that the beliefs and values that we as practitioners or researchers hold will shape our methodological considerations. This is reflected in Kiernan's (1999) article where it is stated that Kiernan's personal experience of working with people with leaning disabilities shaped his views on institutionalising and developing the skills for children. Kiernan (1999) believes that researchers working with disadvantaged groups will "have as their personal 'mission' to improve the lives of people with whom they work" (Kiernan, 1999 p 44). Kiernan discusses a 'new paradigm' in disability research that places the researcher as a facilitator rather than the 'expert' who controls the research, which in Kiernan's opinion can place barriers between the researcher and the participants.

In terms of data collection techniques Lewis (2002) discusses storycards for accessing the views of children with learning difficulties, this is reflected in the work of Brewster (2004) who discusses the use of talking mats or prompt cards. Both techniques allow learners with LD the opportunity to express how they feel about a subject. Brewster (2004) questions the danger of putting words into their mouths. Both techniques have been adopted in this study, the use of worksheets with simple easy to recognise feelings will be used predominantly with the lower ability entry level one learners. These will be backed up by interviews and observations.

The ethnographic research methods of the interpretivist and action research models are fit for purpose in this research project. The Action research methodology is the most appropriate method in ascertaining and analysing the views of all the stakeholders; a quantitative method would not be feasible in this situation.

### **Data Collection, recording and analysis**

The research was collected during three stages over a four-month period. An initial set of questionnaires and interviews with staff and students took place to ascertain a starting point, the second stage was classroom observations and informal interviews with the final stage being a summary and concluding interviews and questionnaires.

#### *Identifying participants*

As the author was the main researcher two of the author's tutor groups were to form the main participants for the research project. The two tutor groups were of different academic levels, one working towards and Entry Level One diploma in Personal Progress; the other group were a group of learners working at the highest level in Foundation Studies, an Entry Level 3 Diploma in Independent Living. Both tutor groups have very different progression routes and intended outcomes and so the research techniques and project aims differed greatly between the two.

In the Entry Level One group there are 6 learners with differing LD and additional needs. The group consists of learners who are working to a low academic level and have difficulties in communication. Learning difficulties and disabilities (LDD) in this group are classed as profound and severe, learners require additional support through a learning support assistant. LDD's include Autistic Spectrum Condition (ASC), Down's Syndrome and Cerebral Palsy. Lewis (2002) story card method was adopted as one technique of collecting the data while the author also conducted face to face

interviews that were recorded on a Dictaphone to be transcribed and coded through coding software Nvivo.

The Entry Level three group were working at a higher academic level in terms of literacy, numeracy and communication. LDD's in this group also include ASC and also dyslexia. Face to face interviews were carried out with this group of learners, other techniques were an online questionnaire and classroom observations. In total 9 Entry 3 learners participated in the research process.

It was important to ascertain the views of other students so after the initial two tutor groups were identified and the level of participation of staff was ascertained, two more tutor groups were included as participants. One key member of the teaching staff who showed an interest in using technology agreed to use some of the tools within their class. Again this was an Entry Level One tutor group of 7 learners with similar abilities to the aforementioned, the second was an Entry Level Two group that consisted of 11 learners with ASC and other LD.

Further learners identified as participants included two sports sessions with 10 and 8 learners and two media sessions consisting of 11 and 9 learners. The groups mentioned were not involved in any formal interviews, class discussions were recorded and transcribed along with classroom observations. In reflection, these groups could have been followed up with further interviews.

The final participants identified were the author's colleagues in Foundation Studies. As identified earlier, the department consists of 5 full time members of staff (including the author) who teach over a range of specialist subjects. The full time staff are also the personal tutors to both Entry One and Entry Two tutor groups (there is only one entry 3 group, the author is the personal tutor). As well as the full-time members of staff there are 6 part-time members of the teaching staff who are contracted to varying hours, the teacher on a .5 contract has an entry two tutor group. All the part-time staff teach their own



subject specialism including dance, catering and art. Interviews and questionnaires were identified as the most appropriate data collection technique for the teaching staff though informal conversations were included as part of the research process due to time constraints.

### *Data collection and analysis techniques*

All interviews with staff and learners were recorded on a Dictaphone, transcribed and then coded using Nvivo software and a coding system developed by the author. The interviews took a semi-structured technique with the ability to further question and develop answers. Prompts and probes will be used to clarify understanding and to extend the questions to ascertain further data.

The majority of the research was carried out through classroom observations. Cohen *et al* (2011) argues that it offers the researcher the opportunity to collect live data on the physical setting, human setting, interactional setting and programs setting (Cohen *et al*, 2011 456 457 citing Morrison 1993, 80). One limitation to this research method was that the author was still teaching during the research so not all interactions could possibly be collected. Issues that are raised by Cohen *et al* (2011) include selective attention, reactivity and selective memory. These issues all surround the validity of the data collection methods; unfortunately due to time constraints and teaching commitments this method was the most appropriate for this project.

A further data collection technique that was used was an online questionnaire. Again this was employed due to time constraints of both the author and colleagues. This was used to collect straightforward information (Denscombe 2010). The web based questionnaire program *Survey Monkey* was used, the limitation of *Survey Monkey* was that as a free user questionnaires were limited to only 10 questions. Staying with an interpretivist method the majority of questions were open questions with the respondent having to answer.

## **Presentation of Data and Analysis**

### *Overview of presentation of the data*

Cohen *et al* (2011) report that there are seven ways of organising and presenting qualitative data. After examining the seven way it has been decided that the most appropriate was to present the data is the fourth method described by Cohen *et al* (2011) by research question. Cohen *et al* (2011) argue that this approach collects all data from the different collection techniques to provide a collective answer to a research question The presentation will draw attributes some of the other methods of presenting the data such as grouping individual responses and grouping particular issues.

There will be a systematic approach to the data analysis, the data collected from the learner point of view and staff point of view will be compared, individual responses from learners and staff will also be compared to ascertain an overall feel about how tablet technology has been received in the short research period. The responses from interviews and the open-ended questionnaires will also be matched and synthesised with the data collected from observations. Cohen *et al* (2011) discuss the requirement for a reflexive interaction between the researcher and the data due to the inevitable interpretive data analysis of qualitative research. Cohen *et al* (2010) stress the need for caution and self-awareness in analysing data due to the data being driven by the researchers agenda. This has been taken into account and a holistic analysis will be presented.

### *The department and use of e-learning technology*

To gauge where the department was in terms of e-learning utilisation a semi-structured interview was conducted with the four members of full-time teaching staff. The author was to be part of the research project and advocated e-learning technology in all lessons. The author had already implemented a blog for Entry Level 3 learners and had started integrating iPad technology into all session.

The first question that was asked during the semi-structured interview was to ascertain what the full-time members of teaching staff defined e-learning as. All staff hesitated during this initial question and no one answered with a confident statement. Tutor A mentioned the use of Blackboard (the Virtual Learning Environment VLE), Tutor C believed e-learning to be the use of the Interactive Whiteboard (IWB) while Tutor D stated that e-learning is learning that takes place on the computer. Surprisingly, Tutor B couldn't define what e-learning was answering:

“Good question...erm...I don't really know to be honest. Just technology...like...I don't know.” (Tutor B)

The unanimity in hesitation and the vague answers already set the precedent to how e-learning is utilised in Foundation Studies at College A, Tutor A mentioned the VLE and went on to state that the department does not use the VLE but understood its advantages:

“Erm, use of Blackboard, although we don't necessarily do that in our department so Virtual Learning Environments with interactive content so learners can go on line, do activities at home, the technology can assess it. A lot of independent learning I suppose, that's why our learners don't do it.” (Tutor A)

The hesitation and ambiguous answers were contrasted with the second question which was about the tutor's current practice. All four respondents were unanimous in their answer, 100% used the interactive whiteboard in their session. This goes some way to prove that e-learning is a confusing area for people and defining it is even harder. After further questioning the tutors used the whiteboard for different tasks in their sessions, Tutor A used the whiteboard to demonstrate tasks while Tutor B used the IWB for interactive games with learners. This type of learning activity stated by Tutor B is inclusive and accessible for learners and provides an alternative way to approach teaching and learning. Interestingly, tutor C stated that the IWB was used “when they work”. On further questioning Tutor C stated that the IWB sometimes does not work in sessions and this can make the tutor lose confidence and “become flustered”.

Confidence was a theme that emerged from the initial interviews; this could be down to a lack of training for the department. When asked about the VLE Tutor C stated that they had attended a training session once and not really understood what it was and what it was used for. Tutor A stated that the reason for not using technology in sessions is simply due to not knowing which stems from training and time constraints.

**Interviewer:** Are there any reasons why you don't use technology and e-learning in your practice?

**Tutor A:** Because I'm clueless.

**Interviewer:** So it's down to...

**Tutor A:** Training or lack of and then when you've had the training the ability to retain information and have a play with it and get confident

**Interviewer:** So it's confidence as well?

**Tutor A:** Yes

In answering the same question, Tutor B reflected the views of Tutor A stating a lack of training and a lack of confidence to embrace the technology in a session.

...I don't think I've had enough experience and not had enough training I suppose...I don't know what's available I wouldn't feel comfortable getting out of depth in a lesson, I wouldn't want to go exploring in the middle of a lesson and I don't have time to do it in my own time. (Tutor B)

When questioning the tutors about the availability of e-learning technology to the department all respondents mentioned laptops, this prompted further probing to ascertain whether the tutors use laptops in their practice. Table 2 shows responses from the tutors.

**Table 2**

Do you use laptops in your classes?	
Tutor A	"They don't work brilliantly, there is always some confusion around the log ons and they're just pretty old really. I don't know what kinds of programs are on there. We just use Word, Internet, if I cant get onto the internet I just try to use desktops if I can."
Tutor B	"Sometimes...I have used them, they are very slow and unreliable so I try not to where possible."

Tutor C	“They are alright when you can get on them, I don’t know if this is just me but is there a different log in for every single computer in the college?”
Tutor D	“... because they don’t work very well and the technology isn’t good”

As the responses show, all tutors have used laptops as a teaching and learning method in their practice but due to the reliability and age of the technology the tutors try alternative methods, often not based around technology.

When questioned about their personal ownership of tablet technology, all tutors responded positively. Three of the tutors owned or had access to an iPad in their household with the other tutor owning an unnamed android tablet. One of the tutors (Tutor C) who was quite negative about technology throughout the interview actually owned a Kindle and a Kindle Fire as well as having access to an iPad. The ownership of technology is an interesting point as all the tutors saw the benefit of owning emerging technology personally but had not linked the technology to their work. Tutor B mentioned how convenient the tablet was and that it could be taken anywhere, this is the whole premise of m-learning and ubiquitous learning. Tutor D was highly enthused by the iPad stating “Easy, amazing, great” when asked how they found using the iPad at home.

All tutors were unanimous in how they thought learners would feel about having more technology implemented in sessions. Table 3 shows the unanimity in responses including “they’d love it” (Tutor C), “I think they like it, they love it” (Tutor D) and “...find it quite exciting” (Tutor B).

**Table 3**

How do you think students feel about technology in classes	
Tutor A	“They would like to see more of it, they are more interested in it than I am.”
Tutor B	“I think they find it quite exciting, they’ve obviously got experience using it at high school and then they come here and its not as interactive as it could be.”

Tutor C	I think they would love it, its their everyday life isn't it, they own it as well"
Tutor D	"I think they like it, they love it. They like to be using things that's in date"

From the results it is clear that the tutors are lacking confidence and experience in using the technology and when they have utilized technology it can be temperamental and unreliable, something that further affects their confidence. Surprisingly though all the tutors are aware that the learners would appreciate more technology in their sessions and they all own some form of tablet in their personal life so they are aware of the benefits to this technology.

Finally another important theme to emerge from the initial interviews with the full-time tutors was their current assessment methods. Despite the tutors stating that they use the IWB and interactive games all tutors continued to use paper based assessments for summative assessment. All tutors were in agreement that the paper based worksheet assessment method was not appropriate for SLDD learners Tutor A mentioned the VLE for assessments so was aware that there are methods available but said of paper based assessments:

“... there is a place for them depending on the task and at a higher level they need to identify that they've got the various basic skills to be able to use it and use it correctly and give a response at a certain level but generally speaking they're not at the right level, they don't meet our students learning styles.” (Tutor A)

Tutor B was in agreement mentioning that there are learners who “struggle to write”, Tutor B describing this as a “big barrier”. Tutor D did state that worksheets were “adapted for different learners” but went on to say that it isn't as good as using technology to assess.

Closely linked to the aforementioned answers was another point that brought unified answers in that all the tutors believed that using technology would improve their own practice with Tutor A stating that using technology would be more engaging for the learners while Tutor D believed that students answers

could be assessed immediately and the tutor could get an idea of the students capabilities. Poignantly all tutors believed that using technology would improve the learning experience for learners in Foundation Studies.

“...significantly, less of me talking and more of them doing something and me recording that they can do something in a more interactive way.” (Tutor A)

“Definitely, I suppose it can be used in any subject cant it, you just have to do some research and find out what’s available and I think it will make things a lot more interesting.” (Tutor B)

“Definitely, again they are familiar with using that technology and easy for them to use them, it’s there and its fun and they don’t have to do as much writing things down.” (Tutor D)

### *Learner participation and engagement – classroom observations*

A large amount of the data collected was ascertained through classroom observations, predominantly within the author’s teaching practice.

College A has access to four iPads; of the four, two are the latest model (iPad 3) and two are the original generation iPad. The limitation of the original iPad is the lack of camera on the device. The researcher brought in an iPad for the learners to use in conjunction with College A’s iPads booked through the e-learning department.

One of the first themes to emerge from the classroom observations was the speed and ease the learners became comfortable with the technology. In all classes that the iPads were used in across the entry-levels the learners found using the iPads very easy. In all classes the excitement that the learners expressed when entering the room to find an iPad on the table was striking. Learners shouted, “get in” and “wow” as they went straight to the iPads and started to explore and experiment with them. The learners were allowed to ‘play’ with the iPads initially so the author could ascertain the level of ability the learners showed. In all classes, there were ‘leaders’ who emerged from the groups and took instant control of the iPads, these learners were encouraged

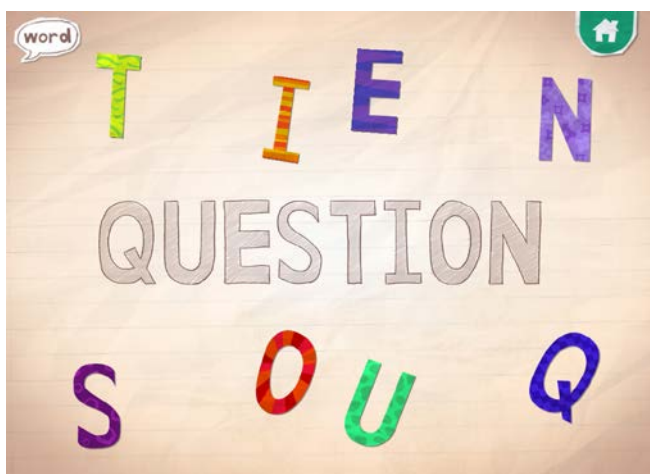
to peer mentor some of the less able learners. The learners who didn't show as much interest were encouraged to use the iPads and all learners took turns in using the equipment.

### *Literacy and Numeracy*

The Entry Level 1 (EL1) tutor group consists of 6 learners with profound and multiple learning difficulties. The initial tasks that were employed for this group were end of session literacy and numeracy tasks.

The availability of apps on the iPad is enormous and one of the most difficult tasks was to select apps that were age appropriate as well as level appropriate for the EL1 learners. The danger was finding apps that were suitable but not age appropriate for learners who are all 16+. Three apps were used over a four week period with the EL1 Personal Development (PD) group, these were 'Endless ABC', 'Little Writers' and 'Telling Time'. Already the name of one of the apps – 'Little Writers' seems inappropriate for learners who are all over 16 years old. The premise and content of the app was useful so the app was utilized. These apps proved very effective for learners working towards literacy and numeracy targets. Traditional methods for learners working towards letter formation and telling the time include paper based worksheets. A screen shot of the apps can be seen in **Fig 1, Fig 2** and **Fig 3**.

**Fig 1. Endless ABC**



The detailed observation report for all observations and assessments can be found in **Appendix 4**.

Endless ABC was used as a joint team teaching activity between both EL1 PD groups. Learners were required to make up the

word using the letters that had scattered across the screen. This mad



use of the iPads touch screen drag and drop functionality. While learners who had issues with fine motor skills struggled initially, they improved as the activity went on. The activity lasted for 35 minutes and all the learners were engaged and actively participating for the duration of the activity. The iPad was linked up to another Apple consumption device, Apple TV. This allows the iPad screen to be wirelessly mirrored onto a larger external screen. All learners were watching the main screen and learners were encouraging and helping the active participant so peer learning was promoted, this helped learners work collaboratively. Another positive to emerge from the activity was that the task could be differentiated and using the longer and more difficult words that were built into the app could stretch more able learners. One of the limitations was that once the words had been exhausted there were no more for the learners to try, the producers of the app update the app fortnightly although there are only three or four more words added. Another negative about the app was that the words were spoken in an American accent; this is only a minor issue but was mentioned by Tutor B who worked with the author for this task.

**Fig 2. Little Writers**

The second task with the E1 PD group was using the 'Little Writers' app. As previously mentioned the name of the app was not very age appropriate and this concern was raised by Tutor B and the Learning Support Assistants (LSAs) in the class. Again the two E1 PD groups were joined for this task.

This app involved learners following the prompts in order to correctly write out a letter. The less able learners improved considerably throughout this task and the Apple TV link up was utilized so all learners could help, support and encourage the learner who was actively participating.

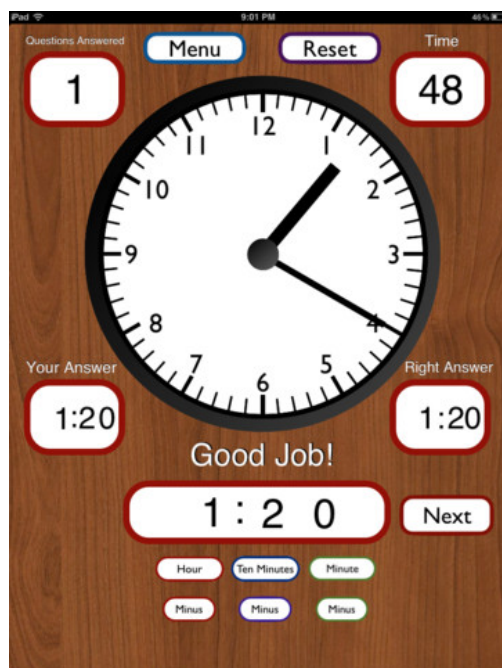


In terms of engagement and participation, the learners were not as engaged as with 'Endless ABC', though even the more able learners embraced the activity. Unfortunately there was not real method to differentiate the activity for the learners.

A major positive to emerge from using this app was that the learners were far more motivated in their quest to write out the letters. This was a view echoed by Tutor B who commented on how the less able learners were enthused by the app. Obviously there is a place for more traditional methods of letter recognition, however this brought an element of fun to a usually dull activity. One of the LSAs commented that the letters were being formed using the touch screen and the learners finger. This was a valid point as a lot of letter formation relies on the use of a pen. To counteract this problem a stylus was purchased so learners could form the letters with the aid of a pen like stylus.

The final app used for working towards targets was the 'Telling Time' app. Again this was a free app from the Apple App Store.

**Fig 3. Telling Time**



In previous sessions, learners working towards a time based target have utilized the IWB and played various interactive games. These games have always proved effective and beneficial to the learner while being more engaging than traditional worksheet methods. 'Telling Time' proved to be as effective as the IWB games but had the added positive of being on an interactive device in front of the learner rather than on the IWB in front of the whole class. The Apple TV

device was again utilized so all the class could see the learners progress as they worked through a series of generated tasks.

A group of 3 learners were given worksheets while a second group of 3 learners were given the iPad to use. The learners with the iPad found the instant feedback an important feature as the worksheet method required a tutor to mark each question. Learners participate in both tasks and were unanimous in their praise for the iPad. This method would be even more effective if the learners had an iPad each rather than taking turns.

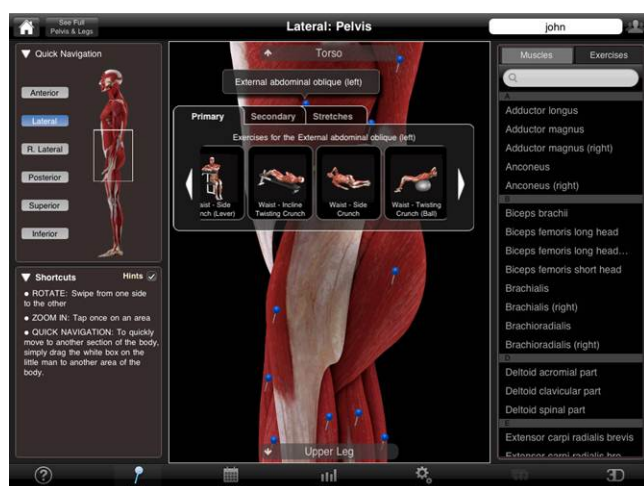
The IWB games included an interactive game called 'Stop the Clock', the makers of Stop the Clock have released the game as an app for the tablet, while this isn't a free app the 69p was very cost effective. From a teacher point of view it transferred all the interactivity of the IWB into a portable device that was in front of the learners.

## Sport

To move away from personal development, the author chose to implement an iPad activity into a sports session. The learners were working towards using the gym and in previous sessions an activity used was to go onto the computers and find out muscles and workouts for these muscles.

After a quick search the author found an app called iMuscle. This was a paid app at £1.99, but again proved very cost effective and used all of the iPads interactive features

**Fig 4. iMuscle**



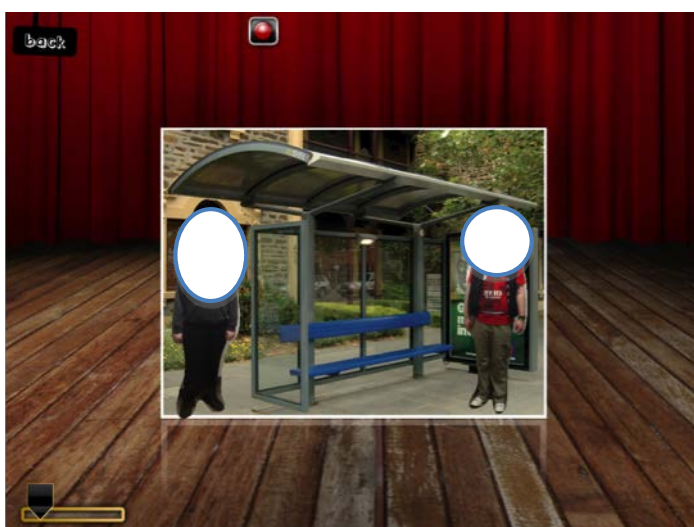
The task asked learners to identify a part of their body they would like to work on, they then identified the muscles and the app demonstrates a number of ways to warm up and then work on the area of their body.

All learners were engaged throughout the activity and the blended learning approach was extremely effective. Learners used their fingers to zoom in and out of the interactive body and look for different exercises that would be suitable for them, this proved to produce a very inclusive and personalized session. Apple TV was linked so learners could view the activities that they had chosen and give feedback to others. The app promoted learner collaboration and peer learning as the more able learners helped the less able learners in identifying the muscles and workouts and also with spelling. The activity lasted around one and a half hours and learners kept on task and motivated throughout the session. A copy of the worked produced by one of the learners can be found in **Appendix 5**.

### *Puppet Pals, iMovie, Aurasma and QR Codes*

When discussing Blooms Taxonomy and how the iPad fits into an education context these 'content creation apps' proved that there is a place for this form of technology in sessions.

'Puppet Pals' is a content creation app where the learners can easily superimpose their body into a range of situations. This gave us the ability to complete assessments in various locations without leaving the classroom. The EL1 learners used 'Puppet Pals' to simulate the steps required to see a doctor,



from booking the appointment on the phone, to actually talking to the doctor and picking up a prescription. This observation for the EL1 group lasted over a three-week period where learners used the iPads to research and then produce a script.

Puppet Pals then records the voices of the learners while the learners can

animate their photographs, moving them whilst the app records motion and sound.

A key theme that emerged from the EL1 group were that all learners were willing to participate including one of the learners Paul (not the learners real name) who would usually refuse to take part in any filming or have picture taken. To see Paul participating with the whole group justified the activity and the recordings were saved onto a USB memory stick for internal and external verification. This form of assessment process removed the learners from the traditional worksheet method and provided the learners with something to watch at the end of the session.

The Entry Level 3 (EL3) learners were less engaged using 'Puppet Pals' though when given the choice between a worksheet and creating a Puppet Pals movie to summatively assess an assertiveness unit six out of nine learners opted to make a Puppet Pals movie, based on 3 scenarios of passive, aggressive and assertive behaviour.

Again a theme to emerge from the use of Puppet Pals was the ease in which the learners took to using the software and the way they collaborated with each other. This was much more evident than in previous sessions when learners worked individually on worksheets or through workbooks.

iMovie is another content creation app that works as a piece of editing software. This app was the most utilized app by the author and also an app that Tutor B and Tutor C implemented into their own practice. This app was used to produce learner movies based on independence and diversity for the EL3 group and the EL1 group used the iPads and iMovie to create a video explaining the fire evacuation procedure and a news item based on their rights and responsibilities. The results were very interesting, especially for the EL1 group who retained more information at the end of the session than they have demonstrated in the past. All 6 learners could independently explain the fire procedure step by step and could list their rights and responsibilities. This is in contrast to previous sessions that have explored the same topics. One of the

EL1 learners remembered all the steps for the evacuation procedure two weeks later when questioned and attributed this to creating the video. Obviously there is nothing to compare this data against but the activity proved to be very successful.

Finally, the use of Augmented Reality proved to be a successful tool in both teaching, learning and assessment. Aurasma is a free app that uses augmented reality, a mixture of real life and a virtual world. This was used in all classes and although some see it as being quite gimmicky, all staff agreed that it was a useful tool and very easy to use. Learners produced a self portrait and then used this as a trigger image for a video that they created all about themselves. Previously this has been assessed through worksheets, the iPad activity allowed learners to express themselves more, they also had the confidence to be filmed whilst talking about themselves. Aurasma overlays the video on the still image creating an interactive and virtual gallery, again this proved to be very successful as the learners could see results almost instantly.

All observation reports can be found in **Appendix 5** but to summarise, from an observers point of view, learners appeared to be much more engaged and motivated using the iPads and apps. Even for research-based tasks learners preferred to use the iPads to look on Google rather than the desktop PCs. The apps proved inclusive and personalized as well, particularly the content creation apps where learners could apply their knowledge into creating videos that they then could watch back and enjoy, giving other learners feedback. From the observations, peer learning emerged as a theme and while some learners adopted the role of the 'digital leader', they encouraged and supported the less able learners. This contrasted with tasks that were observed before the iPads were introduced when learners worked individually on worksheet based assessments.

### *Learner opinions and views*

During the second month of using the iPads with the EL3 group a focus group took place in one of the group tutorials, this was originally set to be a semi

structured interview but the group activity seemed more appropriate to ascertain the views midway through the research. The focus group started with them working in three groups of three and mind-mapping their feelings about how the use of iPads had impacted on their learning experience. The group then fed back to the author who recorded the discussion and transcribed the responses.

Almost all responses to how they found the iPad were positive. One of the themes to emerge was their superiority to using computers. This was mirrored to one of the major positives being that they were better than worksheets. These two answers with four of the learners mentioning that the iPads were faster, and better than computers with three of the learners stating that they were better than working using worksheets.

Another theme that stemmed from the group discussion was the interactivity of the iPads

“They are more interactive and easy to handle, they are fun”  
(EL3 Learner)

“I like using iPads because they are faster than computers, they are more interactive” (EL3 Learner)

On describing one activity where learners were asked to identify destinations and features of the Northern Rail transport map one of the learners stated that it was really easy to zoom in and out of the map, comparing to a desktop computer saying that on a PC you would have to scroll up and down and use the magnify feature whereas the iPad is much more interactive, and ultimately faster in completing work. Another learner who completed the map exercise on paper as well as the iPad said that they struggled to read the paper map but the zoom feature of the iPad made it much easier to work with.

Interactivity was brought up again at the end of the research period during an online questionnaire with learners repeating their original feelings about the interactive nature of the iPad



The fun element is interesting as gamification is one of the latest trends to be adopted by innovators and educators, some would argue that game style sessions have taken place throughout the history of education.

One of the EL3 learners stated how it made them “enthusiastic about learning” while another learner stated they are “the best thing I’ve ever done”. In terms of education, an EL3 learner stated that they were “easy to learn from” and there was a “good choice of apps” available to them for education.

All the responses tied in with the observations in that learners were motivated and engaged, the statement about being enthusiastic about learning underlined the field notes collected during the observations. One of the learners who has ASC stated that they “dawdle on worksheets” and that using iMovie and Puppet Pals made them want to work harder and complete tasks.

Not all the points were positive. One of the male learners described Puppet Pals as childish but contrasted this statement by stating that he enjoyed seeing his character animated and on the screen in different scenarios. One of the learners preferred worksheets as they thought writing it out was faster than filming it and editing the footage.

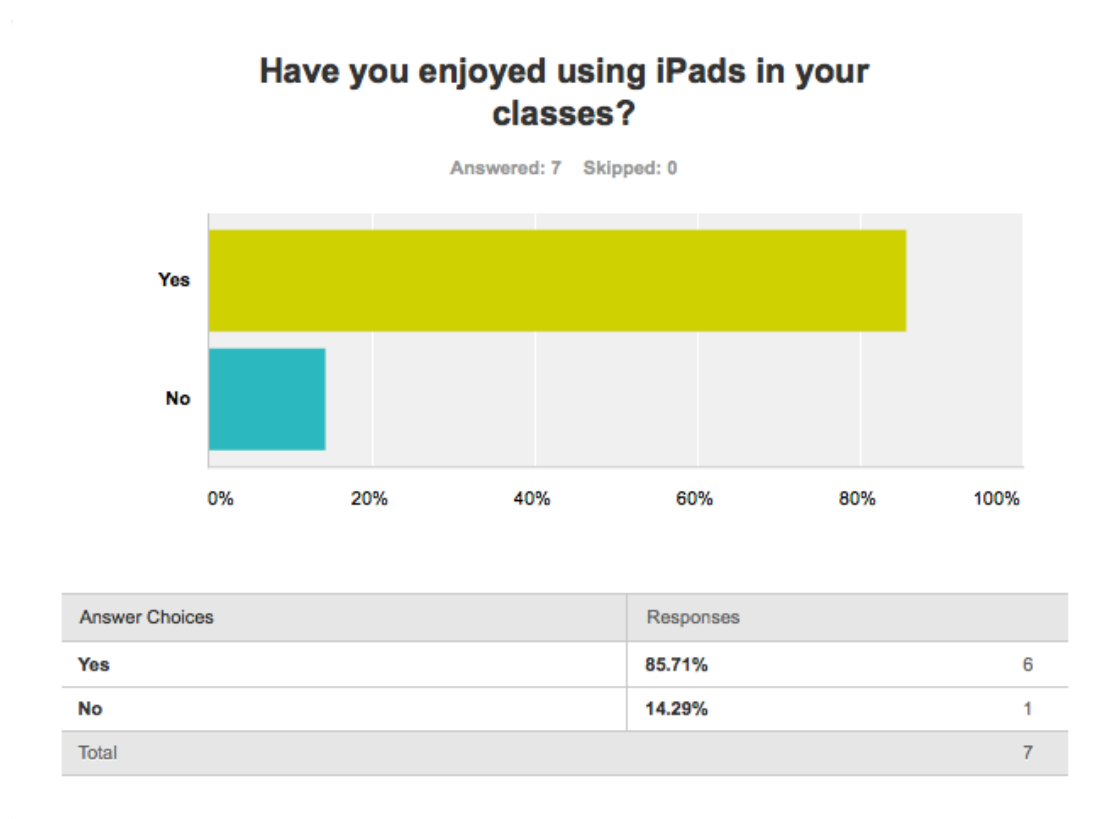
Another theme that emerged from both staff and learner interviews and discussions was that the lack of iPads available to the department hindered their work. From an author and tutor point of view this is a valid point. Within the authors own practice a task based on iMovie was part of a departmental observation. The feedback from the observer was that due to only having 3 iPads that supported iMovie not all learners could possibly be engaged. Peer learning was encouraged but learners did become disinterested when they were not using the iPad but had to work on paper. Another issue raised by the EL3 learners was that the apps could be quite temperamental and not always work, this will be discussed in the limitations section.

The EL3 learners were asked to complete an end questionnaire online. Unfortunately on 7 of the 9 learners responded due to holidays.



When asked if they had enjoyed using the iPads six replied positively with one negatively. When questioned as to why the response was negative the learner stated that they preferred to use their laptop which had a tablet functionality with the screen separating from the computer.

### Chart 1



### *Bring your own device (BYOD)*

Three of the respondents mentioned BYOD as a positive to using iPads in classes. Out of the 9 learners in the EL3 group 4 regularly brought their own personal iPad. This is a major issue that most colleges and institutions face at present and most have a BYOD policy that covers access and what can and cannot be done on their own device. At present College A does not have a BYOD policy and iPads were brought at the learners and parents/carers discretion. It is a major point though as learners felt like they had ownership of their sessions and simple research tasks could be carried out without having to log onto a computer or visit a room with a computer in. Learners could also

use the integrated camera technology for tasks which reduced the need for other equipment.

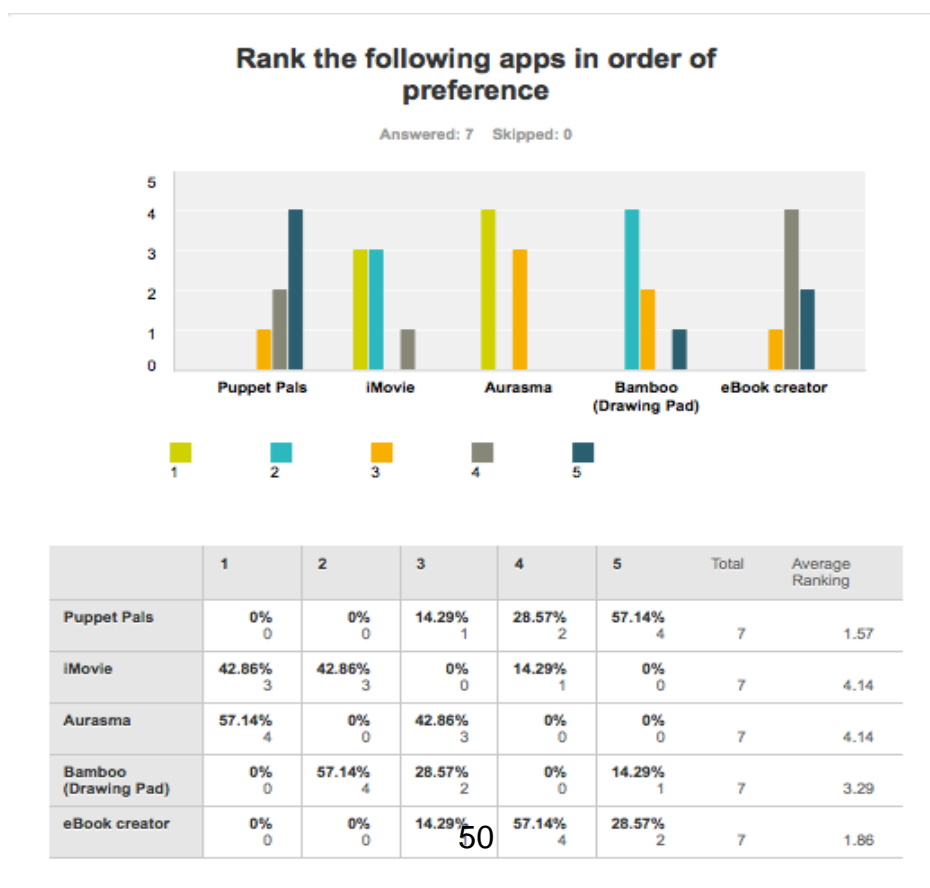
### Portable

Another positive mentioned by the learners was how portable the iPads were. From an observational point of view it was interesting to see how learners could complete work outside of the classroom and take photographs and videos on their iPads to further evidence work. Learners stated that they could complete tasks at the desk without having to go to other rooms and they can move around the room and still be connected to peripherals wirelessly.

### Content creation

The content creation apps Aurasma and iMovie were the favourite apps for the EL3 learners, **Chart 2** shows learner responses when asked what the most useful app that they had used.

**Chart 2**



When asked why Aurasma and iMovie were the preferred app the learners discussed the interactivity and how easy the apps were to create something that they could look back on and show to peers, family and friends. They stated that they don't always have the opportunity to show work to people at home but with a video they could store it on their own memory stick and show parents and friends.

**Table 4**

	1	2	3	4	5	Total	Average Ranking
The iPad is portable, we can use it anywhere	28.57% 2	28.57% 2	0% 0	28.57% 2	14.29% 1	7	3.29
The iPad has lots of things in one, we don't have to use lots of devices	28.57% 2	0% 0	42.86% 3	14.29% 1	14.29% 1	7	3.14
The iPad has a touchscreen	0% 0	14.29% 1	14.29% 1	42.86% 3	28.57% 2	7	2.14
The iPad is cool	28.57% 2	14.29% 1	28.57% 2	0% 0	28.57% 2	7	3.14
The iPad is easy to use	14.29% 1	42.86% 3	14.29% 1	14.29% 1	14.29% 1	7	3.29

### *Apple TV*

Apple TV proved to be an effective tool that worked alongside the iPads during sessions, the learners stated that it was beneficial to see a demonstration on the television before completing the task themselves.

“Apple TV is useful for e-learning, due to being able to use the iPad to demonstrate everything from work - pictures and fun/games. It helps provide more activity and engagement.” (EL3 Learner)

“It was a great and interactive experience” (EL3 Learner)

“it was fun to use because it was better [sic] to look at the big tv” (EL3 Learner)

“I thought it was really good because I can show whats [sic] on my ipad on a big screen” (EL3 Learner)

“Amazing. You could use any apple iPad to connect it to the TV and everyone could see what that iPad was showing.” (EL3 Learner)

“The Apple TV is very interesting and you can display your iDevice on a TV screen” (EL3 Learner)

Only one learner from the EL3 group was negative about the Apple TV saying it was “boring”. From a practitioner’s viewpoint, Apple TV proved invaluable and in essence gave all the learners an IWB on their desk. It was also effective in demonstrating tasks and keeping learners motivated and engaged.

Surprisingly though, from all the positives to emerge from interviews, questionnaires and observations, when questioned 3 out of 7 EL3 learners would prefer to use laptops in the classes. Unfortunately this question was not followed up due to time constraints but it certainly contrasts with the data generated from aforementioned methods.

The EL1 learners were unanimous in their praise for the iPads in sessions though the lower level learners didn’t express themselves as thoroughly as the EL3 learners.

All learners identified the iMovie activities as their favourite as it was a “different way of doing work”, one of the learners stated that the iPads helped as it “helped the group work as a team”. Reflecting the views of the EL3 learners one of the EL1 learners stated that “we could do with one each”.

“It is so much better, it helps you...it is really easy to use. I’ve enjoyed everything, making the movies...it has helped me concentrate.” (EL1 Learner)

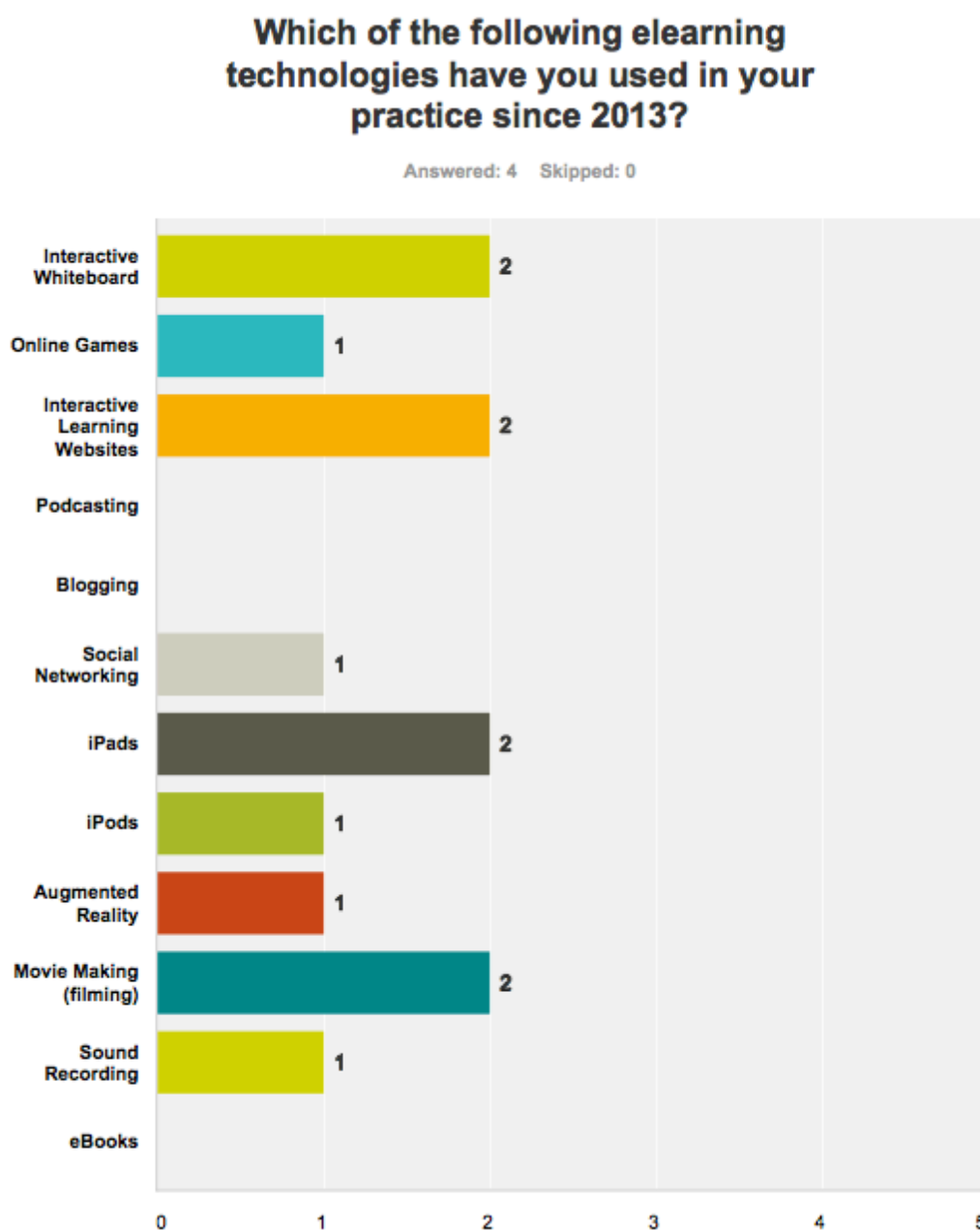
### *Staff perspectives*

After the initial staff interviews at the beginning of the research process a final questionnaire was issued to the full time staff. Two of the full time staff had utilized iPad technology in their sessions while the other two members had chosen not to during this research period. The results were interesting in

comparison to the learners responses and to the responses of the initial interviews.

Chart 3 shows the different technology that the tutors have used since the initial interviews in January. The responses from the interviews were that all tutors used IWB but little else. In the five months that followed e-learning technology utilization had improved.

**Chart 3**



When asked how implanting e-learning into sessions had been successful a similar set of themes emerged. “Interactivity”, “engaging” and “fun” were words used to describe the success, these themes are consistent throughout the data with all stakeholders mentioning the positive outcomes.

In stating the limitations to using tablet technology in sessions all staff were unanimous, the number of equipment available to the department instantly put practitioners off. After talking to the tutors they said that for research based group tasks they would consider using the iPads but as there aren’t enough for one iPad per learner, some would not be engaged. The tutors discussed the idea of BYOD but again this could bring issues of the digital divide and the lack of BYOD policy could raise further concerns from a management perspective.

All staff stated that given training and support they would all consider implementing iPads in their sessions, particularly after seeing results generated from this project, which have been cascaded to staff throughout the project.

### *Learning Support Assistants*

To get a further viewpoint it was important to ask the LSAs who supported the learners in question. They had been in the room observing the engagement and participation of the learners.

Mirroring the views of the tutors and learners and also comparing with the data from the observations the LSAs noticed the level of participation had improved across the levels.

“They were enthusiastic and willing to work, much more than on paper based tasks” (LSA EL3)

“The iPads encouraged the learners to try activities they would normally be negative about” (LSA EL3)

“I think the students approached the session with enthusiasm, they seemed enthused by the equipment” (LSA Sport EL1)

“Learner participation has improved, the learners in the group do join in but the ease in which they participate has shown” (LSA EL1)

The LSAs also mentioned the touchscreen interactivity and also the success of using iMovie as a teaching, learning and assessment tool.

Once again the limitations were identified as a lack of equipment, LSA EL3 stating “it would help them much more if they had one per student.”

### *Limitations*

While the outcomes have been extremely positive from the research project there have been limitations.

### *Compatibility*

Nearpod is a free presentation app that would have been an extremely useful tool for teaching learning and assessment. To describe it briefly, the tutor has an teacher’s app that controls the screens of the learner’s app. Polls, quizzes and interactive drawing activities can be used to assess learning while presentation slides can help teaching. Unfortunately the Nearpod app was not compatible with College A’s network infrastructure due to the large amounts of data it sends between devices every second.

College A has a main central ICT support service that support the college and have to deal with a large amount of requests and complex issues. Unfortunately while the ICT support service do respond to logged jobs relatively quickly, a job to open up the access port was far to large to oversee in the short amount of time available.

Compatibility was a concern throughout the project. One of the research questions was based around accessibility and there was an app that focused on speech and dictation.

'Dragon' a dictation app and a 'text to speech' app were intended to allow EL1 learners who have communication difficulties. The text-to-speech app allows learners to type out statements and the app speaks the sentences out. In contrast the Dragon dictation app allows learners to dictate to the iPad and the app converts the speech into text. Again, the network would not allow these apps to work due to the data flow and restrictions on passwords and accounts.

While the convergence of technologies was a major positive to emerge from the project, the YouTube app failed to work with the infrastructure. If a task involved watching a video learners would need to log onto a laptop or desktop computer.

### *Number of devices*

This was a key theme that emerged from all the data. It was omitted from the observations section to be included in the limitations.

When discussing the level of engagement, at times learners became disengaged or unmotivated when they weren't using the iPads. Tasks had to be designed around the lack of equipment although for the EL3 learners the BYOD brought light relief to the lack of device issue.

### *Cost*

At £399 per unit for an iPad or £269 for an iPad mini (Apple.com 2013) the cost to purchase enough devices for a department would be quite considerable. Added to this is the price per device of the paid for apps such as iMovie, Puppet Pals and iMuscle.



## **Conclusions and Recommendations and Implications**

This research project has produced many positive results and a list of recommendations and implications has been drawn together to take the project and the department to the next level of e-learning.

The learners have shown an increased level of participation and engagement when using the technology. Learners have expressed their enthusiasm for learning when using iPads as a teaching, learning and assessment tool. All data has shown that traditional methods do have a place in assessment but are not always personalized and inclusive and a mixed method is certainly more personalised and enjoyable for learners across the academic levels offered within Foundation Studies at College A.

It is very important to state that while the iPads have provided very positive results the technology is not intended to take over teaching, learning and assessment. iPads should be seen as another tool in the teacher's toolkit, and one to help and support the learning process of SLDD learners.

During this research period, all learners across the entry levels have had access and used other e-learning technologies such as blogs, eBook creators and podcasting. The future shouldn't be simply using iPads but using e-learning technologies to offer a diverse range of teaching, learning and assessment methods.

### *Recommendations*

The main recommendation for the department is to invest time in training and supporting both the full-time and part-time staff in the different e-learning technologies. All staff showed an interest in using the technologies and were unanimous in the view that technology would improve the learning experience for SLDD learners in Foundation Studies. As a result of the project the author will plan and facilitate a staff development day showcasing the different technologies available and giving subject specific scenarios for the tutors and

staff to get a first hand experience of the technology. Further staff development days have been planned that include a road show provided by Jisc, this includes Jisc providing equipment and case studies to present the use of e-learning technologies in an SLDD setting. The plan for the staff development day can be found in Appendix 6

Another recommendation would be to invest in the tablet technology; while cost has been identified as a limitation the devices have a long life and would need replacing in five years. The results from the research have proven that learners are enthused about coming to the department when using technology, particularly new and emerging technology such as the iPad.

The Gartner hype cycle shows tablet technology climbing up the slope of enlightenment and as more professionals and practitioners gain experience and further academic articles are published the positive results to emerge from this project will only get better. Added to this the development of applications by education professionals will improve the experience further.

A further recommendation would be the development of an electronic individual learning plan (eILP) that would use the interactivity of iPads and provide a much more accessible and inclusive learner voice. The eILP will draw upon the positive attributes of the apps and mobile friendly websites that have been encountered throughout this project. The initial stages of development can be found in Appendix 7.

The central ICT support team will be invited to meet with the author in an attempt to open the internet proxy settings to allow the applications that were incompatible to be utilized.

### *Implications*

The implementation of tablet technology within Foundation Studies will have implications from a leadership and management point of view. A 'digital leader' is recommended as a role within the department as a supportive position for

members of the teaching team to seek advice and support. A number of training sessions will also need to be scheduled throughout the academic year to share good practice and ensure that the department is working towards the College's e-learning strategy.

Tutors should endeavor to utilize some form of e-learning technology in all sessions where appropriate; the digital leader and manager of the department could monitor this.

The research findings have been disseminated throughout the process with close links between all full time tutors. Due to time constraints the part time staff have not been participants in the research process, as a result the data and key themes will be disseminated to all teaching and managerial staff during a staff development day at the beginning of the next academic year. Further stakeholders who may be interested in the findings would be the e-learning department who control the e-learning devices. One positive to emerge from the research is that the e-learning team purchased two Apple TV devices and showcased them at a cross college staff development day. Further iPads could be purchase by the e-learning department if not Foundation Studies.

### *Evaluation*

The research process has provided very positive results regarding e-learning. Learners have demonstrated a willingness to learn and participate and the use of tablets have aided this participation. Learners who would usually be unmotivated and negative in classes showed a marked improvement in tasks and using different teaching, learning and assessment methods not only gave a diverse and engaging learning experience for the learners but also added fun to teaching.

The willingness for the members of teaching staff to embrace technology also grew throughout the project and will hopefully be taken forward into the next academic year and into the future, ultimately creating a more accessible, inclusive and fun curriculum for SLDD learners that is not solely based on

technology but uses technology as a tool to support teaching, learning and assessment.

## **Products Processes and Solutions**

As a direct result of the research undertaken in this project a staff development session has been devised for all teaching staff to participate in during the first week of the new academic year 2013/14.

The staff development day will take into consideration a range of e-learning tools and strategies that will improve the learning experience of learners who will be enrolling onto Foundation Studies. E-Learning tools will be:

### *iMovie and Puppet Pals*

Following the success and feedback from using iMovie and Puppet Pals on the iPad a range of scenarios will be offered and staff will aim to identify an e-learning strategy to teach each situation.

The interactivity and ease of use that iMovie and Puppet Pals brings will make these apps easy to integrate into practice. These content creation apps could substitute worksheets that ask learners to express opinions or in various social situations that learners are required to demonstrate appropriate behaviour in.

### *Futaba*

Futaba was an interactive game for up to four participants, tutors create multiple choice questions that can include picture prompts for less able learners. Learners then play against each other and against the clock to score as many points as possible. This is an alternative to standard quizzes and can replace or work alongside PowerPoint quizzes.

### *Issuu – eBooks*

Issuu.com was not included in the research process but is an excellent tool to create interactive online eBooks. A blended approach can be included in this method with worksheets or learner written work being scanned in and

uploaded onto the Issuu site. eBooks can then be viewed on iPads smartphones and shown outside of the classroom.

### *Aurasma*

Augmented reality was only briefly investigated during this process but has since been looked at in more detail by the author. An Aurasma suite allows users to create trigger images that can be used on all devices under a channel much like YouTube. Worksheets can be made interactive with learners using a device to follow instructions, this promotes independence and ubiquitous learning.

While these are only a few of the e-learning technologies and strategies that have provided positive results, there are many more that can be explored. At this point it is important to grasp the tutors attention and provide support to give confidence to the tutors who stated a lack of confidence and training as the main reason they don't use technology in their practice currently.

The second product that has emerged from the research is the design and the development of an eLLP.

The current methods reflect the paper based assessment methods that both staff and learners often struggled with. A breakdown of the design can be found in the Appendix.

The eLLP will provide a target tracing functionality which will give learners the ownership of their targets. Learners will be able to use their smartphone or tablet to take a photograph or video and upload it themselves onto the eLLP. This gives learners ownership of their targets and promotes ubiquitous learning. The eLLP will also encourage collaboration between parents and carers as well as a multi-agency support with all agencies working together towards the same targets.

## **Evaluation**

To monitor and evaluate the products and processes a further qualitative action research method will be undertaken. The data generated from the eILP will be used to gauge the effectiveness of the software. Learners will form a key focus group as the eILP is based solely around the learner voice and the learner journey.

Regular staff development meetings will be scheduled throughout the year giving the tutors the opportunity to disseminate their findings and share good practice. Not all e-learning technology is successful as demonstrated during this project so sharing successes and failures will be beneficial to the department.

The eILP will require a more mixed method approach to research, possibly leaning to a more quantitative methodology. Where Hitchcock and Hughes (1995) discuss epistemology and axiology, the author will be required to embrace the quantitative method.

Stakeholder participation will need to include the Quality Assurance team at College A. The College currently has an eILP system that is not suitable for SLDD learners so the Quality Team will need to be involved at all stages during the trial and implementation of the SLDD eILP. The central ICT support team will also be a key stakeholder. Data extractions and administration will be necessary at the initial stage of implementation so have the central ICT support team is vital.

## References

Apple (2010) *Apple Press Info – Apple sells Sells One Million iPads* Available at: [://www.apple.com/uk/pr/library/2010/05/03Apple-Sells-One-Million-iPads.html](http://www.apple.com/uk/pr/library/2010/05/03Apple-Sells-One-Million-iPads.html) Accessed 10th February 2013

Apple (2013) *Q1 2013 Unaudited Summary Data* Available at: [://images.apple.com/pr/pdf/q1fy13datasum.pdf](http://images.apple.com/pr/pdf/q1fy13datasum.pdf) Accessed

Bennett, S., Maton, K. and Kervin, L. (2008), The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39: 775–786.

Brewster S J. (2004) Putting words into their mouths? Interviewing people with learning disabilities and little/no speech. *British Journal of Learning Disabilities* 166-169

Clark, R. E. (1983) Reconsidering research on learning from media. *Review of Educational Research* 53, 445 – 459

Cohen, L and Manion, L. and Morrison, K. (2011) *Research Methods in Education, 7th Edn*, London: Routledge.

Conole, G Dyke, M Oliver M Seale J (2004) Mapping pedagogy and tools for effective learning design *Computers and Education* 43 p 17-33

Denscombe, M (2010) *The Good Research Guide For Small-Scale Research Projects*, Edn Open University Press

Digit\*Ally (2012) *Gartner's 2012 Hype Cycle for Emerging Technologies*. Available at: [://www.digit-ally.co.uk/gartners-2012-hype-cycle-for-emerging-technologies/#axzz2YrTSgrgO](http://www.digit-ally.co.uk/gartners-2012-hype-cycle-for-emerging-technologies/#axzz2YrTSgrgO) Accessed June 2013

e-learning Stuff (2013) *The iPad Pedagogy Wheel* available at : <http://elearningstuff.net/2013/06/23/the-ipad-pedagogy-wheel/> Accessed on June 2013

Edyburn, D.L. (2001). Critical issues in special education technology research: What do we know? What do we need to know? In M. Mastropieri, & T. Scruggs, (Eds.), *Advances in Learning and Behavioral Disabilities* , Volume 15, NY: JAI Press, pp. 95-118.

Elliot, J. (1991) *Action Research for Educational Change* Buckingham, Open University Press

Foley, A. and Ferri, B. A. (2012), Technology for people, not disabilities: ensuring access and inclusion. *Journal of Research in Special Educational Needs*, 12: 192–200



Gibson, I. W (2001) At the intersection of technology and pedagogy: considering styles of learning and teaching, *Journal of Information Technology for Teacher Education*, 10:1-2, 37-61,

Hofmeister A M. (1984) The special educator in the information age , *Peabody Journal of Education*, 62:1, 5-21

IMS Global Learning Consortium (2004) *IMS Access For All Meta-data Overview* available  
at: [://www.imsglobal.org/accessibility/accmdv1p0/imsaccmd\\_oviewv1p0.html](http://www.imsglobal.org/accessibility/accmdv1p0/imsaccmd_oviewv1p0.html)  
accessed 26th June 2013

Jonassen, D H, Howland, J, Moore, J, Marra, R M. (1999) *Learning to Solve Problems with Technology A Constructivist Perspective* New Jersey, Pearson Education

Kelly, B., Phipps, L., & Swift, E. (2004). Developing a holistic approach for e-learning accessibility. *Canadian Journal of Learning and Technology*, 30, 3

Kemmis (1988) Action Research in Cohen, L and Manion, L. and Morrison, K. (eds) (2011) *Research Methods in Education, 7th Edn*, London: Routledge.

Kiernan, C. (1999), Participation in Research by People with Learning Disability: Origins and Issues. *British Journal of Learning Disabilities*, 27: 43–47.

Koohang, A, Riley, L, Smith, T (2009) E-Learning and Constructivism: From theory to application *Interdisciplinary Journal of E-Learning and Learning Objects* 5 p 91-109

Lewis, A. (2002) Accessing, through research interviews, the views of children with difficulties in learning. *Support for Learning* 110 - 116

Linden, A , Fenn, J (2003) *Strategic Analysis Report 2003 Understanding Gartner's Hype Cycles*

Littlejohn, A, Pegler, C (2007) *Preparing for Blended e-learning* Oxon Routledge

Mason R and Rennie F. (2006) *Elearning The Key Concepts*. Oxon: Routledge

MAYES, J.T. & FOWLER, C.J.H. (1999) Learning technology and usability: a framework for understanding courseware. *Interacting with Computers* 11, 485-497,

McNiff, J. (1988) *Action Research Principles and Practice* London, Routledge

Melhuish K and Falloon G (2010) Looking to the future: M-Learning with the iPad *Computers in New Zealand Schools: Learning Leading Technology* 22 (3) p

Murphy, GD 2011, 'Post-PC devices: A summary of early iPad technology adoption in tertiary environments', *E-Journal Of Business Education & Scholarship Of Teaching*, 5, 1, pp. 18-32

Murray, O, & Olcese, N 2011, 'Teaching and Learning with iPads, Ready or Not?', *Techtrends: Linking Research & Practice To Improve Learning*, 55, 6, pp. 42-48

Ofcom (2012) *Communications Market Report 2012* Available at: [://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/CMR\\_UK\\_2012.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/CMR_UK_2012.pdf) Accessed 30th June 2013

Porter, J Ovry, C, Morgan, M, Downs, C. (2001) Interpreting the communication of people with profound and multiple learning difficulties *British Journal of Learning Disabilities* 29, p12-16

Prensky M, (2001) *Digital Natives, Digital Immigrants Part 1*, On the Horizon, Vol. 9 Iss: 5, pp.1 – 6

Seale, J, Cooper M (2010) E-learning and accessibility: An exploration of the potential role of generic pedagogical tools *Computers & Education*, Volume 54, Issue 4, Pages 1107–1116

Seale J, Draffan E A, Wald M (2010) Digital agility and digital decision-making: conceptualising digital inclusion in the context of disabled learners in higher education *Studies in Higher Education* Vol. 35, Iss. 4,

Topping K and Maloney S (2005) *The RoutledgeFalmer Reader in Inclusive Education* London: Routledge

Upadyay, N (2006) M-Learning – A new paradigm in education *International Journal of Instructional Technology and Distance Learning* 3:2 p27-33

Wehmeyer, Michael L.; Tasse, Marc J.; Davies, Daniel K.; Stock, Stephen (2012) Support Needs of Adults with Intellectual Disability across Domains: The Role of Technology *Journal of Special Education Technology*, v27 n2 p11-21

Whalley, J, Welch, T, Williamson, L (2006) *E-Learning in FE* London Continuum International

Woodward J; Rieth H (1997) A Historical Review of Technology Research in Special Education *REVIEW OF EDUCATIONAL RESEARCH* 67: 503