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Developing Digital Fluency in Higher Education: a study in the acquisition of digital capability by academics in Irish higher education settings.

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This thesis is submitted to University College Dublin in fulfilment of Requirements for the Award of Doctor of Philosophy in The National University of Ireland

September 2018

Research supervisor: Conor GALVIN, PhD (Cantab)
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Abstract

Developing Digital Fluency in Higher Education: a study in the acquisition of digital capability by academics in Irish higher education settings.

Higher education is facing the challenges of a growing and diverse student body and the potential of digital technologies for their learning. Digital fluency has become a major concept in technology enhanced learning (TEL) research, as digitally fluent educators can use TEL at the highest cognitive levels. This thesis contributes to our understanding of TEL, by examining the factors that influence the development of digital fluency among academic staff in institutions of higher education in Ireland and how such fluency can be facilitated and fostered both by the digitally fluent educators and by the academic institutions where they work. This question is examined through the theoretical lenses of innovation theories (Theory of Diffusion of Innovations and the Unified Theory of Acceptance and Use of Technology), Learning Design and Landscapes of Practice.

The research takes an explanatory case study approach, drawing on a thematic analysis of eight semi-structured interviews with educators working in higher education in Ireland and of a national policy document, known as the Digital Roadmap (Phase 1). This analysis led to the identification of professional identity and institutional culture as themes to interpret the findings.

The research found that enthusiasm, educational qualifications and prior experience of digital technologies were major influences in the development of digital fluency, which was an aspect of the participants’ professional identity. All were willing to help less digitally-proficient colleagues with advice and to present on formal courses. However, none wished to be seen as cheerleaders for technology. Those who developed an interest in TEL to improve their own teaching practice were keen to give informal demonstrations to colleagues but were less likely to be engaged in policy development than those who had developed their career around TEL. Both groups considered that accredited courses and informal learning were effective means of developing digital fluency. Educational technologists were considered to play a valuable role, particularly, when they went beyond guiding academics in institutional systems and enabled and encouraged them to explore other tools. This was considered to be a more sustainable approach as it helped the academics to develop their own fluency. Institutions can help
with the sustainable development of digital fluency by providing technological and pedagogical support services and in some cases by offering awards. However, interview participants working in the university sector tended to be more sceptical of the value of awards and modest levels of funding than those working in institutes of technology. Institutional leadership can promote a culture of professional development which can be more effective where it draws on reflection on the participants own practice.
Statement of Original Authorship

I hereby certify that the submitted work is my own work, was completed while registered as a candidate for the degree of Doctor of Philosophy and I have not obtained a degree elsewhere on the basis of the research presented in this submitted work.

Niall Watts         Date
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1. Introduction

1.1 Preamble - Global, institutional and individual context

“First we build the tools, then they build us.” – Marshall McLuhan

Even before the time of the Luddites, changes in technology have been feared by many. Twentieth century writers such as Huxley and Orwell saw technology as means of enslavement and control. According to popular literature, the Internet is destroying traditional media and reducing our ability to think (Carr, 2011; Keen, 2008). It is also invading our privacy, allowing governments and corporations to read and analyse our personal communications in the interests of national security or commerce and damaging our social and personal relationships (Turkle, 2015; Wacks, 2015). Yet the Internet continues to grow as more and more people are using it to search for information, to connect with friends and to do business. According to the International Telecommunication Union (ITU), an estimated 51% of the world’s population, 81% of the population of developed countries and 45% of the population of developing countries were using the Internet at the end of 2018 (ITU, 2019).

As in wider society, the use of information technology in education is a contested issue. As early as the 1970s, idealists such as Illich (1971) saw “learning webs” of students as an improvement on formal schooling, while Christensen (1997), a Harvard business professor, has suggested that online education is a “disruptive innovation” that will lead to the demise of higher education as we know it. Seymour Papert, a professor of Education in the Massachusetts Institute of Technology and a co-director of the MIT Artificial Intelligence Laboratory, suggested that the “technocentric” focus on the power of technology was mistaken and that change in education and society will be driven by what humans can do with technology (Papert, 1987).

Views on the role of information technology in education are informed by views on the role and value of education itself. Is its goal economic, social or vocational? Is its role to assess and certify students or to facilitate their intellectual and social development? Should higher education be aiming to help individuals develop over their lifetime, to supply the economy with a suitably skilled workforce or to provide educational products

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1 All references are in APA 6th edition style as formatted by EndNote™ (American Psychological Association, 2010)
for institutions to commercialise (Harpur, 2010)? Or, perhaps it is some combination of these. Or, in a more sinister view, is it used as part of management practice to control and monitor the professional practice of academics (Deem & Brehony, 2005) or to change the values of the public education system (Selwyn, 2014). Do these differing viewpoints influence how information technology is deployed by people in higher education and, if so, how?

This thesis examines these global issues in the context of Irish higher education. It starts with a brief examination of the global challenges, which leads on to their effect on higher education in Ireland and how educators are facing these challenges. It uses the lenses of digital fluency, innovation theory, communities of practice and learning design to examine how and why institutions are making use of learning technologies and how and why academics are developing the expertise needed to benefit from the potential of these new technologies. Before starting this examination, it is useful to clarify some widely-used terms.

1.2 Terminology

Technology-enhanced learning (TEL) describes the beneficial application of information and communication technologies (ICTs) or digital technologies to teaching and learning (Kirkwood & Price, 2013). There is no consensus as to the nature of this enhancement (Kirkwood & Price, 2013). There are many other largely synonymous terms used to describe the use of ICTs in education including e-learning, virtual learning, online learning and online education (Guri-Rosenblit & Gros, 2011). In campus-based higher education, TEL often takes a “blended” form, combining traditional classroom teaching with online activities and resources (Garrison & Vaughan, 2008). A course can be said to be blended when thirty per cent (30%) to seventy-nine per cent (79%) of the content and activities are online (Allen & Seaman, 2013). Blended courses are usually made available through a virtual learning environment (VLE). Blackboard and Moodle are both widely-used VLEs. TEL in all its forms raises interesting pedagogical possibilities for higher education which this study proposes to investigate.

1.3 Global challenges to education

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) is the major international body responsible for developing education. UNESCO’s work ranges from pre-school to higher education and includes vocational training and adult
education. One of its principal aims is to improve education worldwide, in the belief that education is the key to social and economic development (UNESCO, 2014). It partners with other organisations including private sector companies to help achieve its aims (UNESCO, 2014). According to Lynch, Grummell, and Devine (2012), UNESCO considers education to be a valuable industry with a global market. However, UNESCO does not express this view on its own website; rather it considers that information and communication technologies have an increasingly important role to play in education by contributing to access, equity, the quality of learning and teaching and to teachers’ professional development. However, this depends on the correct mix of policies, technologies and capacities being in place (UNESCO, 2014).

To help develop this mix, UNESCO is one of the partners in the Assessment & Teaching of 21st-Century Skills (ATC21S) programme along with business and national and international partners. Business partners include technology companies such as Cisco, Intel and Microsoft who play a dual role, both as producers of information and communication systems and potential employers. Twenty first century skills are founded on the ability to adapt, to solve complex problems and create new knowledge by communicating and sharing information according to ATC21S (Binkley et al., 2012). ATC21S have produced reports identifying the problems in assessing these skills (Csapó, Ainley, Bennett, Latour, & Law, 2012) and analysing the technological problems in using computer-based assessment (Wilson et al., 2012). In an interview, Mitchel Resnick, Professor of Learning Research at MIT, warns that there is a risk that computer-based assessment will concentrate on multiple-choice and other easy to test question types that can only offer simplistic feedback (Barshay, 2013). However, the goal of ATC21S is to create a new assessment framework with teaching and learning resources to help students develop twenty-first century skills (Binkley et al., 2012). Not all educators share these views on twenty-first century skills. Christodoulou (2014) suggests that skills such as problem solving, critical thinking and creativity are not new and that the approach to teaching twenty-first skills is mistaken. To solve problems and think critically students require an understanding of existing knowledge of which the fundamentals are stable over time in most disciplines. Searching the web, without a deeper understanding of context or the ability to place new information into a framework does not lead to much learning (Christodoulou, 2014).
Like UNESCO, the Organisation for Economic Co-operation and Development (OECD) is an international organisation with an interest in education and assessment, which it sees as facilitating its goal of promoting policies that will improve the economic and social well-being of peoples around the world (OECD, 2014). The OECD runs the Programme for International Student Assessment (PISA) which assesses the knowledge and skills of fifteen year-old students in countries around the world (OECD, 2014). PISA aims to connect data on student learning outcomes, on student characteristics and on the factors shaping student learning. Their goal is to identify the characteristics of students, schools and education systems with high performance standards. Longitudinal studies have shown a strong relationship between performance in PISA assessment and future success in education and the work-force (OECD, 2011). In 2011, PISA assessed the digital reading skills of fifteen year-old students in nineteen countries (OECD, 2011). They found that home use of computers had a greater effect on digital reading skills than school use and recommended that computer usage should be better integrated into the curriculum and more money invested in training teachers to use information technology in their classroom practice (OECD, 2011). ATC21S and PISA are both collaborative international programmes interested in measuring educational practice in schools. They focus on assessment, standards and employability.

Looking at Europe, the European Union (EU) increasingly seeks to develop a role for itself in education in its member states. The EU sees education as a means of addressing both social and economic challenges and, to that end, wants to encourage lifelong learning to aid personal development and to increase employability among its citizens. The EU, through its Joint Research Centre Institute for Prospective Technological Studies, considers digital competence as one of the key competences for lifelong learning (Ala-Mutka, 2011, p. 5). It defines digital competence as possessing the knowledge, skills and attitudes necessary to work, live and learn effectively in the “knowledge society” (Ala-Mutka, 2011, p. 4). This is in line with their policy of lifelong learning “No one is left behind” (Ala-Mutka, 2011, p. 33). In the context of meeting current and future employment needs, the EU has set digital competence for all its citizens as a goal in its New Skills for New Jobs report (European Commission, 2010b, p. 25). Digital competence can be extended to digital capacity, a broader term covering the individual, the organisation and the nation. The National Forum for the Enhancement of Teaching and Learning in Higher Education in Ireland (National Forum) gives a similar
definition for digital competence, describing it as “The skills, competences and attitudes that enable people to work, live and learn in a complex world that is increasingly digital” (NFETLHE, 2014a, p. 5). To meet this goal for lifelong learning the education sector needs to develop its own skills (European Commission, 2010b, p. 27), such as meeting the challenges of online learning and non-traditional students. Educational institutions at all levels need to prioritise the development and motivation of educators, particularly those who have been working for many years. Effective and innovative pedagogies will only flourish where educators have both incentives and opportunities to develop their own skills (European Commission, 2010b, p. 28). The European Union has recognised the importance of creativity and innovation for economic growth and social development (Cachia, Ferrari, Ala-Mutka, & Punie, 2010, p. 9). Education and training play an important role in fostering people’s creative and innovative abilities (Cachia et al., 2010, p. 9). ICTs are potential enablers for creativity and innovation. To realise this potential there needs to be a change in how both teachers and students use new technologies (Cachia et al., 2010, p. 10). Teacher training programmes should be updated to include the development of the ICT skills needed to foster creativity and innovation (Cachia et al., 2010).

Higher Education can have a role in developing training programmes in ICT skills both for teachers and students (Cachia et al., 2010). These programmes can help in the development of both individual and societal digital capacity, by fostering the knowledge and skills required for employability and lifelong learning. In particular, it can develop the digital capacity of its own academic and support personnel and develop its own institutional digital capacity through the development of appropriate policies. These roles can help higher education to address some of the challenges it faces. There is a diversity of views as to the appropriate response to these challenges and the role of digital technologies in any such response.

1.4 Global challenges to higher education

Internationally, higher education is facing the challenge of massification, of increasing student numbers from increasingly diverse backgrounds (Kubler & Sayers, 2010). This is leading to questions about the purpose and value of higher education, the possible decline in standards and about the employability of graduates (Gallagher, 2012; Harpur, 2010). The belief in the pedagogical benefits of digital technologies and the even the importance of teaching in higher education are being contested as higher education is
becoming a commodity to be marketed to students (Harpur, 2010). The positive views of the European Commission and the National Forum towards both teaching and technology contrast with a very different, potential future, “Higher Education Inc.” outlined by Kubler and Sayers (2010, p. 56) in their report for the Association of Commonwealth Universities. They foresee higher education as becoming characterised by competition, a commercial outlook and a disconnection between teaching and research. Scanlon and Issroff (2005, p. 433) take this further suggesting that there is a fundamental conflict in UK higher education between the “student as a person to be educated” and the “student as source of revenue and profit”. Rising fees in many countries and high dropout rates have given momentum to the concept of the student as customer, who is paying for an education and, therefore, expects a certain level of service (George, 2007; Pitman, 2016). Students may see this service as including contact with their lecturers even more than the availability of ICTs (Mayes, Morrison, Mellar, Bullen, & Oliver, 2009). These views are reflected by Harpur (2010) who suggests that higher education in Ireland is changing its goals from academic research and teaching to aiding national prosperity through commercially focused research and innovation. His view is supported by the New Media Consortium (now part of Educause), who in their Horizon Report on higher education, note that driving innovation is now considered a major role for global higher education (NMC Horizon, 2018). This change is fed by the rapid expansion of student numbers and increasing international recruitment. Technology can enable and support this process (Harpur, 2010). Taking a broad perspective, Selwyn (2014) suggests that society has been over optimistic about the benefits of digital technologies in education and has ignored their implicit values, which are leading to an increase in the alignment of public education with neo-liberal and market-oriented values. Despite these critiques, there is an impetus from the European Commission and the Department of Education and Skills (Ireland), through the National Forum, to make greater use of digital technologies in higher education (DES, 2010; European Commission, 2010a, 2010b, 2013; NFETLHE, 2014b, 2015, 2016, 2018).

Recent school leavers are familiar with the internet and use it in their personal lives and, therefore, may expect and like online learning or e-learning in higher education (Prensky, 2001). However, familiarity with social media does not necessarily lead to enthusiasm for technology in general nor does it transfer to the effective use of technology for teaching and learning (Bennett, Maton, & Kervin, 2008; Hosein, Ramanau, & Jones,
Online learning allows students to choose their own study location and time and make their own choice of resources and degree of interaction (R. Wang, Mattick, & Dunne, 2010). According to Guri-Rosenblit and Gros (2011), the pedagogical advantages of online learning in higher education are far from self-evident. However, ICTs can facilitate the use of active learning, giving feedback and collaborative projects (Blin & Munro, 2008; Laurillard, 2004; Mortera-Gutierrez, 2006). This choice of time and place may help to increase diversity by allowing larger numbers of students and by enabling part-time and remote learners to participate. The choice of resources and active learning may suit the learning preferences of some students. However, students may struggle with time management and the need for self-direction (Vaughan, 2007) and the absence of face-to-face contact may lead to less engagement (R. Wang et al., 2010). According to Harpur (2010), the computer may even become a barrier to communication between lecturers and students.

While improved learning is often the stated goal for the introduction of e-learning, there are many more powerful drivers of change, such as innovations in technology and the business needs of institutions of higher education (Laurillard, 2004). According to Blin and Munro (2008), motivations for the adoption of e-learning by universities include the (often conflicting) impact of perceived market pressures and a desire to improve the student learning experience and outcomes. From an institutional perspective the introduction of e-learning may be seen to enhance the institution’s reputation, reduce operating costs and widen access to courses (Vaughan, 2007), while practitioners have to divert the regular waves of enthusiasm for each new technology from “techno-hype” towards quality and learning (Laurillard, 2004). E-learning may also provide institutions with a “product”, courses, that can be sold internationally to increase revenues in a way that is considered innovative (Harpur, 2010).

In a 2012 survey of 2,800 US colleges and universities, over sixty-nine per cent (69%) of chief academic officers stated that online learning was critical to their long-term institutional strategy (Allen & Seaman, 2013). This strategy may be a combination of educational, reputational and commercial elements. Thirty-two per cent (32%) of students in these institutions were taking part in at least one online course (defined as being 80% or more online delivery) (Allen & Seaman, 2013). Seventy-seven per cent (77%) of these chief academic officers rated learning outcomes in online education to be as good or better than face-to-face education (Allen & Seaman, 2013). In Ireland, online education
increasingly takes a blended form with a mixture of in class and online activities (Cosgrave et al., 2011). This is also the case in North America (Garrison & Vaughan, 2008). The increasing number of online courses and the growing popularity of Massive Open Online Courses (MOOCs) have led to the suggestion that higher education is not merely being enhanced by technology but its very nature is being transformed and its processes disrupted (Young, 2013).

Undoubtedly, e-learning has the potential to be a disruptive technology, facilitating active learning in many disciplines (Blin & Munro, 2008; Christensen, 1997; Christensen & Eyring, 2011; Laurillard, 2004). Christensen (1997) defined a disruptive innovation as one which replaces existing practices by catering for new needs, by providing a service which is often cheaper, easier to use but, at least initially, not as good as the original. Disruptive innovations can be either new products or processes (Markides, 2006). The use of ICTs in higher education is an innovation in a process. Such innovations tend to be driven by demand, take place gradually over time and tend not to make business sense to established organisations (Markides, 2006).

There is little evidence that online learning has a disruptive effect on teaching practice in institutions of higher education (Blin & Munro, 2008; Buchan, 2011, 2014; Ferrari, Cachia, & Punie, 2009; Flavin, 2012; Kirkwood & Price, 2013; Quinney, Lamont, Biggins, & Hollie, 2017). The hierarchical structures of higher education make this difficult (Laurillard, 2004). Those at the top do not have sufficient knowledge to successfully implement innovations in teaching practice. They may also have goals of increasing control, measuring performance or auditing quality (Deem & Brehony, 2005; Harpur, 2010). While an adaptive model of governance allows localised innovation to spread downwards, a customised version to spread sideways and a generalised version to spread upwards, these models do not lead to widespread disruption (Buchan, 2014). In practice, academics are using the ICTs in an evolutionary rather than a disruptive manner (Benson, Anderson, & Ooms, 2011; Blin & Munro, 2008). They are a sustaining innovation, which improves rather than disrupts current practice (Christensen, 1997).

Since the mid-eighties, innovative use of learning technology has been part of the strategy in the university where Blin and Munro (2008) worked, but in practice this has been limited to the deployment of a virtual learning environment (VLE). This has not led to widespread change in teaching practice as many academics use VLEs to store lecture
notes and course materials (Blin & Munro, 2008; Rienties, Giesbers, Lygo-Baker, Ma, & Rees, 2014). In Ireland, the nine higher education institutions which participated in a survey by Cosgrave et al. (2011), all reported considerable use of a VLE for course activities, though these activities mainly consisted of accessing course notes and readings and submitting assignments. Most academics in the business school investigated by Benson et al. (2011) used blended learning to supplement rather than disrupt their existing practice. Flavin (2012) found that technologies supplied by the university were sustaining rather than disruptive and often awkward to use; while many free tools on the web were easy and convenient to use. This was having a disruptive effect, as these tools were being used instead of the institutional systems managed by the university. For example, his research participants preferred to use Google Scholar rather than a journal aggregator available through the university library. While the potential may exist, there is little evidence that online learning is disruptive at an institutional level (Benson et al., 2011; Blin & Munro, 2008; Cosgrave et al., 2011). However, lecturers’ choice of non-institutional tools is starting to disrupt practice at the level of the individual, as it may diminish the role of centralised IT and e-learning services (Flavin, 2012).

While online and blended learning may not be disruptive, they may be enhancing learning as previously mentioned. There is no agreement in higher education as to what constitutes the “enhancement” that technology-enhanced learning should bring to learning (Kirkwood & Price, 2013). Enhancement can mean any one of efficiency, improvement or transformation; efficiency involves the redevelopment of existing processes to become more cost or time effective or to be more scalable or sustainable while improvement involves the development of better outcomes from existing processes (Kirkwood & Price, 2013). Transformation is a more radical change to existing processes or the introduction of new processes (Buchan, 2011; Kirkwood & Price, 2013). This radical change can be at an institutional or individual level (Buchan, 2011).

Transformational learning takes place when an individual develops a new perspective which helps them to understand and manage a “disorienting dilemma” or a troubling and unexpected difficulty (Kitchenham, 2008). Institutions, as such, cannot learn but transformational learning by individual staff members expands the collective capabilities and consciousness of the institution, leading to the development of a new world view (Buchan, 2011). This can be described as developing the institution’s digital capacity.
The redesign of courses for blended learning has the potential to transform or radically change higher education (Blin & Munro, 2008; Elgort, 2005; Garrison & Kanuka, 2004; Garrison & Vaughan, 2008; Haythornthwaite & Andrews, 2011). Such a transformation will probably be gradual (Garrison & Vaughan, 2008). The convergence of asynchronous online communication and face-to-face teaching in blended learning facilitates the development of lifelong learning in institutes of higher education (Garrison & Vaughan, 2008). It can lead to an “approach whereby both face to face and online learning are made better by the presence of each other” (Garrison & Vaughan, 2008, p. 5). According to Garrison and Vaughan (2008), the redesign of teaching and learning activities for blended learning, can lead to the development of learning activities which foster critical thinking and are, therefore, consistent with the values of higher education. Thus, a transformed higher education can maintain its original values.

Despite the benefits claimed for blended learning, its transformative potential has yet to be realised (Benson et al., 2011; Blin & Munro, 2008; Elgort, 2005; Power, 2008). Adoption of blended learning in universities is a complex process generally instigated at institutional level (Benson et al., 2011). It is often driven by market forces and values from outside the traditions of higher education (Selwyn, 2014). This need not be the case where educators and institutions of higher education lead their own development (NFETLHE, 2014b; Selwyn, 2014). However, such institutional transformation requires the redesign of curricula and changes in management processes. To be successful, this needs both a strategic drive from university management and considerable time and effort by lecturers to redesign their courses (Benson et al., 2011). This redesign can be difficult to achieve in practice due to the time and effort required from lecturers (Power, 2008). However, “learning design” methodology may lead to improvements in this process (Laurillard, 2012).

The introduction of a VLE in Charles Sturt University, Australia, transformed the institution as it involved a structural reorganisation, changes in teaching practice and resource production and the development of new skills by lecturers, educational technologists and support staff (Buchan, 2011). However, the transformative potential of blended learning can be overstated (Bradwell, 2009, p. 65). Universities will continue to exist but must react to changing economic circumstances. Technology is just a tool to help develop universities to support learning and research into the future (Bradwell, 2009, p. 65). Transformation of higher education by blended learning is likely to be an
evolutionary rather than revolutionary (Garrison & Vaughan, 2008). Successful transformation requires leadership from the management of higher education institutions (Devine, 2015b; Garrison & Vaughan, 2008; Mayes et al., 2009).

In his review of trends in e-learning research, Hung (2010) found that approaches to e-learning research and practice differed between countries and that government policy played an important role in shaping both research and practice in higher education. In Ireland, the government has drawn on international and EU programmes to build its own programmes for developing higher education, including the use of information and communication technologies in teaching and learning.

1.5 Challenges facing higher education in Ireland

A focus on the role of higher education in the labour market has formed part of the modernisation discourse in Irish education since a government-initiated review of the university sector by the OECD in 2004 (Lynch et al., 2012). The Expert Group on Future Skills Needs (EGFSN) sets an agenda of skills and jobs for higher education. It reports to both the Department of Education and Skills and the Department for Jobs, Enterprise & Innovation and is chaired by a person with a background in the multinational IT industry (EGFSN, 2014; Lynch et al., 2012). In particular, there has been an emphasis on educating students in scientific and technical subjects (Lynch et al., 2012). Increasingly, education has become a marketable commodity which influences what is taught and to whom (Lynch et al., 2012). For instance, in 2010, the Department of Education became the Department of Education and Skills with its own Customer Action Plan (Lynch et al., 2012). Such thinking has influenced reports from the Department of Education and Skills (DES) such as the National Strategy for Higher Education to 2030 (DES, 2010) and Part-time higher education and training in Ireland: Current policy, practice and options for the future (HEA, 2012). The chairs of both report committees had backgrounds in industry rather than education (Lynch et al., 2012).

In Ireland, as in many other countries, third level education is facing the challenges of educating increasing numbers of students with reduced resources, according to the Department of Education and Skills (DES) report National Strategy for Higher Education to 2030, widely known, after its chairman, as the Hunt Report (DES, 2010). The student population is becoming more diverse with greater numbers of non-traditional students, including adult and part-time learners and overseas students (DES, 2010). Over
fourteen per cent (14%) of undergraduates were part-time in 2010 (HEA, 2012, p. 4). This proportion is steadily increasing. Part-time learners are more likely to be mature students, have a disability or be from a disadvantaged background. Blended, distance and online learning can help these groups to participate in higher education (HEA, 2012, p. 8). This will help to meet the national goal of increasing the proportion of graduates to forty-eight per cent (48%) of the labour force by 2020 (HEA, 2012).

According to the National Strategy for Higher Education to 2030, the delivery of higher education in Ireland must be characterised by flexibility and innovation to meet these challenges (DES, 2010). A “culture of enquiry” where research and teaching are closely linked should be the essence of higher education (DES, 2010, p. 44). Higher education students require “state-of-the-art” learning resources including e-learning facilities (DES, 2010, p. 52). However, the report does not explain what such “state-of-the-art” facilities are or who would decide what they might be. “Best practice” in pedagogy and technology-based learning need to become standard (DES, 2010, p. 42). According to the strategy, these best practices include encouraging students to become creative and critical thinkers. As part of a move to encourage wider participation, first year and non-traditional students, in particular, need preparation for these practices. The strategy considers that regional consortia, such as the Dublin Region Higher Education Alliance (DES, 2010, p. 95; DRHEA, 2014) whose members are the four universities and four institutes of technology in the Dublin area, could bring efficiencies and economies of scale to the enhancement of education, including the development of e-learning (DES, 2010; DRHEA, 2014).

Internet and web-based technologies have the potential for enhancing the learning experience for this diverse student population (DES, 2010). This expectation is being driven both by the government and the general public. To meet the challenges outlined in the National Strategy for Higher Education to 2030, the Department of Education and Skills established the National Forum for the Enhancement of Teaching and Learning in November 2012. The National Forum aims to build on expertise within higher education to support and develop best practice in teaching and learning (NFETLHE, 2014a). Its board is drawn from academia and higher education institutions will have a major input into its policies. One of the Forum’s first activities was to investigate digital capacity, as previously defined. Digital capacity can be considered at the individual, organisational and national levels (NFETLHE, 2014b).
The Forum envisages the development of learning environments which integrate digital learning and innovation. Teachers will have access to training and support in digital technologies and pedagogies to help them to develop digital teaching skills. Students will have access to supports to help them to be effective learners. Higher education institutions will collaborate with each other in regional groupings, such as the DRHEA, and with secondary schools to help develop the digital skills, competencies and attitudes for teaching and learning. Currently higher education institutions do not have a sufficiently evidence-based or cohesive approach to developing digital capacity (NFETLHE, 2014a). They can be overwhelmed by constant technological innovation or influenced by commercial interests. To overcome this the Forum is intended to help Irish higher education to lead its own transformation by developing a roadmap which will enhance and support the institutions own efforts to develop their digital capacity. The roadmap aims both to reflect priorities, ambitions and challenges from across the whole sector and to support and enable individual institutional strategies. Based on feedback from consultation with its member institutions, the roadmap has made four recommendations for the development of digital capacity in higher education. These are:

1: Prioritise the strategic development of digital capacity in institutional and national policy and quality frameworks in a way that supports innovation for impact

2: Strengthen and support collaboration within and between institutions, and with different parts of the higher education sector; develop shared policies and infrastructure that reflect the complexity of an increasingly digital world

3: Develop a consistent, seamless and coherent digital experience for students in Irish higher education and actively engage with students and teachers to develop their digital skills and knowledge

4: Develop a strong evidence base for enhanced pedagogy (NFETLHE, 2014a)

To start implementing these recommendations, the forum has proposed some initial actions including the development of strategies for digital capacity at institutional level, a survey of technical infrastructure and development of programmes (both within and between institutions) in digital literacy for both staff and students. The forum stresses the importance of an evidence base for all its activities and while this research is completely independent of the Forum, it aims to provide findings that will help to develop digital capacity in Irish higher education.

The government and policy makers see creativity, flexibility and innovation as desirable characteristics in the workforce and in society. Their policies aim to redesign education systems to develop these talents in people of all ages with information and
communication technologies playing a major role. This redesign or transformation is not accepted by many in higher education (Gallagher, 2012; Harpur, 2010; Selwyn, 2014). It does not necessarily fit with the traditional values and pedagogical aims of higher education such as developing “deep” learning. For this transformation to succeed, educators and institutions will need to increase their digital capacity to create an environment where students can develop their own digital competence to make best use of the potential of ICTs. However, independent of this transformation, ICTs can help to improve student learning by fostering active and deep learning as described in the next section.

1.6 Challenges facing the educators

Educators are essential for the successful implementation of any innovative, institutional programme such as increasing digital capacity (Guri-Rosenblit & Gros, 2011). They are accustomed to the transmission model of teaching, which is still dominant in higher education (Laurillard, 2012). In this model, the educator presents a narrative and the student plays a largely passive role (Laurillard, 2012). She calls this learning by acquisition. Reading, whether from books, websites or the VLE, listening to lectures or podcasts and watching videos are all ways of learning by acquisition (Laurillard, 2012). Learning by acquisition is an essential element of higher education as it helps students to gain knowledge of their field and to build on the work of others. Students learn how experts think and practice their discipline (Laurillard, 2012).

Even before the advent of TEL, active learning was recommended as a better means of increasing knowledge retention by students than learning by acquisition (Chickering & Gamson, 1987). Active learning prioritises skills development over content transmission (Petress, 2008; Roehl, Reddy, & Shannon, 2013). It may involve discussing, writing or problem-solving and should engage students at the higher levels of Bloom’s Taxonomy (Chickering & Gamson, 1987; Petress, 2008; Roehl et al., 2013). Chickering and Gamson (1987) developed their seven principles for good practice in undergraduate education, namely, to encourage contact between students and faculty, develop reciprocity and co-operation among students, use active learning techniques, give prompt feedback, emphasise time on task, communicate high expectations and respect diversity of talents and ways of learning. Similarly and more recently, Umbach and Wawrzynski (2005) found that higher education students reported greater levels of engagement and learning in institutions where educators used active and collaborative
learning techniques, engaged students in experiences, emphasised higher-order cognitive activities, interacted with students, challenged students academically, and valued enriching educational experiences. All of these techniques can be implemented by adapting the transmission model (Laurillard, 2012; Petress, 2008; Roehl et al., 2013). However, ICTs do offer greater possibilities for active learning, providing feedback and allowing a diversity of ways of learning (Blin & Munro, 2008; Laurillard, 2004; Mortera-Gutierrez, 2006; Roehl et al., 2013). While not all new technologies can help to improve teaching and learning (Garrison & Vaughan, 2008, p. 146), the collaborative and interactive possibilities of ICTs are suited to achieving “higher order” learning outcomes that can lead to “deep” learning (Garrison & Vaughan, 2008, p. 4). According to Mitchel Resnick in an interview by Jill Barshay (2013), creativity and collaboration are two of the most important aspects of learning that can be facilitated by ICTs. However, ICTs are often used for content transmission (Barshay, 2013) and asking simple questions that test recall of information rather than comprehension, application or transfer to practice (Clark & Mayer, 2011, p. 154). The collaborative, creative and interactive possibilities of TEL are suited to achieving higher-order learning outcomes and to fostering “deep” learning (Garrison & Vaughan, 2008, p. 4). This “deep” approach to learning is characterised by a desire to understand and search for meaning (Marton & Säljö, 1976). It can be achieved by organising material into a coherent whole, relating new ideas to other topics and to real-life situations, asking questions of oneself and the integration with existing knowledge (Ramsden, 2003, p. 47). This is consistent with the traditional values of higher education institutions (Garrison & Vaughan, 2008, p. 5).

To implement deep learning, educators need to develop new skills in both pedagogy and technology (Vaughan, 2007). In terms of technology, most educators have adapted to the use of PowerPoint to the extent that it is part of their everyday practice (Blin & Munro, 2008; Elgort, 2005; Zemsky & Massy, 2004). However, PowerPoint presentations are examples of teacher centred use of technology which fit well with the transmission model (Cuban, 2012). Smaller numbers of educators are familiar with and make effective use of some of the wide range of collaborative and media-rich technologies that can enhance or extend their teaching (Blin & Munro, 2008; Rienties et al., 2014).

To make best use of these technologies, experienced educators perform a variety of professional, pedagogical, social and technological roles including evaluator, assessor,
administrator, researcher, advisor, content-facilitator, process facilitator, instructional
designer and materials producer (Baran, Correia, & Thompson, 2013; Mortera-Gutierrez,
2006). In a survey, experienced online teachers reported that developing a sense of
community, encouraging participation and contribution, providing ongoing interaction
and support, creating collaborative learning activities, responding with feedback,
providing up-to-date resources and minimising technology problems were all effective
pedagogical strategies (Baran et al., 2013). With the addition of technology problems,
these strategies resemble the seven principles of Chickering and Gamson (1987) and the
methods for increasing student engagement and learning described by Umbach and
Wawrzynski (2005).

To perform the roles and develop the pedagogical strategies described by Baran
et al. (2013), educators not only need to be familiar with a technology but also require
an understanding of its fundamental design model and the limitations of that design, the
appropriate pedagogical methods and how to apply this understanding in teaching their
discipline. To develop such an understanding, higher education will have to support
educators in developing the necessary skills and knowledge (Guri-Rosenblit & Gros,
2011). Any attempts to circumvent or limit their role in curriculum development or the
use of new media and methods are liable to fail as educators are in control of teaching
practice (Guri-Rosenblit & Gros, 2011).

Effective educators who have developed these skills and knowledge can be
described as digitally fluent, a term which describes the skills and knowledge required to
work with technology in a pedagogically effective manner. Fluency can be described as
the unconscious competence of an expert (Dreyfus, 2004) or as tacit knowledge, which
the expert cannot explain (Polanyi, 1966), while “digital fluency” is used to describe such
expertise in the effective use of ICTs in education (Briggs & Makice, 2012; Hsi, 2007;
Resnick, 2001). The next section examines digital fluency in detail, examining how
communities of practice could help us to understand the informal development of digital
fluency, learning design could be used as a formal methodology to develop digital fluency
and how theories of adoption of innovation could help to understand the implementation
of digital capacity. Digitally fluency, communities of practice, learning design and
adoption of innovation theories provide the initial, theoretical basis for this study.
1.7 Thesis outline

The work underpinning this thesis focuses on the development of digital fluency by academic staff in institutions of higher education in Ireland. As digital technologies become pervasive in our lives and lifelong learning becomes widespread, the development of digital fluency is increasingly worth researching; because it helps educators to evaluate and create effective technology-enhanced learning activities for their students. While there is a considerable body of research discussing the barriers to the effective use of TEL in higher education, there is little research examining the factors that facilitate it (Porter & Graham, 2016). The purpose of this thesis is to help to fill that gap by investigating how digital fluency can be developed to facilitate the effective use of TEL in higher education in Ireland. This study examines how and why the digitally fluent educators studied became and remain fluent, how their fluency relates to their professional practice, how they and the academic institutions where they work can help their less technologically-proficient colleagues to become more fluent and the role of institutional and national policies in the development of professional practice in TEL.

The study proceeds with a literature review which explores existing research and policy in the field, thus, helping to crystallise the research question. This is followed by a discussion of the research approach, an explanatory case study, consisting of a thematic analysis of interviews with digitally fluent educators in higher education and a policy document. The findings from this analysis are presented and discussed in the fourth chapter with a detailed analysis in the fifth. The final chapter summarises the work, finishing with suggestions for future research.
2. Literature Review

2.1 Introduction to the literature review

To examine the issues raised in the introduction and to develop a research question, this chapter of the thesis investigates the academic and professional literature relating to the broad area of interest; the nature and acquisition of digital fluency by those who teach in higher education in Ireland. Grant and Booth (2009) provide a useful typology of academic reviews of this nature. Of the fourteen (14) types of review they identify, the design chosen for this study is closest to what they describe as a “Literature Review” (Grant & Booth, 2009, p. 99). In literature reviews there is always a trade-off between rigour and relevance. Their principal strength or value lies in their ability to identify what has been accomplished previously; allowing for the consolidation of previous work, for its summation, the avoidance of duplication and the identification of omissions or gaps which are worthy of further investigation (Grant & Booth, 2009). Their principal weakness is arguably that such reviews do not explicitly maximise scope or analyse data and, therefore, their conclusions are open to bias, as they may omit significant sections of the literature. This bias may be intended or inadvertent (Grant & Booth, 2009). In order to counter this possibility, this researcher made three decisions: first, not to operate from a particular worldview that would lead to the intentional exclusion of any sources. Critical openness was deliberately pursued at all stages of the literature review. Second, a spirit of dialogical supervision was embraced in all conversations involving adviser and researcher. This helped ensure the critical openness just mentioned. Third, a “critical friend” (Costa & Kalllick, 1993), was engaged who reviewed the literature chapter and indeed the whole thesis, thus helping to check for any inadvertent omissions.

This thesis lies in the domain of educational technology and is set in the context of higher education, specifically higher education in Ireland. As such, the literature review is necessarily wide-ranging and multi-disciplinary, drawing on books, academic journals and policy documents from many fields. However, while broad in scope the literature review cannot be all encompassing. It is informed by many areas of literature which can give insights into the use of TEL in higher education and how it can be facilitated by the development of digital fluency. Digital fluency has been chosen as a lens for exploring the uptake of TEL as it is considered “a vital concept to explore technology-enhanced learning research” (R. L. Wang, Wiesemes, & Gibbons, 2012, p.
Moreover, digital fluency not only enables and encourages educators to develop an active, collaborative and engaging approach to their teaching practice but also gives them the expertise needed to advise institutional and departmental practice in TEL.

To help us to understand how digital fluency is developed this review focuses on the theories of innovation and communities of practice. These theories can help us to understand the processes whereby both knowledge and expertise are developed by individuals and organisations. They focus on process rather than technology, helping us to understand how individuals and organisations respond to technological change and how colleagues can learn from each other. Three case studies help us to explore the potential of these theories to explain the effective use of TEL from an institutional, departmental and individual perspective. Finally, a synthesis of the literature with these perspectives leads to the research questions for this thesis.

2.2 Theoretical stance and related lenses

There is little research to show how experienced educators gain their experience with new technology, the extent to which they reflect on their practice or how they apply their strategies in practice (Baran et al., 2013). Equally, there is little research into the role played by educational technologists (Hannon, 2012) and how effective practice with digital technologies can be facilitated (Porter & Graham, 2016; Reid, 2014). Such proficient practices can be described as digital fluency, which is defined and discussed in this section. Taylerson (2014, p. 9) in her report on initial teacher education, suggested that low levels of digital fluency among educators contributed to low levels of use of digital technologies in teaching and learning practice.

ICTs allow learners to be exposed to the practices and habits of the digitally fluent, for example, by capturing practice and recording data and by supporting reflection, diagnosis and planning, for example, in blogs or e-portfolios (Beetham, McGill, & Littlejohn, 2009). Learning design is a methodology which aims to represent teaching and learning practice in a systematic way so that it can be reused by other educators to improve practice (Agostinho, Bennett, Lockyer, & Harper, 2011; Dalziel et al., 2013). While there are no simple solutions to the complexity of professional development in TEL in higher education (Beetham & Sharpe, 2007), learning design can help to understand the nature of proficient practice and can be used to provide a template for
developing digital fluency. It involves developing design patterns from a semi-structured description of an expert’s method. This includes a description of the original “problem” and the context in which the solution was implemented. Design patterns are generally refined through collaboration (Laurillard, 2012).

More informally, educators can learn from colleagues through “corridor conversations” (K. E. Thomson & Trigwell, 2016), casual conversations about teaching practice, which may lead to continuing professional development. Such conversations can be understood in terms of the theories of communities of practice (Lave & Wenger, 1991; Wenger, 1998; Wenger, McDermott, & Snyder, 2002), which form part of a wider landscape of practice (Wenger-Trayner, Fenton-O'Creevy, Hutchinson, Kubiak, & Wenger-Trayner, 2015). These communities of practice provide an opportunity for colleagues to learn from each other and for new members to learn how to be a professional in that community.

Innovation theory can be used as a lens to examine the uptake (or lack of uptake) of technological changes both by individuals and organisations. Rogers (2003) Diffusion of Innovations theory (IDT) proposes factors affecting the adoption of an innovation in a population. The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003) shows how factors such as perceived usefulness or performance expectancy, perceived ease of use or effort expectancy, social influence and facilitating conditions all affect how an individual may or may not adopt a particular technological or pedagogical change.

Before examining communities of practice, learning design and innovation theories, this thesis introduces the concept of digital fluency, distinguishing it from digital literacy and digital competence. It illustrates the link between digital fluency and higher order thinking, thus, explaining why the preferred term in this research is digital fluency.

2.3 Digital fluency

2.3.1 Why digital fluency? Choice of terminology

The literature uses the terms digital literacy, digital competence and digital fluency to describe the skills and knowledge individuals need to use ICTs effectively (Ala-Mutka, 2011; Ala-Mutka, Punie, & Redecker, 2008; Briggs & Makice, 2012; Hsi, 2007; Lankshear & Knobel, 2008; Resnick, 2001, 2012a). This section discusses some of the varying definitions of digital literacy and digital competence and two principal
definitions of digital fluency, namely those of Resnick (2001, 2012a, 2012b) and Hsi (2007). The terms digital capacity and digital learning are also used. Digital capacity refers to the levels of digital proficiency at multiple levels - in the organisation, the nation and the individual (NFETLHE, 2014a). Digital learning refers to the processes and tools in teaching and learning used while digital literacy is a series of developmental steps not unlike reading (Turner, 2012). The term digital divide has been widely used to describe the gap between skilled and unskilled users of ICT. The term digital spectrum is more accurate as individuals move along a continuum from low levels of skills and knowledge towards fluency (Haythornthwaite & Andrews, 2011, p. 180; Lenhart & Horrigan, 2003). The 2018 Horizon report considers the improvement of digital literacy to be a challenge that higher education is able to solve despite the challenges of obtaining institution-wide acceptance and support (NMC Horizon, 2018).

Digital literacy means knowing what ICT tools to use and how to use them (Briggs & Makice, 2012). Others have extended its definition beyond information technology (IT) literacy, for example, to include photo-visual literacy, reproduction literacy, branching literacy, information literacy and socio-emotional literacy (Eshet, 2004). Digital literacy is an element in the construction of identity which is distinct from IT literacy (Lankshear & Knobel, 2008). They describe three levels of digital literacy starting with technical skills or competences, followed by the appropriate use of digital tools and finally transformation through creativity and innovation (Lankshear & Knobel, 2008). The European Union eSkills project describes three levels of skills ICT User skills, eBusiness skills and ICT Practitioner Skills (Ala-Mutka, 2011, p. 32) while the New Media Consortium in their Horizon Report define digital literacy as “generating a deeper understanding of the digital environment, enabling intuitive adaptation to new contexts and co-creation of content” (NMC Horizon, 2018).

Digital competence has been defined by the European Union as providing the knowledge, skills and attitudes necessary to work, live and learn effectively in the knowledge society (Ala-Mutka, 2011, p. 4). There is a continuum in these skills starting with the operational skills in using software packages and the web and extending to the ability to use ICT to perform tasks and for self-expression and the creation and evaluation of content. These skills and knowledge need to be continually developed in response to changes in technology (Ala-Mutka, 2011). Digital competence “involves the confident and critical use of information and communications technology (ICTs) for employment,
learning, self-development and participation in society” (Ala-Mutka, 2011, p. 4). Digital competence should also recognise the potential suitability of non-digital tools (Ala-Mutka, 2011, p. 19). The European Union recognises digital competence as one of the eight key competences for lifelong learning (Ala-Mutka, 2011, p. 5). Their definition of digital competence seems similar to the definition of digital literacy by Lankshear and Knobel (2008). Going further, the New Skills for New Jobs report commissioned by the European Union (European Commission, 2010b) advocates closer linkages between education, training and employers in providing a highly skilled workforce. It recommends a goal of matching competences on to digital fluency, using the term “digital fluency” explicitly. To create such a workforce, the reports sets the ambitious goal of digital fluency for all EU citizens (European Commission, 2010b, p. 25) and recommends embedding digital and media literacy in all levels of education and training (European Commission, 2010b, p. 25).

Fluency can be described as “unconscious competence” where people perform a skill, naturally without having to think (Churches, 2008). It is similar to expertise, the final stage in Five-Stage Model of Adult Skill Acquisition, where the expert sees what needs to be achieved and, drawing on previous experience, knows immediately how to achieve it (Dreyfus, 2004). This ability to make subtle distinctions is what distinguishes expertise from proficiency (Dreyfus, 2004). “Unconscious competence” is the end point in a transition from “unconscious incompetence”, where people are happily, unaware of their own ignorance, through the uncomfortable stages of “conscious incompetence”, where they realise their lack of skill and knowledge and “conscious competence”, where they struggle to practice what they have learned (Churches, 2008; K.-L. Thomson, von Solms, & Louw, 2006). Most teaching aims to bring the learner from “conscious incompetence” to “conscious competence”. The “consciously competent” learner has a degree of understanding but needs to think actively to perform a task, for example, thinking before speaking a second language or before driving a car. In terms of digital fluency, the learner is literate at this stage. This is similar to “competence”, stage three in the Dreyfus (2004) model, where the learner forms rules to determine the essential features of a task. Fluency or “unconscious competence” can only come later with practice as knowledge and skills become ingrained or tacit (Churches, 2008; Polanyi, 1966). Competence is not necessarily transferable from one context to another and needs to be continuously maintained to keep abreast of change (Frank et al., 2010).
Seymour Papert, at the time, a professor in the Massachusetts Institute of Technology, was an early investigator of the potential of computers in education. He invented the Logo language to help children to learn problem-solving skills (Papert, 1996). Mitchel Resnick studied under Papert (Resnick, 2012b). He has described the computer as the “most extraordinary construction material” (Resnick, 2001, p. 48). Most people do not use computers to make interesting objects; instead, they use them to perform technical tasks such as searching for information on the web, sending email or word processing. To help young people to “write digitally” and become digitally fluent, Resnick (2012b) and his colleagues in MIT have developed, Scratch, an easy-to-use programming tool with an attractive graphical user interface. Digital fluency is similar to fluency in a foreign language (Resnick, 2001, p. 48). Fluent speakers can do more than read a menu or ask directions, they can explain complex ideas and tell stories. People who play with computer games and simulations, but do not know how to create them are not fluent (Resnick, 2012b). It is like being able to read but not able to write (Resnick, 2012b). However, R. L. Wang et al. (2012), drawing on their work on the usage of mobile devices by mature nursing students, considered that digital fluency was more context sensitive than language fluency, as these nursing students often found it difficult to transfer their practice as nurses in the hospital ward to the research environment.

Drawing on the work of Resnick and Papert, Q. E. Wang, Myers, and Sundaram (2013) in their study of the factors affecting an individual’s position on the digital spectrum, defined digital fluency as “the ability to reformulate knowledge and produce information to express oneself creatively and appropriately in a digital environment”. This seems similar to the New Media Consortium’s definition of digital literacy as previously discussed (NMC Horizon, 2018). Hsi (2007) studied how young people learnt informally and unintentionally from digital technologies and considered how that could be integrated with their formal education. She defined digital fluency more broadly as “competencies, new representational practises, design sensibilities, ownership, and strategic expertise that a learner gains or demonstrates by using digital tools to gather, design, evaluate, critique, synthesise, and develop digital media artefacts, communication messages, or other electronic expressions” rather than a technological fluency which is data, information, or knowledge-centred perspective (Hsi, 2007, p. 1509). Both these definitions seem to correspond to the third or top level of digital literacy, transformation through creativity and innovation, as discussed by Lankshear and Knobel (2008) and the
third or top level of digital competence of using ICTs for self-expression and the creation and evaluation of content (Ala-Mutka, 2011).

Drawing on Papert’s focus on the human aspect of the human technology relationship in education, Briggs and Makice (2012) examined how digital fluency could help individuals and organisations to adapt to rapid technological and societal change. They defined digital fluency, more concisely, as knowing when to use a tool (or not) and why it should be used. They considered it more valuable than digital literacy which they defined as knowing what tools to use and how to use them. Under these definitions, fluency includes the ability to evaluate tools so that the right tool, or combination of tools, is chosen for a particular context. The digitally fluent have the transferable knowledge, skills and mindset to achieve desired outcomes by using digital technology (Briggs & Makice, 2012). In their work with part-time, mature doctoral students in nursing, R. L. Wang et al. (2012) drew on the work of Hsi and Resnick. R. L. Wang et al. (2012) considered digital fluency to be a developmental process where individuals overcame the novelty of new technology, in their case a personal digital assistant, to incorporate its usage into their current practice. This led to increased self-confidence with the technology which in turn encouraged further exploration of its potential, inspiring new practices. These practices generated new expectations and preferences, thus increasing digital fluency.

While Briggs and Makice (2012) discuss digital fluency in terms of why a technology should be used, Baran et al. (2013) focus on an understanding of the fundamental design of that technology and its intended usage, which they discuss in terms of its affordances, without defining what they mean by that term. The concept of affordances was introduced by Gibson (1979) and developed by Norman (1988, 1999, 2013), who defines an affordance as the attribute of an object that allows people to know how to use it or “give a clue” to its usage. This makes sense for physical objects such as a door handle or mouse. Since then, the term affordance has been widened to describe the properties of screen-based user interfaces (Norman, 1999). The usage of the term had become vague and had lost much of its original meaning (Norman, 1999). To counter this, Norman (1999, 2013) distinguished between these meanings of the term affordance by respectively defining them as real and perceived affordances. Physical objects have real affordances while digital technologies have perceived affordances, which are learned conventions based on the logical and cultural constraints of the system. Perceptions of
affordances can vary between individuals based on their own culture and experiences. Feedback and constraints are more useful concepts than affordances when considering how best to design and use digital technologies (Norman, 1999, 2013).

Feedback draws the users’ attention to an object on screen such as highlighted text or a flashing cursor. A cursor changing shape is a convention not an affordance. Conventions are not arbitrary and must be learned. They evolve, are slow to be adopted and, once adopted, slow to go away. Such conventions are logical constraints that permit some activities and prohibit others. Similar constraints and feedback methods are used in many different technologies. These logical constraints can help to make the underlying design model clear to users so that they can readily deduce what actions are required. Thus, logical constraints go hand in hand with a good conceptual model (Norman, 1999, 2013).

A good conceptual model helps to make a technology easier to understand, learn and use. An understanding of the conceptual model underlying a digital tool enables educators to take advantage of the potential of that tool for active learning while maintaining an awareness of its limitations. This potential can be achieved by making appropriate use of feedback and, more broadly, by increasing the opportunities for creativity and collaboration. Digitally fluent educators are likely to have experience of and understand a wide range of conceptual models. Such experience will help them to understand new models which will, in turn help them to make the effective use of TEL in their professional practice and further increase their digital fluency.

While an understanding of the perceived affordances or the conceptual model underlying a digital technology can help us to understand how it may be used, the Technological Pedagogical and Content Knowledge (TPACK) framework can help us to understand how use of that technology can be integrated into professional practice (Koehler & Mishra, 2009). TPACK describes the integration of discipline specific content knowledge, technology knowledge and a knowledge of teaching practices in that discipline to teach effectively teaching with technology (Koehler & Mishra, 2009). It requires an understanding of how concepts are represented by technologies; how technologies can be used in a constructive ways to teach new content by building on existing knowledge, how students learn in a particular discipline and how these concepts can inter-relate (Koehler & Mishra, 2009; Mishra & Koehler, 2006). In a systematic
literature review of journal articles on TPACK, Voogt, Fisser, Pareja Roblin, Tondeur, and Van Braak (2013) found that TPACK was being interpreted in three different ways as an extension of content and pedagogical knowledge, as a body of knowledge in its own right or as interplay between content, pedagogical and technological knowledge and their intersections. The latter view comes closest to resembling digital fluency as defined by Hsi (2007) and Briggs and Makice (2012).

While terminology in this field is prone to rapid change, the term *digital fluency* as in the broader definitions of Hsi (2007) and Briggs and Makice (2012) is used in this research since it has a more precise definition than digital literacy and digital competence, avoids the multiplicity of meanings in TPACK as discussed by Voogt et al. (2013) and has a broader focus than perceived affordances or conceptual models of technology (Norman, 1988, 1999, 2013). This research is following on the words of R. L. Wang et al. (2012, p. 577) “We maintain that (in agreement with the work of Hsi (2007)) digital fluency could become a vital concept to explore technology-enhanced learning and m-learning research.”

2.3.2 Digital fluency and higher order thinking

As discussed, digital fluency requires the ability to evaluate and create. Bloom’s Taxonomy considers analysis, evaluation, synthesis and creativity as *higher order* thinking skills (L. Anderson & Krathwohl, 2001). The taxonomy is a framework for classifying what educators expect or intend students to learn from instruction in terms of learning objectives. It was originally developed by a committee of educators chaired by Benjamin Bloom in 1956 (Bloom, 1956) to facilitate the exchange of test items between universities. The taxonomy divides learning into the cognitive (thinking), affective (feeling) and psychomotor (doing) domains. The cognitive domain is subdivided into six categories of thinking skills ranging from factual knowledge to evaluation (Bloom, 1956). In order of increasing complexity, the “lower order” thinking skills were knowledge, comprehension and application, while the “higher order” skills were analysis, synthesis and evaluation. Since its original development for assessment, the taxonomy’s use extended into areas such as curriculum development and lesson planning (L. Anderson & Krathwohl, 2001). To facilitate this broader use, L. Anderson and Krathwohl (2001) revised the taxonomy for the cognitive domain, using the verbs (from the lowest level upwards) remember, understand, apply, analyse, evaluate and create (L. Anderson & Krathwohl, 2001, p. 30). *Create* replaced *synthesis*. Synthesis suggests fitting new
knowledge with existing knowledge while create suggests an active process of sense making, leading to planning and production (Krathwohl & Anderson, 2010). Create was moved to the highest level, as creating is a more complex cognitive process than evaluating. Creating is an inductive process, which builds on prior evaluation to select and combine appropriate elements to make something new (L. Anderson & Krathwohl, 2001, p. 294). The proposed top levels of digital competence (Ala-Mutka, 2011) and digital literacy (Lankshear & Knobel, 2008) seem to correspond to the higher levels of Bloom’s taxonomy.

Churches (2008) has developed Bloom’s Digital Taxonomy to take account of new methods and tools for learning facilitated by the web. He has added verbs at all levels of cognitive domain. Examples include highlighting and bookmarking in Remember, blogging (as a journal) in Understand, editing in Apply, validating sources in Analyse, moderating in Evaluate and programming, filming and podcasting in Create. He emphasises that the digital taxonomy is not about tools and technology but about using these to facilitate learning. It should be noted that many tools and technologies can be used at multiple levels of Bloom’s taxonomy. Learning objectives not only measure the ability to use the tool they must also measure the quality of the product. For example, bookmarking is of no value if the resource bookmarked is inappropriate or worthless. Digitally literate students know what a bookmark is and how to apply it. If that is all they know, they are demonstrating lower order thinking skills. Digitally fluent students know when to bookmark and how to select the most appropriate resources. They are exhibiting higher order thinking skills in terms of Bloom’s Taxonomy (Churches, 2008).

Like R. L. Wang et al. (2012), Meyer (2010) worked with doctoral students in the context of their practice. She used Bloom’s Digital Taxonomy to analyse learning on an online doctoral course that she gave to adult professional learners who worked in higher education administration. The participants used blogs, wikis and online discussion as well as a traditional research paper. Meyer (2010) found their level of learning depended more on the nature of the assignment than on the tool used. Some of the participants were uncomfortable with the new tools and complained about the amount of time required to learn them. However, she postulated that “learning by doing” (Laurillard, 2012) helped the adult learners to develop higher order thinking skills by making them reflect on their own learning processes and by discovering new ways of achieving their goals (Meyer, 2010). Adult learners may need guidance both on collaborative and
reflective learning and on Web 2.0 tools to help them to develop such thinking skills (Meyer, 2010).

Resnick (2001, p. 48) defines digital fluency as “knowing how to use digital technology to construct things of significance”. This definition focuses on creating, the highest category in Bloom’s Taxonomy. Hsi (2007) has a broader definition which includes the terms design, evaluate and synthesise; all verbs associated with Bloom’s higher order thinking skills. Briggs and Makice (2012) add the affective domain by stressing that the fluent bring the appropriate mindset or attitude to analysis and evaluation. It is at Bloom’s higher levels of thinking that the potential of technology-enhanced learning for deep learning as defined by Ramsden (2003) can be realised. Such potential is consistent with the values of higher education (Garrison & Vaughan, 2008). Digital fluency has a catalytic effect on learning, opening many new learning opportunities (Resnick, 2001; R. L. Wang et al., 2012). The development of digital fluency can be influenced by many factors.

2.3.3 Factors affecting digital fluency

There are many factors affecting an individual’s position on the digital spectrum, including demographic, organisational, psychological and social influences. All of these affect the opportunities and intention to use technology and the actual use of technology (Q. E. Wang, Myers, & Sundaram, 2012; Q. E. Wang et al., 2013). Demographic factors include age, gender, socioeconomic status and level of education (Haythornthwaite & Andrews, 2011, p. 189). Older people have been noted as using digital technologies less than younger people and there has been considerable debate on the role of age in the uptake of ICTs (Bennett et al., 2008; Hosein et al., 2010; Teo & Noyes, 2014). In the USA, sixty-six percent (66%) of those aged over sixty-five use the Internet compared to ninety-eight percent (98%) of those in the eighteen (18) to twenty-nine (29) age group (Pew, 2017). Computer anxiety and low self-efficacy can be barriers to stop seniors from using technology (Q. E. Wang et al., 2012). Prensky (2001) coined the terms digital native and digital migrant to distinguish between those who have grown up before and after widespread use of the Internet. According to Prensky (2001), the “biggest problem facing education” is that digital migrant educators speak an outdated language that is incomprehensible to their digital native students. This may be an oversimplification of a more complicated reality (Clarke & Clarke, 2009). Digital natives are not homogenous and vary in their choice of tools as well as the ability to use those tools (Q. E. Wang et
al., 2012, 2013). Social networks are frequently the only ICT tool used by digital natives and where this is the case they are not digitally fluent (Q. E. Wang et al., 2012, 2013). Students who are digitally fluent have better educational outcomes (Wei, 2011). In a study of the use of mobile devices by nurses (R. L. Wang et al., 2012) found the age of the participants did not affect their use of the devices. Prior experiences with technology and personal skills and interests had a greater effect. Many writers (Horrigan, 2010; R. L. Wang et al., 2012; D. S. White & LeCornu, 2011) have commented that not all young people are technically adept while many older people are technically adept. There may be as much variation within generations as between them (Bennett et al., 2008). Many of the architects of the world wide web and of current computer technologies are themselves digital migrants (Stoerger, 2009). D. S. White and LeCornu (2011) favour the terms “digital resident” and “digital visitor” as they focus on usage rather than on age or language. In a study of eleven humanities lecturers, who considered themselves to have adapted their practice to digital technology, Cousins and Bissar (2012) found a strong relationship between the use of technology in the lecturers’ lives and their engagement in the process of e-learning. This relationship was a more significant aspect than their demographic profile, which was predominantly white and female with more than a third aged over fifty.

The patterns and preferences of ICT use may be influenced by gender (Dutton & Blank, 2011; Sun, 2012; Teo & Noyes, 2014). Females use ICT for education and design-oriented activities more often than males (Selwyn, 2008) while males are more likely to play computer games and learn programming languages (Hosein et al., 2010). Teo and Noyes (2014) found that social influences had a greater influence on the reported intentions to use ICTs in their teaching practice by female pre-service teachers in Hong Kong. For both males and females digital fluency is positively correlated with frequency of use (Q. E. Wang et al., 2012).

Marginalised groups such as the low-income and low-skilled may have no or poor digital skills. In the UK, Dutton and Blank (2011) noted that 99% of those in highest income category use the Internet compared to 43% in the lowest and that 91% of those with a university education used the Internet compared to 31% of those with no educational qualifications. Digital access is a prerequisite but not a determinant for gaining digital fluency (Q. E. Wang et al., 2012). Not everyone uses or has access to the Internet even in developed countries (Haythornthwaite & Andrews, 2011). In 2009 to
2010, 74% of the population of the USA, 70% of the UK and 65% of the European Union had access to the Internet from home (Haythornthwaite & Andrews, 2011, p. 183). 78% of the population of Ireland had home Internet access in 2011 (CSO, 2011). This gap in access is in part due to a gap in skills (Q. E. Wang et al., 2012). Non-users can be divided almost equally between those who are interested in using the Internet and those who are not (CSO, 2011; Haythornthwaite & Andrews, 2011). The main reasons for not using ICTs are a lack of interest followed by a lack of skills and the costs of equipment and access (CSO, 2011). Briggs and Makice (2012) refer to the interested as the “pre-literate” and the uninterested as “anti-literate” respectively. For the interested, cost and or lack of skills are barriers to access (Horrigan, 2010).

As the pace of change is rapid, keeping up with changes in technology is a constant struggle both in adopting new technologies and in abandoning old ones. This can easily lead to a digital fluency gap (R. L. Wang et al., 2012). Rapid change is particularly difficult for disadvantaged groups who have less access and poorer skills. They can be repeatedly left behind with each introduction of new technology. This slower rate of uptake has been referred to as digital lag or delayed use (Haythornthwaite & Andrews, 2011).

There are contradictory findings on the effect of computer ownership on digital skills. Horrigan (2010) found that the digital fluency of Chinese secondary school students was not affected by home access to computers and the Internet whereas Goode (2010) found that students with limited home or school access suffered from low digital fluency. Students with home computers and Internet access reported the highest self-efficacy, i.e. belief that they could successfully complete tasks (Wei, 2011) and were able to carry out more sophisticated tasks (Barron, Walter, Kennedy Martin, & Schatz, 2010). Support for computer learning in school increased digital fluency (Goode, 2010). Family, friends and teachers can all have a positive influence on technology use and thus help to increase proficiency (Q. E. Wang et al., 2012, 2013).

Q. E. Wang et al. (2013) carried out a literature review of peer-reviewed journal articles on the digital divide between digital natives and migrants. They found shortcomings in this distinction and used digital fluency as a tool for investigating individual differences in skills and abilities with ICTs. This led to the development of a model of the factors affecting digital fluency. Demographic factors such as age and
gender along with organisational factors such as access to computers influenced the opportunity to use a particular technology. Psychological factors such as anxiety and self-efficacy affected perceived ease of use and social factors such as the influence of friends, family and teachers affected the behavioural intention to use. Some of these factors are correlated and in some cases conflicting findings are noted in the literature (Q. E. Wang et al., 2012, 2013). Use of the technology led to digital fluency which in turn led to further use of the technology. ICTs consist of many technologies, some of which will be more relevant to an individual’s work and life. Individuals develop a preference for and pattern of actual use of these technologies and will be more proficient users of them. However, their overall fluency is distinct from proficiency with any particular technology (Q. E. Wang et al., 2012, 2013).

This research proposes to investigate the importance of technology experience and personal interest to digitally fluent educators. It will examine how they gained their experience, how they keep their skills up-to-date and why they see use of ICTs as relevant to their professional practice. The research will also examine the extent that they were aided by facilitating conditions and the impact of organisational and social factors such as the availability of ICTs and the support of friends, family and colleagues.

Having appreciated the value of digital fluency and having developed their model, Q. E. Wang et al. (2012, 2013) did not, however, attempt to create a scale or system for determining an individual’s position on the digital spectrum. The issues around this are discussed in the next sub-section.

2.3.4 “Measuring” digital fluency

It is challenging to find ways of operationalising a high-level definition of competence so that objectives and tasks can be defined, measured and assessed (Ala-Mutka, 2011, p. 20). This is equally the case for determining someone’s position on the digital spectrum. Unlike language proficiency, there are no widely recognised guidelines, such as the Common European Framework of Reference for Languages (Council of Europe, 2011). The literature describes a few test instruments, attempting to meet this challenge such as the Instant Digital Competence Assessment (iDCA) developed and used by Calvani, Cartelli, Fini, and Ranieri (2008) and Li and Ranieri (2010) and the Digital Native Assessment Scale (Teo, 2013). Both these instruments were used with secondary school children. Digital competence is multidimensional (cognitive, relational and social),
complex (difficult to quantify and assess), interconnected (with other skills) and sensitive to socio-cultural context. Therefore, the model will differ in different contexts e.g. school, university, professional training (Calvani et al., 2008; Horrigan, 2010). The iDCA instrument has 85 questions covering the technological, cognitive and ethical components of digital competence. It has been validated by a panel of experts and has been tested on secondary school students aged from 15-16 in Italy (Calvani, Fini, Ranieri, & Picci, 2012) and aged from 14-17 in China (Horrigan, 2010). In both Italy and China, most students scored highly on the technological questions with lower scores on the cognitive and ethical components (Calvani et al., 2012; Horrigan, 2010). They found a wide range of abilities amongst the students with higher scores on the technological questions than on the cognitive or ethical questions. Their level of digital competency depended on their age and the school they attended. Differences in gender, computer ownership and Internet usage were not found to be significant. Having IT skills did not necessarily lead to digital competence. Thus, there is a risk of “fluency gap” even among digital natives (Li & Ranieri, 2010).

The Situated Digital Competence Assessment instrument aimed to build on the iDCA to measure digital competence in the workplace (Calvani et al., 2008). It was a considerably more complex test instrument than iDCA with four components: Technological Exploration, Simulation, Inquiry and Collaborative Wiki where the participants master an unknown technological interface, build hypotheses on data, gather and select information and write collaboratively respectively. Development of this instrument was discontinued, according to an email message from Antonio Cartelli, one of its creators (Cartelli, 2014).

Like the digital fluency of educators, the digital capacity of institutions varies along a spectrum. Taking an institutional approach, Galvin et al. (2010) measured the value of ICTs in case studies of two secondary schools, one in the Republic of Ireland and one in Northern Ireland. Their research was part of a larger Measuring the Value of Educational Technologies project undertaken in several countries. Value was considered to be the tangible and intangible contribution of ICTs to achieving the school’s strategic goals. Tangible assets, such as computers and other equipment, are prerequisites for the development of intangible assets, such as the increased competence of staff, improved student performance, organisational change and the impact on the wider community. Training, support and organisational culture all contribute to the existence and value of
intangible assets. It is relatively easy to identify the costs of tangible assets, but their contribution to the intangible assets is more difficult to identify. Gartner’s Total Cost of Ownership (TCO) approach can be used to measure the value of intangible assets in terms of the schools’ strategy and performance and in terms of the quality of learning as perceived by both students and teachers (Galvin et al., 2010). Intangible assets were categorised in terms of human, information and organisational capital. To investigate intangible assets, the research team analysed documents on the schools’ plans and aspirations and practice in the use educational technologies. They conducted a self-assessment survey of teacher capabilities, interviews with staff and students and a student questionnaire in both schools.

The research team found that ICTs had penetrated everyday teaching practice in the schools. Both schools had developed patterns and practices in task-based activities and problem solving that could only be achieved with ICTs. There was a culture of practical, classroom-level decision making with teachers and management successful at identifying and delivering pedagogical benefits. Effective leadership and committed teachers, who had embedded ICTs in the school culture, created an environment of organisational change where ICTs enhanced teaching and learning. A reliable and robust ICT infrastructure allowed this to happen, as did staff development programmes and frameworks for subject departments. Both schools were using proficiency in ICTs to seek a strategic advantage for themselves. However, these changes had not been disruptive both for technological and pedagogical reasons. The schools had not yet reached technology saturation nor did they possess sufficient technological and pedagogical cultural expertise (Galvin et al., 2010). The terms “technological and pedagogical cultural expertise” are similar to digital fluency.

At the time of writing, there do not seem to be any instruments appropriate for measuring digital fluency in sufficient depth and detail among individual higher educators. Therefore, given the complexity outlined above and the need for rich and detailed insights into the practices involved in developing digital fluency, qualitative methods such as surveys, interviews and observation are used by researchers to investigate digital fluency. Organisational digital capacity can be measured through total cost of ownership, participant surveys and analysis of policies and procedures. However, direct comparisons between institutions can be problematic due to differences in practice and organisational culture.
The thesis now explores how theories on the development of practice both informally through social learning in communities of practice and more formally through learning design can help us to understand the development of digital fluency and the use of TEL in higher education.

2.4 Developing professional practice

The development of digital fluency takes place in a particular cultural, social and organisational context. In situated cognition theory, learning is considered to take place or is situated in the context where it is applied, for example, the workplace (J. S. Brown, Collins, & Duguid, 1989). Tools can best be understood based on their usage in such a context (J. S. Brown et al., 1989). It is practice, both formal and informal, that determines how tools are used and processes are implemented (Wenger, 1998). Within this context communities of practice (Lave & Wenger, 1991; Wenger, 1998) and landscapes consisting of many communities of practice (Wenger-Trayner et al., 2015) may evolve and develop. These concepts provide a useful framework for examining how digitally fluent educators can help their less technologically-proficient colleagues to increase their fluency and make greater use of TEL in their professional practice.

2.4.1 Communities and landscapes of practice

A community of practice can arise where people with a common interest come together, either face-to-face or virtually, providing them with an opportunity to learn how to develop their interest (Lave & Wenger, 1991; Wenger, 1998). They may be unaware that they are learning or that they are members of a community, when learning takes place in casual social settings such as conversations over lunch (Wenger, 1998). Over time, people meet and interact, participate in joint activities and help each other. In this way, communities of practice develop with their own culture, language and values. This leads to the building and sharing a common repertoire of “stories” about their work and its practices. It is through such sharing of information and experiences that people learn from each other and that communities of practice evolve. People wishing to join the community start learning through “legitimate peripheral participation” and through engagement with its norms and rituals learn how to be members of that community (Lave & Wenger, 1991). Communities of practice disappear when they no longer serve a useful purpose for their members. They need not be static as practice is continually changing, therefore, experienced members are also learners in a developing community. Thus, communities of practice can have a role in lifelong learning and professional development.
(Wenger-Trayner et al., 2015; Wenger, 1998). This suggests both a hierarchical and organic view of communities and of practice (Cox, 2005).

However, in the workplace the development of such communities may be facilitated or even directed by the employer (Wenger et al., 2002). J. S. Brown and Duguid (1991, 2017) discuss a dynamic view of workplace communities, where the focus is on problem-solving, innovation and overcoming bureaucratic and managerial obstacles. They cite the seminal example of the photocopier repairmen who met unofficially over breakfast to discuss solutions to the problems that they were encountering in their daily work. Official, product documentation rarely provided solutions to these problems. Thus, the informal sharing of knowledge and experience helped the repairmen to learn how to get their job done. A community of this type can be seen as egalitarian, subverting management in order to get the job done. It is not primarily about learning to be a member of a community (Cox, 2005).

The higher education workplace provides the context for this research. Like most professionals, educators in higher education can be seen as members of multiple communities of practice such as disciplinary, research, administrative, technological and pedagogical communities. Together these communities can be considered as forming a landscape of practice (Wenger-Trayner et al., 2015). In a complex organisational landscape, like a higher education institution, no single practice can represent the whole landscape. While there may be a hierarchy of practices with, for example, policy and curriculum influencing other communities, local practice is never subsumed, as it created by its own practitioners. Where the boundaries of practices meet, there is a potential for misunderstanding and conflict but also for collaboration and innovation. Contact with practices of another community can provide an opportunity for engagement and for self-reflection; thus, creating a rich opportunity for learning. Such engagement may be difficult at first. Brokers, who understand the practices of both communities, can help people to cross the boundary between two communities. In higher education, digitally fluent educators and educational technologists can be considered as brokers who can help lecturers to make the trajectory across the boundaries between their disciplinary and the pedagogical and technological communities of practice. An educational technology community of practice can be considered to form at the intersection between the pedagogical and technological communities. Its members can be characterised by their digital fluency and effective use of TEL.
Members of a community share a common practice but need not share a common location (Garrison, 2017; Garrison & Anderson, 2003). Garrison and Anderson (2003); Garrison and Vaughan (2008) consider “social presence” as an essential element of a successful online learning community. A social presence can help to ease the journey across the boundary into an unfamiliar community. Brokers can facilitate this journey by developing social presence through activities starting with online introductions and exchange of information before, and while, attempting more challenging learning activities (Salmon, 2004). Brokers can also help the new members to handle any technical issues that may arise (Salmon, 2004).

It is not possible to be competent or fluent in all the communities encountered in our professional landscape, we can however be knowledgeable and be familiar with reputable sources of information. An educational technologist, for example, should be a highly competent (in Wenger’s terms) or fluent member of the educational technology community of practice. However, he or she may have a lesser degree of competence in the pedagogical and technological communities; yet, be able to relate them to the educational technology community of practice when required. Furthermore, the educational technologist may have little knowledge of a particular academic discipline but still be able to help an academic to relate its practice to those of the educational community. Wenger-Trayner et al. (2015) refer to these lesser degrees of competence as knowledgeability. This degree of knowledgeability relates closely to professional identity (Trede, Macklin, & Bridges, 2012). Engagement with a landscape’s activities, alignment with its norms and rules and imagination about its practices all help members to identify professionally with that landscape (Wenger-Trayner et al., 2015).

A digitally fluent colleague would be a competent member of the same disciplinary community of practice and share that aspect of professional identity with their less technologically-proficient colleagues. This might make the digitally fluent colleague more readily accepted as a broker who could help those colleagues across the boundary of the educational community. This journey across this landscape of practice can be considered in both technological and educational (or pedagogical) terms. In technological terms, it can be compared to moving along the digital spectrum towards digital fluency (Lenhart & Horrigan, 2003). Digital fluency helps to enable the pedagogical journey by helping the participants to understand not only how, but also why,
to use digital technologies in their practice, in the words of Briggs and Makice (2012) or the perceived affordances of those technologies (Baran et al., 2013).

Landscapes of practice can provide an environment for informal learning through practice, the development of knowledgability and professional identity. This is one means of developing digital fluency and applying it to teaching and professional practice. Learning design provides a more formalised and structured approach for the exchange of knowledge between practitioners. It is discussed in the next section.

2.4.2 Learning design

While communities of practice tend to have relatively informal learning structures and processes, learning design provides a formalised approach for developing and sharing the design of learning activities. Such a formalised approach may have a role in the development of digital fluency. To understand its potential role, it is first necessary to understand what is meant by “learning design” and how it works in theory and in practice.

The word “design” can have a wide range of meaning. Hsi (2007) discusses “design sensibility” in the creation of online games. Her work draws on design-based research which features the design and evaluation of educational interventions in context (formal or informal), which are intended to be of research value while also having an impact on practice (T. Anderson & Shattuck, 2012; F. Wang & Hannafin, 2005). Mishra and Koehler (2006) drew on design-based research to develop their TPACK framework. Likewise, learning design is intended to be of value for both research and practice. However, learning design is a separate, specific framework which aims to improve teaching and learning by providing a notation for sharing teaching practice (Conole, 2014; Dalziel et al., 2013). Such a notation, can be compared to musical scores for sharing music (Conole, 2014; Dalziel et al., 2013). This section introduces learning design and shows how educators might use its formal methods to develop digital fluency by learning from the experiences of their colleagues. Educators can then help their students to increase their fluency through effective practice with learning technologies.

Learning activities are usually designed and deployed in class or online by individual lecturers (Benson et al., 2011). Lecturers learn what works best from their own practice but such knowledge is not usually articulated or shared with others (Laurillard, 2012). Research tends to have little influence on their practice (Laurillard, 2012; Mayes et al., 2009). Learning design enables lecturers to draw on the practice of
more experienced colleagues to make informed decisions on the design of learning activities and interventions (Laurillard, 2012). The process should be explicit and shareable. It includes both gathering empirical evidence to understand the design process, and the development of resources, tools and activities (Conole, 2014). Learning design draws on subject knowledge, pedagogical theory, technological know-how and practical experience, while also facilitating innovation in all these domains (Mor & Craft, 2012). This knowledge and experience can be developed by experienced educators documenting their reflective practice. The National Forum for the Enhancement of Teaching and Learning in Ireland emphasised the importance of such evidence-based design of learning in its digital roadmap (NFETLHE, 2014b).

Most lecturers have little experience in designing TEL (Garrison & Vaughan, 2008). However, the successful implementation of TEL depends on the quality of learning activities developed for the virtual learning environment (VLE) and their implementation into the curriculum (Blin & Munro, 2008). In order to evaluate the potential of a digital technology for teaching in their discipline, lecturers have not only to be familiar with the technology, but must also understand its underlying design model, what it can do and what it cannot (Baran et al., 2013). Learning design can help educators to meet this challenge by providing a methodology and notation to capture the experience and knowledge of their digitally fluent colleagues and use it to develop learning resources (Laurillard, 2012).

Learning design may also help to address the issues of quality and time in TEL. Educators have underestimated the time and effort to develop effective TEL practices. Forty-four per cent (44%) of chief academic officers considered that it takes more time to prepare and deliver a course online than face-to-face. This latter figure has been steadily increasing in recent years (Allen & Seaman, 2013). Acceptance of online learning by academic faculty has been declining in recent years and is now rated at 30.2% (Allen & Seaman, 2013). Many lecturers are turning away from blended learning for both pedagogical and practical reasons (Power, 2008). They have doubts about the quality of learning and find that TEL has imposed an additional, unrewarded workload (Power, 2008). Learning design may help to reverse these trends by providing a specific methodology for sharing practice, thus, both reducing the time required to develop TEL and improving its quality.
Lecturers often lack the support needed to acquire new teaching and technological skills (Vaughan, 2007). In the absence of appropriate infrastructure and support, TEL is unlikely to be adopted successfully (Price & Oliver, 2007). Higher education needs to support educators in developing the necessary expertise (Guri-Rosenblit & Gros, 2011). Lecturers reported being more confident in developing TEL where training and mentoring helped produce a culture of support (R. L. Wang et al., 2012). This support can be from educational technologists (Benson et al., 2011) or from academic peers (Cousins & Bissar, 2012). For successful adoption of new pedagogies and technologies, academic staff need release time to develop technical skills and pedagogic strategies (Ooms, Burke, Linsey, & Heaton-Shrestha, 2008; R. L. Wang et al., 2012). Along with support, this is particularly important for a formal methodology such as learning design which requires experts to develop the initial designs and the techniques for sharing them.

To engage with learning design, not only must educators have, or develop, the necessary skills and knowledge, but they must all have the appropriate mindset (Briggs & Makice, 2012). For successful uptake, any new technology must be consistent with educators’ beliefs, practices and values (Bain & McNaught, 2006). The successful implementation of learning design requires that it conforms both to the individual educator’s professional identity (Trede et al., 2012) and to the culture of the academic institution (Skelton, 2012). Due to its structured nature, learning design cannot readily be implemented by educators, without the intervention and support of institutional level units, such as teaching and learning centres.

In conclusion, learning design provides formal methods for documenting and sharing the teaching practices of digitally fluent educators. It can demonstrate how they make use of a particular technology in teaching their discipline, in particular, how they take advantage of its perceived affordances and avoid its limitations in helping their students to learn. Exchange of such learning designs should reduce the time required and improve the quality of learning activities, while leading to improved professional practice and increasing digital fluency. Interviews with and observation of the practices of experienced educators can illustrate the extent to which this occurs in practice.

For the effective and efficient implementation of learning design, educators need sufficient support and time to engage with the process. This requires a supportive organisational culture. This research proposes to investigate the extent to which formal
learning design processes helped the digitally fluent educators to develop their own fluency, to what extent they use learning design methods to share their teaching practice with their less technologically-proficient colleagues and to what extent they are supported by their institutional structures and services, such as educational technologists.

While learning design can provide a structured approach for the development of learning activities, theories of innovation may help to explain why some educators become digitally fluent regardless of institutional structures, how others can be helped to develop their fluency and how institutional culture and structures can help or hinder them.

2.5 Adoption of innovations theories

Innovation theories can act as a framework explaining how organisational culture and personal preferences can lead to the adoption of new technologies in education. Culture can provide the right environment for communities of practice or methodologies such as learning design to flourish, thus, helping to increase individual digital fluency and institutional digital capacity. This may ultimately lead to organisational transformation.

The adoption of ICTs in learning is considered innovative by governments and international bodies (Ala-Mutka et al., 2008; Harpur, 2010; NFETLHE, 2014a; UNESCO, 2014). There is a governmental and societal expectation that such an innovation can help higher education to address the educational and financial challenges that it faces. Yet, there is no consensus as to what constitutes successful adoption (Reid, 2014). The pedagogically sound adoption of TEL can help to address these challenges. However, their adoption is often limited to the introduction of a VLE with little attempt to make greater use of the digital technologies to enhance teaching practice (Benson et al., 2011; Blin & Munro, 2008; Rienties et al., 2014; Roblyer, McDaniel, Webb, Herman, & Witty, 2010). Theories of adoption of innovations such as Theory of Diffusion of Innovations (IDT) (Rogers, 2003), the Technology Acceptance Model (TAM) (Davis, 1989), the Theory of Planned Behaviour (TPB) (Ajzen, 1991) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) can help to explain the development of digital fluency and the uptake of TEL in higher education and are used extensively in the contemporary research literature. This section continues by examining these theories in more detail.
2.5.1 Diffusion of innovations

Everett Rogers originally published his seminal work on *Innovation Diffusion Theory (IDT)* in 1962, and updated it in 1995 and 2003 (Rogers, 1962, 2003). He has defined diffusion as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003, p. 5). His theory was originally developed for innovations in agricultural practice in the USA but has since been utilised in a wide range of contexts and cultures. He found four main factors influenced the diffusion of an innovation, namely, the perception of that innovation, how information about it is communicated, the nature of the social system (individuals, informal groups or organisations) and time. Communications among informal groups and within the organisation can be considered in terms of communities and landscapes of practice. An educator’s professional identity will affect how he or she perceives an innovation. Rogers defined adoption of the innovation as “a decision to make full use of an innovation as the best course of action available” (Rogers, 2003, p. 21).

Rogers (2003) considered the rate of adoption to be influenced by the adopter’s perceptions of five attributes of the innovation. These were the relative advantage of adoption, that is, to what extent they perceive it as improving on their current situation, compatibility with their existing practice and their beliefs and values, complexity of the innovation, trialability or how easy it is to try out and observability, how easily the results of adopting the innovation can be seen. The type of innovation decision also affects the rate of adoption; an individual decision is likely to be quicker than a group or organisational decision. Communication of information about the innovation is also likely to be quicker when it is through mass media rather than interpersonal communication (Rogers, 2003, p. 233).

Innovation Diffusion Theory describes a linear process, suggesting a one to many communication of the innovation while frequently there is two-way communication between the change agent and the potential adoptee (Rogers, 2003). It focuses on attitudes towards the innovation rather than on behaviour, actual implementation and usage. The ability of the change agent to promote themselves to the potential adoptees can also be a critical factor (Rogers, 2003). IDT focuses on adoption by individuals rather than institutions where regulatory, technical and organisational considerations may apply (Lundblad, 2003; Lyttinen & Damsgaard, 2001). In organisations, innovations may need to be integrated with existing processes and infrastructure (Lyttinen & Damsgaard, 2001).
Within a large organisation, groups can perceive the innovation differently while there may be a herd effect between organisations (Lyytinen & Damsgaard, 2001). In higher education and public bodies, gatekeepers can play an important role in helping or hindering the rate of adoption of an innovation (Lyytinen & Damsgaard, 2001). In the adoption of TEL, these gatekeepers can be IT Departments or Centres for Teaching and Learning; when facilitating the adoption of an innovation the gatekeepers can act as change agents.

Elgort (2005) and Porter and Graham (2016) used IDT as the theoretical basis for their investigations of the adoption of e-learning and blended learning in higher education respectively while Cook, Ley, Crawford, and Warner (2009) used it in a quantitative study to investigate the factors motivating faculty to engage and to continue their engagement with distance and e-learning in four US universities. In small scale, qualitative studies, Stieler-Hunt and Jones (2015) used IDT to explore the slow diffusion of digital games in Australian classrooms and Gillies (2016) used it to explore the uptake of BYOD programmes in a UK university. Fischer and Köhler (2011) have built on IDT to develop their own adopter categories for the uptake of TEL in higher education while Loogma, Kruusvall, and Ümarik (2012) have used IDT to investigate the importance of pedagogical and technological competences, individual motivation and institutional support in the adoption of e-learning in vocational education in Estonia.

G. C. Moore and Benbasat (1991) refined and developed Rogers’ five factors to apply IDT specifically to information technology adoption. They added the factors of voluntariness of use and image. These represent the extent to which adoption is voluntary (or perceived to be voluntary within an organisation) and the extent to which adopting the innovation enhances the adoptee’s social standing respectively. Others such as Davis (1989) and Venkatesh et al. (2003) have developed theories specifically for technology acceptance. These theories may help to explain why higher education has adopted VLEs without making much change to teaching practice.

2.5.2 Technology acceptance

The Technology Acceptance Model (TAM) (Bagozzi, Davis, & Warshaw, 1992; Davis, 1989) suggests that technological innovations are adopted when individuals perceive them to be both useful and easy to use. These two factors are known as perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness is defined as
the degree to which the innovation will help the person with their job performance while perceived ease of use is defined as the ease with which the person can use (and learn to use) the innovation (Bagozzi et al., 1992). Both PEOU and PU are influenced by the educators’ *perceived affordances* or conceptual model of the technology. PEOU can be compared with Rogers’ *complexity* while PU can be compared with his *relative advantage* (Zhou, Lu, & Wang, 2010). His *compatibility* contains elements of both PU and PEOU. Together, PEOU and PU are considered to be predictors of individuals’ attitude towards a new technology, thus determining their intentions to use that technology, which in turn leads to actual usage (Bagozzi, 2007; Bagozzi et al., 1992). Perceptions of ease of use and usefulness contribute towards a positive attitude to a new technology and self-efficacy in its adoption. These perceptions correspond with the views of Briggs and Makice (2012) and Q. E. Wang et al. (2012) writing on digital fluency. They emphasise the importance of a positive mindset and a need for self-efficacy respectively.

TAM has been widely used in studies of the uptake of educational technologies in education (Rienties et al., 2014). Edmunds, Thorpe, and Conole (2012) used TAM to investigate Open University students’ attitudes to the use of digital technologies in their studies, paid work and leisure activities. They found that perceived usefulness and perceived ease of use affected students’ attitudes in all three contexts with the greatest influence being at work; and that use at work was a driver for use of digital technologies in other aspects of their lives. Working with faculty, Rienties et al. (2014) investigated PEOU and PU of a new VLE. In a questionnaire, fifty-three percent (53%) of the participants stated that they found VLEs to be easy to use and sixty-nine percent (69%) perceived VLEs to be useful. After performing five common tasks in a new VLE, which was being introduced to their institution, a similar percentage found it to be easy to use. However, this did not lead them to perceive it as useful. This is considered unusual in technology acceptance model research and may be due to an idealised perception of usefulness as a state which could ultimately be reached with training and experience (Rienties et al., 2014).

Arbaugh (2014) has noted that while TAM has been a good predictor of faculty and student attitudes to VLEs, it has not been a reliable predictor of learning. Bagozzi (2007), who contributed to the original development of TAM, has suggested that, while TAM has been widely cited in the research literature, it has limitations. TAM does not consider users’ goals and is too deterministic in assuming that actual use will follow from
an intention to use, especially where users have no compelling reasons to make use of the technology in practice (Bagozzi, 2007). Although technology adoption decisions are rarely made in isolation, TAM is focused on the individual adopter, ignoring group, social and cultural factors (Bagozzi, 2007). It makes an assumption of voluntariness of use (G. C. Moore & Benbasat, 1991). To address some of these limitations, Venkatesh et al. (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT), which unites elements of earlier theories including TAM and IDT in one combined theory. UTAUT synthesises these theories, proposing that the intention to use and actual usage of a technological innovation are influenced by four main factors. These are performance expectancy, effort expectancy, social influence and facilitating conditions. Performance expectancy is similar to perceived usefulness in TAM; it is the perception that using the innovation will help job performance. Effort expectancy is similar to perceived ease of use in TAM; it is the perception that the innovation will be easy to use. UTAUT introduces two new factors social influence and facilitating conditions. Social influence is the perception that important people want the innovation to be used and that it conforms to management views of what is appropriate for the culture of the organisation or that particular community of practice. Facilitating conditions is the perception that support mechanisms such as training, help desk and possibly financial incentives, will be there to help with the use of the innovation (Venkatesh et al., 2003).

While some studies have found that the four factors in UTAUT do not fully explain the intention to use technology (Teo & Noyes, 2014; Verhoeven, Heerwegh, & De Wit, 2010), UTAUT has been used in studies on the adoption of technology in education (Gillies, 2016; Marchewka, Liu, & Kostiwa, 2007; Teo, 2011; Teo & Noyes, 2014; Verhoeven et al., 2010). Performance expectancy, effort expectancy, facilitating conditions and social influence helped to explain the intention of school teachers and pre-service teachers in Singapore to use ICTs in their practice (Teo, 2011; Teo & Noyes, 2014). Gillies (2016) found that performance expectancy and facilitating conditions helped to explain academic acceptance of Bring Your Own Device (BYOD) practices while Marchewka et al. (2007) used UTAUT to investigate student perceptions of the Blackboard VLE, and Verhoeven et al. (2010) used it to examine freshmen students’ perceptions of their ICT competence and usage. Gillies (2016) also found that both UTAUT and IDT helped him to prepare his questions for semi-structured interviews with academics.
While TAM and UTAUT can help to explain why individuals might choose to adopt technologies, they do not attempt to explain the rate of uptake in a population. Other innovation theories, such as IDT, have divided adopters into categories in an attempt to explain differences in the rate of adoption of an innovation over time.

2.5.3 Adopter categories

In his work on the Diffusion of Innovations, Rogers (1962, 2003) has conceptualised the division between members of a social system, such as a university, into adopter categories based on the length of time it takes them to adopt an innovation. TEL, in general, and, more specifically, learning design can be considered such innovations. Rogers (2003, p. 247) labels these categories as innovators, early adopters, early majority, late majority and laggards. He stresses that these categories are fluid with no distinct boundaries between them. Their presence in a population follows a statistically normal distribution though some members of the community never adopt an innovation (Rogers, 2003). Innovators are the first to adopt an innovation. Typically, they are capable of understanding and applying complex technical concepts, willing to experiment and take risks and have broad, cosmopolitan social networks (Rogers, 2003). They comprise 2.5% of the population in a normal distribution (Rogers, 2003). The early adopters are the next group to adopt an innovation. They are characterised as being opinion leaders, who are better integrated into and more respected by the community than the innovators (Rogers, 2003). Early adopters are also considered to be less experimental and to make more judicious innovation decisions than innovators (Rogers, 2003). They comprise 13.5% of the population in a normal distribution (Rogers, 2003).

The role of a change agent is to influence members of the population to adopt an innovation desired by the change agent’s employer. Change agents often work with early adopters to influence members of the social system to adopt an innovation (Rogers, 2003, p. 28). In higher education educational technologists can be considered as change agents (Buchan, 2014; McNutt, 2010) or change managers (Fox & Sumner, 2014). They are usually employed by an institution of higher education to provide institutional support for the development of digital fluency and the wider adoption of TEL by faculty. In this role, educational technologists often work closely with individual innovators and early adopters who can act as “champions” and complement institutional support for TEL (Cousins & Bissar, 2012; Rolfe, 2012). These innovators and early adopters are often motivated by enthusiasm and idealism, while the majority are pragmatists (G. A. Moore,
Adoption often stops at this stage; failing to cross the *innovation chasm* (G. A. Moore, 2014) or the boundary of a community of practice (Wenger-Trayner et al., 2015). In higher education, institutional leadership and policies can help to create the conditions where it is possible bridge the chasm and reach the majority of faculty (Mayes et al., 2009, p. 111). The early and late majority each comprise 34% of a population. The early majority tend to have higher social status and more contact with the early adopters than the late majority. The late majority tend to be sceptical of innovations but not to the same extent as the laggards who are the last group to innovate. *Laggards* comprise about 16% of a population and tend to look to the past rather than the future (Rogers, 2003, p. 250).

They can form a useful role in raising doubts and possible unintended consequences of adopting an innovation (G. A. Moore, 2014, p. 66). An innovation may never be adopted by all members of the social system (Rogers, 2003). Rogers has stressed that adoption is not necessarily the correct course of action for everyone in the social system.

Fischer & Köhler (2011) have drawn on Rogers (2003) theory of the *Diffusion of Innovations*, to investigate the attitudes, motivation and needs of lecturers towards technology-enhanced learning in higher education. They identified four adopter types – *young professionals, experienced explorers, preservers and reward seekers*. As each type adopts e-learning for differing reasons, any programme to increase digital capacity should reflect these differences. The research participants were academics in Saxony, Germany. Fischer & Köhler (2011) selected a sample of 530 academics from a population of over 8,000. They balanced the sample for type of institution, discipline, position and gender. One hundred and eighty-nine (189) academics completed an online questionnaire. Sixty-nine percent (69%) were using TEL. The respondents had an average of 11.9 years teaching experience. They answered four main questions – reasons for using technology in their teaching practice, their plans for using digital technology, measures that promote the use of TEL and the characteristics of their ideal virtual learning environment. Fischer and Köhler (2011) took a quantitative approach, using factor analysis of the responses to the question, “Why did/do you use digital technology in teaching?” to identify four motives – “increase in performance”, such as, producing better learning materials or being more efficient teachers, “career advancement”, “social reputation” and “performance of duties”, such as ensuring the quality of teaching. They then used cluster analysis to identify four adopter types. These adopter types can be compared with the professional identity of the participants (Trede et al., 2012).
Preservers focus on traditional academic values. They were below average in all four motives, which suggests they had reservations about TEL. Of the four types, the preservers spent most time teaching and in preparation for teaching and had the highest proportion of female respondents. Their wariness of TEL warrants further investigation. Their attitude may correspond to the “bolt-on” approach, where TEL adds to existing practice without fundamentally changing it (Benson et al., 2011). Young Professionals have the least experience of both e-learning and teaching. This type has high values for the motives of “increase in performance” and “social reputation”. They seem to want to increase their efficiency and gain respect from their peers. These values seem to correspond to performance expectancy and social influence in UTAUT (Venkatesh et al., 2003). Experienced Explorers have extensive experience of teaching and of e-learning. This adopter type has above average values for the motives of “performance of duties”, “increase in performance” and “career advancement” and below average values for “social reputation”. They seem to be comparable with the “technology is all” and “purely pedagogic” approaches identified by Benson et al. (2011) and performance expectancy in UTAUT (Venkatesh et al., 2003). Reward Seekers have above average values for the motives of “career advancement” and “social recognition” and below average values for “increase in performance” and “performance of duties”. Their values are likely to be those of the institution where they work. They are mostly male and on average have the highest academic titles.

The second question “In which scenarios do you want to use digital technologies in the future?” attempted to find the level of digital fluency among the participants (Fischer & Köhler, 2011). Factor analysis led to the identification of three factors – enriching teaching processes, enhancing social interaction and replacing existing practices. Young professionals and experienced explorers scored above average on all three factors. Preservers were above average on enriching teaching processes but below average on the other factors especially replacing existing practices. Reward seekers were about average on replacing existing practices but below average on the other two factors. These responses show the relationship between digital fluency, attitudes to teaching and their effect on an academic career.

With their third question “What measures promote the use of digital technology in teaching?” Fischer and Köhler (2011) aimed to find which interventions would promote the uptake of TEL. Factor analysis led to the identification of three factors –
improving professional status, supporting appropriate technology and improving teaching and learning. *Young professionals* and *experienced explorers* scored above average on all three factors though the *young professionals* gave a lower value to improving teaching and learning. *Preservers* were above average on supporting appropriate technology and improving teaching and learning but below average on improving professional status. *Reward seekers* were below average on all three factors. These responses show the relationship between digital fluency, attitudes to teaching and their effect on an academic career.

In their final question, “Imagine a new learning management system was being introduced to your organisation? What characteristics would be important to you?” Fischer and Köhler (2011) aimed to identify those aspects of TEL that were most important to the participants. Factor analysis led to the identification of three factors – usability, reputation and uniqueness. Uniqueness is likely to be selected by those willing to experiment or innovators (Rogers, 2003). Young professionals and experienced explorers gave above average values for all three factors. Preservers rated all three factors below average especially reputation while reward seekers rated all factors below average but give the highest value to reputation.

As well as giving insights into the motivation of educators, the questions asked by Fischer and Köhler (2011) are in themselves pertinent to the investigation of the development of digital fluency. This research plans to reuse three of the questions posed, namely “Why did/do you use digital technology in teaching”, “In which scenarios do you want to use digital technologies in the future?” and “What measures promote the use of digital technology in teaching?”

From all their responses, *young professionals* and *experienced explorers* are most enthusiastic about TEL. Learning design can capture their experiences to provide methods and materials suitable for use by the *preservers* and other educators who are less advanced on the digital spectrum. *Preservers* need to be convinced of its pedagogical benefits while *reward seekers* need to see that using TEL will help advance their career. Each adopter category has different information needs about the attributes of the innovation. Where the institutional culture values the development of digital capacity, there will be digitally fluent *reward seekers*, otherwise the interests and values of *young professionals* and *experienced explorers* mean that they are more likely to be digitally fluent. Institutional
strategies focusing on these needs would facilitate the adoption of technology-enhanced learning innovations (Fischer & Köhler, 2011). These strategies can help higher education institutions to provide the facilitating conditions and social influence that support the development of digital fluency and the use of TEL.

2.5.4 Facilitating conditions and social influence

Digital fluency facilitates the introduction of many pedagogical and technological innovations. Institutional support is usually required for their widespread adoption and implementation. Any innovation may fail at the chasm between the early adopters and the early majority (G. A. Moore, 2014) or at the boundary between communities in a landscape of practice (Wenger-Trayner et al., 2015). For example, there are two parts to the adoption of blended learning adoption in higher education, technology innovation adoption and pedagogy innovation adoption (Elgort, 2005). The technology innovation has largely been adopted by the institutions with the introduction of virtual learning environments (VLE). Likewise, further additions to the technical infrastructure such as SCORM (for sharing data between learning activities and the VLE) are easily adopted at an institutional level as they provide technical solutions to a particular user need (Johnson, Griffiths, & Wang, 2011). Such decisions can be made quickly at an organisational level by the authorities but their implementation may be less effective as actual usage by individuals is optional (Lundblad, 2003). Unlike the institutional adoption of a system, pedagogical use is a voluntary decision by individual academics in the terms of G. C. Moore and Benbasat (1991). While VLEs are made available by the institution, individual academics can choose how to make use (or not) of digital technologies in their teaching practice both online and in the classroom (Vaughan, 2007). Innovation and change introduce risk which educators may seek to minimise (Mayes et al., 2009). Changing practice depends on the educators’ own experiences and views of both education and technology, which form part of their teaching and professional identities (Skelton, 2012). These factors contribute to the relatively low adoption of innovations in TEL as widely noted in the research literature (Blin & Munro, 2008; Elgort, 2005; Rienties et al., 2014; Roblyer et al., 2010). Despite their potential for active and collaborative learning, VLEs are frequently used to distribute lecture notes and PowerPoint slides and generally to complement face-to-face teaching in the transmission model (Blin & Munro, 2008; Laurillard, 2012; Rienties et al., 2014; Roblyer et al., 2010). Theories of technology
acceptance can help to explain why institutions have adopted VLEs without making changes to teaching practice.

Meyer (2010) asked doctoral students, who were working in university administration, to use Web 2.0 tools for communication and discussion of topics on university finance. While her paper did not explicitly mention UTAUT, or the terms, effort or performance expectancy, they can help to interpret her findings. While the students found blogs and online discussion easy to use and useful, they complained about the amount of time required to learn how to use the wiki. They perceived that the wiki was not easy to use and had a high effort expectancy. This may have been linked to the dislike of group work expressed by many of the students (Meyer, 2010); thus may also be evidence of low performance expectancy. The collaborative nature of the wiki may also not have been consistent with their own practice as administrators or research students. Many academics perceive VLEs as a technology that is easy to use but not particularly useful (Elgort, 2005). Asynchronous communication tools such as forums, blogs and wikis are perceived as being both difficult to use and not fitting with their teaching practice (Blin & Munro, 2008) whereas the use of webinars and synchronous online e-learning are seen as easy to use and useful, as they match existing teaching practice, that is, lecture type classes at a fixed time (Power, 2008). Popular technologies, such as PowerPoint and YouTube, were not designed for education but are easy to use and considered useful. Therefore, they are frequently adopted by lecturers (Johnson, Griffiths, & Wang, 2011).

The factors of facilitating conditions and social influence take the adoption of innovations beyond personal perceptions and attitudes towards a wider organisational and societal view. In their model for the development of digital fluency, Q. E. Wang et al. (2013) suggest that organisational factors (or facilitating conditions) and social influence have an effect on the *behavioural intention to use* which in turn effects the actual use of technology, thus affecting the development of digital fluency. According to Bain and McNaught (2006), universities can provide facilitating conditions to develop perceptions of usefulness and ease of use by running workshops to increase awareness of the potential of blended learning; thus increasing the educators’ intention to use. For effective usage of technology, these workshops should focus on pedagogy rather than technological innovation (Blin & Munro, 2008) or both pedagogy and technology (Benson et al., 2011; Hannon, 2008). Support from educational technologist can also be a facilitating condition
according to the respondents in the work of Fischer and Köhler (2011) who also suggest improving professional status and improving teaching and learning as positive social influences.

Official recognition, incentives and awards also act as facilitating conditions and social influences for the adoption of an innovation (Cook et al., 2009; Ooms et al., 2008; R. L. Wang et al., 2012). Their absence may also hinder its adoption (Power, 2008). However, the introduction of incentives to encourage the uptake of an innovation distorts the adoption process. The innovation may be dropped when the incentive is removed (Rogers, 2003). Cook et al. (2009) found that initially academics were intrinsically motivated to participate in TEL but as they spent increasing amounts of time the expectation of extrinsic awards, such as payment, course releases, reduced workload or time off increased (Power, 2008; R. L. Wang et al., 2012).

The slow adoption of new pedagogy may be due to other factors than educators’ attitudes or institutional barriers. It may simply be a matter of time (Rogers, 2003, p. 20). Organisational issues such as the lack of resources and time may hinder the development of new teaching practices (Power, 2008). Developing resources and the preparation for teaching with digital technologies requires more time than conventional lecturing (Baran et al., 2013; Ooms et al., 2008; Vaughan, 2007). This additional time adds to an increasingly heavy workload without any additional rewards and has been considered part of a strategy of “doing more with less” in higher education (Deem & Brehony, 2005).

Fears for their own future and concerns about the direction that higher education is taking can also be a factor. In Ireland, academic work is becoming increasingly casual (Cush, 2016). According to Harpur (2010), lecturers may fear that e-learning is leading to the reduction of their pedagogic role, converting them from lecturers into advisors. Selwyn (2014) suggests that technology can lead to a disembodied transfer of information from the institution to the students which facilitates a contractual, service arrangement between them; thus, further bringing market forces into higher education.

An innovation is more likely to be adopted when it is consistent with the culture and values of the population (Rogers, 2003). Training and capacity building activities in higher education should be “embodied in the academic identity” (Cousins & Bissar, 2012, p. 2). University teachers use e-learning in a way that is consistent with their beliefs about teaching and learning (Johnson et al., 2011). In many cases, this is based on the way that
they were taught as students (Cachia et al., 2010); often on the one-hour didactic lecture (Power, 2008). They, like most people, form their own personal theories about teaching and learning early in their lives and do not change them easily when they become university teachers (Ramsden, 2003). Such perceptions influence the uptake of an innovation and often do not match governmental visions of “state-of-the-art” and “best practice” as outlined in the Hunt Report (DES, 2010) or institutional aspirations for innovative teaching and learning practices and an enhanced student learning experience (Blin & Munro, 2008). Examining higher education in the UK, Skelton (2012) notes that despite years of investment in policy recommendations, a “world class” approach to teaching and learning is still aspirational in British higher education. This is largely due to a prioritisation of research both by many academics and by the universities where they work (Skelton, 2012).

Though computers and networks have replaced earlier technologies such as the use of transparencies on an overhead projector, they are not disruptive to educational practice per se as they fit within the transmission model of education (Laurillard, 2012). Educators regularly use PowerPoint to display information but with little idea of how best to design their slides for effective communication (Kosslyn, 2007). However, they may not consider improved design to be useful and there is little social influence encouraging it. This level of use of PowerPoint suggests that the educators are digitally literate as they know how to use PowerPoint but not digitally fluent, as it is not being adopted in a pedagogically effective manner (Kosslyn, 2007). This could be addressed by learning design using patterns developed by experienced practitioners. Institutions would also need to value and encourage better design. This raises the question for this research as to what extent institutions and individual educators perceive a need for or value digital fluency.

As part of the literature review, the next section presents three cases which illustrate some of the issues affecting digital fluency at the institutional, departmental and individual level in higher education.

2.6 Higher education case studies

ICTs have the potential to act as a disruptive innovation (Christensen, 1997) which could transform higher education (Garrison & Kanuka, 2004). This section examines technology enhanced learning in higher education at an institutional, departmental and
individual level and the extent (if any) to which it has been disruptive or transformative. It also investigates the influence of digital fluency at all levels and its effect on the adoption of TEL.

2.6.1 An institutional case study

Blin and Munro (2008) investigated the implementation of blended learning in an Irish University where the innovative use of learning technologies has been a strategic aspiration since the mid-1980s. This university had recently implemented Moodle as its VLE. Blin and Munro (2008) examined the nature of resources and activities used in active modules in the VLE. Almost 70% of academic staff and most students were found to have used the VLE. 4,740 activities and 11,044 resources had been created in the four main faculties during an academic year. Most of the resources were text-based content such as Word documents, PDF files or PowerPoint slides. Some video, audio and animations were also present (Blin & Munro, 2008). Discussion forums were the most widely implemented activity. Other activities available were wikis, quizzes, chat and glossaries. The division between resources and activities varied between the four faculties with one creating many more collaborative activities than the other three. The much greater usage of resources by all four faculties suggested that the VLE was mainly being used in a way that mirrored conventional lecturing, that is, the transmission model of teaching (Blin & Munro, 2008). There was little evidence of disruption.

Blin and Munro (2008) also conducted a staff survey to determine perceptions of the VLE and to estimate training requirements. This survey was completed by 27% of the academic staff. About one third of the respondents felt that activities in the VLE were not relevant to their teaching, while 60% of respondents were unfamiliar with the more advanced features of the VLE. They were also concerned about the time and support needed to master these advanced features. The survey found that most academics had developed basic “tool-related competencies” in the VLE, that is, they knew how to use the tools. This resembles digital literacy as defined by Briggs and Makice (2012). Training was available in the use of tools such as the VLE. About 43% had attended basic training while others reported that they were self-taught or that they learned in one-to-one sessions with an educational technologist or from a colleague. Similar findings on VLE usage and training have been reported more recently in a large scale study in the USA by Dahlstrom, Brooks, and Bichsel (2014) and in a study of over 200 academics in a higher education institution in Ireland by O'Rourke (2014). Both these studies reported
a growing awareness of emerging technologies but little change in actual practice since 2008.

According to Lane (2009), VLEs (which she calls course management systems) have a built-in instructivist pedagogy which most lecturers use by default. While VLEs contain many interactive features, educators do not make much use of them as they make little use of active and collaborative web technologies in their personal lives. To solve this she recommends training focused on pedagogy before training on tool use (Lane, 2009). While most academics were confident users of the VLE as a tool, few academics had developed “task-related competencies”, that is, knowledge about pedagogical goals that could be achieved, or “metafunctional competencies”, that is, knowing how and when to best use the tools (Blin & Munro, 2008). There was little training in these competencies, which were most likely to be developed (if at all) through experience and informal interaction with colleagues including educational technologists and other support staff (Blin & Munro, 2008). According to Dahlstrom et al. (2014), most educators found it difficult to implement active and collaborative learning in the VLE. However, 57% of the educators surveyed were interested in training to improve their usage of the VLE, which they believed would make them better instructors. O’Rourke (2014) found that many educators were aware of emerging technologies that could facilitate active and collaborative learning but were not inclined to change their teaching practice to use them due to a perceived shortage of time and lack of support.

Task-related and metafunctional competencies in the terms of Blin and Munro (2008) resemble digital fluency as described by Resnick (2001), Hsi (2007) and Briggs and Makice (2012). To achieve its strategic goal of innovation with learning technologies and increase its digital capacity, the university would need to develop training in “task-related competencies” and develop means by which educators could gain “metafunctional competencies” from more experienced colleagues. Learning design could play a role in this process. This could lead to a transformation of existing practice.

While Blin and Munro (2008) examined practice within an entire institution, Benson et al. (2011) conducted an in-depth analysis of practice within a single department in a higher education institution. This allowed them to focus on the experiences and motivations of individual educators.
2.6.2 A departmental case study

Benson et al. (2011) investigated blended learning practices among academic staff in a business school in an English institution of higher education. A 2005 survey had found that over two thousand (2,000) Blackboard (VLE) modules were available and that 99% of students were making regular use of Blackboard (Ooms et al., 2008). However, the use of Blackboard had not affected the approach of most staff to teaching. Benson et al. (2011) conducted semi-structured interviews with a purposive sample of sixteen staff. Resources and activities used in the VLE included video, podcasts and discussion forums. They asked academic staff about their perceptions of, attitudes towards and current practice in blended learning. A typology of blended learning approaches emerged from their data. The researchers characterised the three approaches that emerged as “bolt-ons”, “technology is all” and “purely pedagogic” (Benson et al., 2011, p. 151).

Most of the academics used the “bolt-ons” approach, supplementing their existing practice with ICTs. They used blended learning to vary their teaching delivery and as a means of efficiently managing student groups through the VLE. This group also used non-technological innovations in their teaching and were reluctant to learn technological tools (Benson et al., 2011). In the main, this group had a positive attitude toward blended learning and believed that it benefited their students. These beliefs correspond with “performance expectancy” and suggest that they support the adoption of blended learning. However, concerns about technology problems and the amount of time required suggest that their “effort expectancy” is high. Their concerns could be seen as “performance of duties” in the terminology of Fischer and Köhler (2011). This group could be described as having “tool-related competences” in the terms of Blin and Munro (2008), being digitally literate in the terms of Briggs and Makice (2012) or having a technological fluency in the terms of Hsi (2007), as they have enough technical skill to use the VLE. However, they could not be described as digitally fluent as they did not gather, design, evaluate, critique, synthesize or develop digital media artefacts Hsi (2007).

The technology enthusiasts or “Technology is all” were the second largest group using blended learning in the business school surveyed by (Benson et al., 2011). They were keen to try the latest tools and to include them in their teaching with little consideration for their impact on student learning. Their confidence in experimenting with new technologies suggests that they are “innovators” (Rogers, 2003) who perceived blended learning to be both easy to use and useful (Davis, 1989). They are motivated by
“increased performance” in the terminology of Fischer and Köhler (2011). In terms of Hsi (2007) or Briggs and Makice (2012), these lecturers could be considered as “digitally literate” as they knew about the tools and knew how to use them but lacked “digital fluency” as they did know why and when to use them effectively.

“Purely pedagogic” users of blended learning were the smallest group in the business school (Benson et al., 2011). They used both technological and non-technological innovations in their teaching, selecting approaches that would ensure effective student learning. They perceived blending learning to be useful and had a “positive attitude towards use” (Ajzen, 1991; Teo, 2011). They were innovators who seemed unconcerned about effort expectancy. They are probably “experienced explorers” in the terminology of Fischer and Köhler (2011). Both the “purely pedagogic” and the “technology is all” lecturers could also be considered as innovators in terms of the theory of Diffusion of Innovations (Rogers, 2003). However, only the “purely pedagogic” could be described as digitally fluent, as they were, constructing things of significance using digital technology (Resnick, 2001), and evaluating the use of the technology (Briggs & Makice, 2012; Hsi, 2007). Only this group could be considered to take a transformative approach (Garrison & Vaughan, 2008, p. 5).

Three educational technologists were appointed to help academics adapt their teaching practices and materials for blended learning (Ooms et al., 2008). They worked successfully with all three groups in the business school (Benson et al., 2011). Despite that, the largest group in the business school, the “bolt-ons” made the least use of blended learning (Benson et al., 2011). The educational technologists’ role included staff development in both the pedagogical and technical aspects of blended learning and providing advice and support. They worked collaboratively with the academics on the design, technology and pedagogical approach to both content and activities. In an analysis of the project, the lecturers found the educational technologists to be flexible, reliable, knowledgeable and pleasant to work with among other positive characteristics. They were considered as role models and mentors. Negative factors were lack of time and unclear expectations. Faculty underestimated the time required and in some cases educational technologist knowledge of the subject while the educational technologists overestimated academics technical and pedagogical knowledge (Ooms et al., 2008). The motivations and values of educational technologists may influence the apparent failure of technology-enhanced learning to transform higher education (McNutt, 2010). He found that most
educational technologists valued the learner more than the technology. In the terminology of Benson et al. (2011) they would be “purely pedagogic”, that is, selecting both technological and non-technological innovations that facilitated effective student learning.

Benson et al (2011) stressed that they were not judging the different approaches followed in the business school. Individuals and institutions can choose between them. However, the approach chosen will affect the level and nature of staff development, training and support. Studies of other disciplines or institutions might show a different balance of approaches or even different approaches. For example, in a study of humanities lecturers, blended learning advisers were drawn from the academic staff to support their colleagues in managing the “overwhelming” quantities of resources and tools (Cousins & Bissar, 2012). These advisers were to complement training and support activities by technical staff. The institutional aim was to bring about change horizontally or from the “bottom up” with a focus on individual rather than institutional needs (Cousins & Bissar, 2012).

Cousins and Bissar (2012) focused on the motivations and experiences of digitally fluent academics with a view to understanding how and why they developed their digital fluency. These experiences included tinkering with technology, a feeling of self-efficacy mastering a piece of software, the importance of trying and a supportive family background. Neither they nor Benson et al. (2011) investigated how educational technologists or “purely pedagogic” colleagues could share their expertise with less proficient colleagues.

While Benson et al. (2011) and Cousins and Bissar (2012) focused on the attitudes, experienced and skills of educators within an academic department, Flavin (2012) investigated the adoption (or lack) of learning technologies by individual educators with varying levels of digital fluency.

2.6.3 An individual case study

Flavin (2012) investigated the adoption of learning technologies by individual lecturers, students and educational technologists. He introduced a lecturer who was not skilled in technology (not digitally fluent) to the free, social bookmarking tool, Delicious, and found that after ten months she was a competent and regular user. She had received no training. During the ten months, her family and wider social circle started using
Delicious. She perceived it to be useful, easy to use and social influences encouraged her to use it despite the absence of facilitating conditions such as training and support. About the same time, he introduced an educational technologist to Wallwisher, a free, online noticeboard; she did not use it as she found no reason to do so. While it was easy to use, she did not perceive it to be useful nor did she have a social circle with whom she wanted to share online notices. Facilitating conditions did not seem to be an issue. In the case of the digitally literate lecturer performance expectancy or perceived usefulness and social influences, the wish to share, seemed to be the main driver. Their absence seemed to be the main reason for the non-adoption of the online noticeboard by the digitally fluent educational technologist. The non-fluent lecturer was able to transfer her skills and experiences with Delicious informally to friends and family. Competent and effective use of a single tool or technology is digital literacy or technological fluency, it requires integration into teaching practice to become digital fluency. Both Delicious and Wallwisher are available free on the web. They are not part of the ICT infrastructure typically supplied by an educational institution. The use of and, particularly, a preference for non-institutional tools may have a disruptive effect on higher education institutions.

To further investigate the choice of tools, Flavin (2012) conducted an observation of lecturers and students performing a task on a computer. In fifteen minutes, they had to identify and store materials for a class on assessment using only computer in front of them. All participants successfully completed the task. Both lecturers and students preferred non-institutional tools. Non-institutional tools had a lower effort expectancy; they were considered quicker and easier to use. The institutional tools were not perceived to add usefulness. This suggests that free, non-institutional tools are having a disruptive effect on the in-house IT infrastructure and that the institution is not making best use of its digital capacity. Similarly, Conole, De Laat, Dillon, and Darby (2008) found that students from four disciplinary fields chose tools to create their own rich, technology enhanced learning environment. The students’ choices were highly personalised; often favouring web-based services over institutional systems such as the VLE. Significantly for this research, the work of Flavin (2012) also suggests that the development of digital fluency may be hindered by inappropriate or cumbersome institutional IT infrastructure and that support and facilitating conditions are less important when the technology is easier to use.
2.6.4 Case study summary

The institutional study by Blin and Munro (2008) found that educators were mostly using the VLE to share resources with their students. They were not using the potential of the VLE for active and collaborative learning, mainly due to a lack of awareness. While awareness has increased, the VLE is still mainly being used to support the transmission model of teaching (Dahlstrom et al., 2014; O'Rourke, 2014). Survey responses show that educators give the lack of training, time and support as reasons for their limited use of the VLE (Dahlstrom et al., 2014) and that more training in the pedagogic aspects of ICTs would be beneficial (Blin & Munro, 2008; Dahlstrom et al., 2014). The business school study by Benson et al. (2011) found that most educators were using the VLE in a way that supported rather than changed existing teaching practice with a minority seeing the pedagogic potential of ICTs. Educational technologists supported the lecturers in the business school in working with the VLE. Cousins and Bissar (2012) investigated how some purely pedagogic or digitally fluent humanities lecturers developed their expertise while Flavin (2012) focused on the choices of tools and technologies made by individual educators. First, irrespective of their position on the digital spectrum, any tools and technologies must be considered as useful or have a high performance expectancy. Then, ease of use and social factors are the major factors in the uptake of learning technologies by educators. His findings also suggest that institutional ICT infrastructure may actually hinder the development of digital fluency (Flavin, 2012; Lane, 2009).

These studies suggest that there are small numbers of lecturers making effective use of the potential of learning technologies for active and collaborative learning. Such lecturers can be described as digitally fluent. This raises the question as to how and why these lecturers became digitally fluent and how their skills and expertise can be shared with their colleagues. Barriers to the development of digital fluency include inappropriate infrastructure and a lack of training and support. Time pressures are also an issue. Communities of practice and learning design may help to overcome some of these barriers. These issues will be investigated in this research. To help finalise the research questions, there follows a brief review of this document which concludes with the questions proposed for this research.
2.7 Research Question

International organisations such as UNESCO, OECD and the EU see the economic, social and personal benefit of harnessing the strengths of digital technologies in education. At the same time, the role and values of higher education are being questioned, due both to the increasing number and diversity of students and the enhancing, disruptive or transformative potential of web-based technologies. These technologies are being promoted for many reasons, including their educational benefits, interest in technology per se and from commercial, economic and political interests. Both internationally and domestically, there is a debate as to who controls the contribution of technology to education and what values influence them. In Ireland, the National Forum for the Enhancement of Teaching & Learning in Higher Education has been established by the government with a view to increasing the digital capacity of higher education, both at an institutional level through policies and an individual level through training and skills development. Its board and membership are largely drawn from higher education.

The initial introduction of VLEs has, according to the literature, largely continued a teacher-centred approach to higher education. As illustrated in the institutional and departmental case studies, technology enhanced learning is most often used to supplement and support existing practice and largely makes use of learning by acquisition rather than active learning. ICTs have yet to achieve their potential for developing active and deep learning. To do so higher education institutions should develop policies and structures to support educators in the effective use of their technological infrastructure. This will aid the development of institutional digital capacity. Training and skills development can help educators to benefit from the potential of ICTs to enhance their teaching and professional practice. This training should focus on pedagogy more than tool use.

Educators who are proficient in using ICTs in teaching and learning in their discipline can be described as digitally fluent. A digitally fluent lecturer can evaluate, design and create learning activities using ICTs in a pedagogically effective manner. Digital fluency can be compared with fluency in a foreign language. It requires a positive attitude to technology and corresponds with higher order cognitive skills. These are both essential for deep learning. Individuals may be proficient in the use of some technologies such as social media yet have little interest or aptitude for TEL. There are no measures of digital fluency as such, however, total cost of ownership has been used to measure organisational digital capacity in schools, while surveys have been used to measure digital
competence in school children. Digital fluency is influenced by many factors including age, gender, educational level, income, social support and previous use of and interest in technology. The latter two factors are the best predictors of uptake of TEL in higher education (R. L. Wang et al., 2012).

When considering adopting a new technology, individuals are influenced by their perception of its usefulness and of its ease of use, according to theories of the adoption of innovations such as UTAUT. Social influences, such as use by peers, and facilitating conditions, such as the availability of training and support are also factors. Attitude towards the innovation is also important. Educators have varying attitudes towards using TEL, some value it for its potential to improve their teaching practice while others are concerned about the time required for development of resources or the value of TEL in enhancing their career.

Academics can learn how to improve their proficiency with ICTs from more experienced colleagues. This may happen informally through communities of practice. There is little evidence as to what their experienced colleagues do, how they do it and to what extent they are supported by educational technologists or others. Learning design is an evidence-based technique which can be used to capture their experiences and share them with colleagues. It draws on subject knowledge, pedagogical theory, technological know-how and practical experience and can be used to develop teaching and learning activities, resources and tools. By providing a technique, it can be used to reduce development time and improve both classroom and online learning.

In summary, digital fluency is influenced by institutional commitment to enhancing learning using technology. Appropriate policies and structures can increase digital capacity, by providing an environment where educators can increase their digital fluency. This environment consists of technological infrastructure, positive social influences and facilitating conditions such as training and support. At an individual level, digital fluency enables and encourages educators to use TEL by giving them ability and confidence in their deployment of digital technologies in their professional practice in a pedagogically sound manner. Less technologically-proficient academics can learn how to design engaging teaching and learning activities from the experiences of their digitally fluent colleagues and educational technologists.
The three case studies discussed earlier (Benson et al., 2011; Blin & Munro, 2008; Flavin, 2012) examined how the introduction of institutional technologies has made little change to the teaching practice of most academics. There are many such studies discussing barriers to the effective use of technology enhanced learning (TEL) in higher education but few examining the factors that facilitate it (Porter & Graham, 2016). The purpose of this research is to help to fill that gap by examining how digital fluency can be developed to facilitate the effective use of TEL in higher education. In addition to making an original contribution, the researcher aims to make recommendations for the enhancement of policy and practice in TEL from the outputs of this research. To meet the purposes of the research, the researcher proposes to address this anchor question:

How can the development of digital fluency among academic staff in institutions of higher education in Ireland be understood, facilitated and fostered?

This question will be investigated under the following sub-questions:

1a: What factors influence digitally fluent educators in the development of their own digital fluency?

1b: How do their digital fluency and their teaching and professional practice inter-relate?

2a: How can the digitally fluent educators help their less technologically-engaged colleagues in the development of those colleagues’ digital fluency?

2b: How can educational technologists help their less technologically-engaged academic colleagues in the development of their digital fluency?

2c: How can academic institutions support educators in the development of their digital fluency and its application in professional practice?

3a: What are the views of digitally fluent educators on institutional and national TEL policies?

3b: What role (if any) do they have in their development?

The next chapter discusses the research methods used to investigate these questions.
3. Research Methods

3.1 Introduction to the research methods

As we have seen in the literature review, educators vary widely in their position on the digital spectrum, ranging from those with a basic, technological level of digital literacy to a small number who may be termed digitally fluent (Q. E. Wang et al., 2013; R. L. Wang et al., 2012). Digitally fluent educators can use TEL at the highest cognitive levels (Churches, 2008; Meyer, 2010). They can evaluate technological tools, selecting the most appropriate for a particular pedagogical goal (Briggs & Makice, 2012). They gain their expertise and develop new practices by critiquing, designing and developing teaching and learning materials with digital media (Hsi, 2007). G. A. Moore (2014), writing from an innovation perspective, suggests that there is an innovation chasm between the majority, who are pragmatists and the innovators and early adopters, in this case the digitally fluent, who are motivated by enthusiasm and idealism. To increase the digital capacity in higher education and, perhaps, for their own personal and career development (Fischer & Köhler, 2011), many educators could benefit from an efficient and effective means of learning from their digitally fluent colleagues. This research study draws on the experiences and practices of digitally fluent educators to investigate how they develop their own digital fluency to give them the skills and attitudes needed to create teaching and learning activities using TEL. It then examines how the digitally fluent can help their less technologically proficient colleagues to integrate TEL into their teaching practice in an efficient and effective manner. Furthermore, the study examines how institutional and national policies help or hinder the wider adoption of such approaches. Having described the design of this study in the previous chapter, the current chapter discusses the precise methodology used in this research.

3.2 Research approach

Hsi (2007) argues for a need to study the authentic and emergent uses of digital technologies from a practise-oriented rather than a knowledge-centred perspective. This researcher has chosen a similar approach within the interpretive tradition as it fits with his desire to understand the experiences of digitally fluent educators from their own perspective. Much research on TEL in practice follows in this tradition, for example, Benson et al. (2011) on blended learning in a business school, Cousins and Bissar (2012) on digitally fluent academics in the humanities, Baran et al. (2013) on the transfer of
practice from face-to-face to online environments and Flavin (2012) on the choice of tools and technologies by educators.

According to Creswell (2009), qualitative or interpretive researchers are influenced by a “worldview” which can be social constructivist, advocacy and participatory or pragmatic. In those terms, this researcher is starting from a pragmatic “worldview”, that is, he is concerned with a problem and its solution rather than adherence to any philosophical tradition. Such an approach to postgraduate research in educational technology is advocated by C. Jones and Kennedy (2011). Furthermore, as seen from the work of Calvani et al. (2008); Li and Ranieri (2010) in the previous chapter, it is difficult to quantify digital fluency. Therefore, the researcher is taking a qualitative approach, choosing the methods that best suit his research question with an awareness of both its advantages and disadvantages. As a strategy of inquiry, the case study allows him to explore his research question in depth using a variety of methods both quantitative and qualitative (Creswell, 2009; Simons, 2009; Yin, 2015).

3.2.1 Case study

Blin and Munro (2008) and Galvin et al. (2010) followed a case study approach in their research into the uptake of TEL in higher and secondary education respectively. Likewise, a case study approach has much to offer in terms of the present research, as it can help to illuminate causes and effects by allowing an in-depth investigation of real educators in the context of their practice (Simons, 2009). An explanatory case study is of particular value as it allows the researcher to explain complex, causal links between activities in actual practice (Simons, 2009, p. 21). It explains how and why things happened or the reasons for people saying what they did (Yin, 2015, p. 231), focusing on an issue rather the case (Bassey, 1999, p. 62). An explanatory case study can lead to “fuzzy generalisation” about the issue (Bassey, 1999, p. 62).

In addition to their academic value, case studies enable researchers to write in non-academic language which can help to explain their findings to the general reader. This can act as a call to action as their insights may be used in actual practice in similar situations. Potential weaknesses of case studies include bias and subjectivity on the part of the researcher, the difficulties of checking the accuracy of the findings and a lack of generalisability. These potential weaknesses are factors in the interpretive research tradition which seeks to understand subjective human experience.
In this research, each individual digitally fluent educator is a unique case to be studied (Simons, 2009, p. 4). To investigate these cases, the researcher needed to identify digitally fluent academics, who were noted for their expertise and who would be willing to give a personal view of their own experiences and practices. As in Goode (2010), these academics were not intended to serve as representative examples, rather they were chosen to help to deepen our understanding of the case; in this instance, the facilitation and fostering of the development of digital fluency among academics in higher education in Ireland.

3.2.2 Participant selection

To investigate his research question, the researcher wanted to interview digitally fluent educators. This required the selection of a small, purposive sample which would enable him to conduct an in-depth investigation of participants with the desired characteristics (Simons, 2009, p. 34). Specifically, he used intensity sampling, a form of purposive sampling used to select knowledgeable people (Simons, 2009, p. 34). Benson et al. (2011), used purposive sampling of lecturers in their research on the uptake of blended learning in a business school while Conole et al. (2008) used it in their study of the choices of technology and tools by students from four disciplinary areas, who were experienced in using technology to support their learning.

The researcher decided to use participation in the “EdTech” conference of the Irish Learning Technology Association (ILTA) as a means of identifying digitally fluent educators in Irish higher education. Running since the year 2000, EdTech is an annual two-day conference. It is the principal conference focusing on learning technology in higher education in Ireland. While such a source does not include all digitally fluent educators in Ireland, it includes very many of those who make use of digital technologies in their teaching and professional practice and who are interested in sharing that practice with their colleagues. Thus, it is a suitable source for locating a purposive sample of participants who are digitally fluent, as defined by Hsi (2007), as having developed new teaching and learning practices by critiquing, designing and developing teaching and learning activities with digital media on an ongoing basis. Such participants could help the researcher to answer his research question.

To create his sample and to concentrate on current and recent practice, the researcher decided to examine presentations at EdTech during the last six years (2010 –
2015). On average there were fifty (50) presenters at each EdTech conference in the research period. Research participants were to be drawn from or recommended by the most frequent presenters in this group.

3.2.3 Arriving at a sample

To identify digitally fluent educators, the researcher obtained a list of presenters at all “EdTech” conferences from 2010 - 2015, a total of 6 years. It was difficult to obtain information from the organisers. Therefore, the researcher was obliged to obtain speaker details from the website and convert to Excel for analysis. This was a laborious and time-consuming process. Such a process is liable to human error and while the researcher made considerable efforts to check the data, it is possible that there are minor inaccuracies. There may also be some differences between the published list of presenters and the actual presenters on the day.

To identify regular speakers the researcher gave a score of one for every presentation listed, regardless of presentation type, that is, including keynotes, research, practitioner, technology, poster and “quick-fire” presentations. The exact types of presentation vary slightly between conferences. Where multiple authors were listed, only the first author was considered. Using this method, the researcher identified twenty-two (22) presenters who had given three (3) or more presentations out of a total of 298 presenters. The largest number of presentations given was ten (10) see Table 1 below

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Table 1: Number of presentations given by individual presenters

The researcher considered that more frequent presenters would have broader or deeper insights as their presentations discussed ongoing practice and tended not to be
limited to single projects. To identify these presenters, the researcher decided to focus on those who had given three or more presentations. Table 1 above shows that there were twenty-two (22) such presenters. (It should be noted that the researcher is the person who gave the seven presentations.) Table 2 below shows the number of presenters, their gender and principal job role.

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<thead>
<tr>
<th>Role</th>
<th>#</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer</td>
<td>8</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Educational Technologist</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Head of Unit</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Researcher</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Consultant</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>22</td>
<td>14</td>
<td>8</td>
</tr>
</tbody>
</table>

**Table 2: Presenters by gender and role**

It can be seen that fourteen (14) of the presenters were male and eight (8) were female. Eight of the nine presenters who gave more four or more presentations are male. This does not match the totality of the 298 presenters which divides almost evenly between male (151), female (141) and unknown (6). The presenter’s gender was determined by their first name.

An analysis of principal job role of these twenty-two (22) presenters shows a broad mix of lecturers, educational technologists, unit heads and researchers as in Table 2 above. Gender differences are quite noticeable with men being dominant in the lecturer and head of unit categories, while women dominate the educational technologist category. In terms of the theory of Diffusion of Innovation (Rogers, 2003), these lecturers can be considered to be innovators or early adopters. Innovators may be institutional champions of a new technology or digital fluency (Cousins & Bissar, 2012; Rolfe, 2012). Early adopters may be more useful as participants than innovators as they are considered to be opinion leaders, who are better integrated into and more respected by the community than the innovators (G. A. Moore, 2014). Most unit heads are also innovators or come from a background as innovators but have little or no current lecturing responsibilities. Educational technologists can be considered as change agents who work closely with the early adopters (McNutt, 2010). Table 3 below displays the type of higher education institution where the presenter was employed.
<table>
<thead>
<tr>
<th>Role</th>
<th>#</th>
<th>Uni.</th>
<th>IT</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Educational Technologist</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Head of Unit</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Researcher</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Consultant</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>11</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 3: Presenters by role and institution

Of the eleven presenters from the seven Irish universities, four were from one institution, three from another, two (including the researcher) from the researcher’s own institution and one each from two other universities. Two Irish universities did not feature among the presenters. Of the presenters from the fourteen Institutes of Technology, three were from one institution, two from another and one each from three other institutions. Two lecturers were from a private third-level institution.

Among other questions, this research intends to investigate teaching practice and how colleagues, educational technologists and academic institutions can support its development. This suggests that lecturers and those with a considerable teaching role are more appropriate as research participants than heads of units or educational technologists, who may well be enthusiasts but are not practitioners. Such lecturers could be interviewed based on their individual experiences and expertise rather than as institutional representatives. As these are in a minority (8 out of 22 people identified), it was necessary to use snowballing to identify some of the potential participants.

Due to their role and knowledge of colleagues in their own institutions, the researcher asked the selected heads of unit and educational technologists to suggest further suitable participants. This enabled the researcher to identify additional suitable lecturers and helped to address any gender imbalances. Such snowballing is widely used in qualitative research as it makes use of the participants own social networks to identify further participants (Cohen, Manion, & Morrison, 2011, p. 158; Yin, 2015). In particular, reputational snowballing is a powerful way of identifying members of a small professional network such as digitally fluent educators (Cohen et al., 2011, p. 159). The disadvantage of snowballing is that it may exclude potential participants, perhaps from other subgroups, who may not be members of the participants’ network.
As this group of twenty-two (22) educators represents the most active EdTech conference participants, who are interested in using digital technologies in their teaching practice and sharing that practice, a sample drawn from, or recommended by, these educators is suitable for the explanatory case study used in this research. Through their own voice, these participants can provide rich descriptions and authentic insights, helping to deepen our understanding of the case (Goode, 2010; Hsi, 2007).

3.2.4 Sample size and properties

As recommended by Hsi (2007), and like both Baran et al. (2013) and Cousins and Bissar (2012) this research intends to draw on the emergent practices of digitally fluent educators in their own voice. In their research, Cousins and Bissar (2012) interviewed eleven lecturers who had replied to their email looking for participants who had “adapted successfully to digital change” while Baran et al. (2013) interviewed six “exemplary” teachers based on a selection by programme co-ordinators. By choosing respondents from different colleges within a university, Baran et al. (2013) sought to include a diversity of conditions and contexts. Likewise, this researcher wants to investigate the practice of digitally fluent educators across a range of disciplines and institutions. As he is pursuing an interpretative strategy of inquiry his sample is not intended to be representative rather it is intended to be diverse and to raise interesting and original issues.

In such a qualitative study, it can be difficult to determine how many participants to include. The concept of *saturation* introduced by Glaser and Strauss (1967) asserts that all relevant characteristics or settings have been sampled and that sample size has reached a point where increasing the sample size contributes no further useful information (Barbour, 2008). This can be a “hostage to fortune” and a “bold claim” that is difficult to determine (Barbour, 2008). While it is possible that a larger sample involving more disciplines and institutions might produce additional findings of interest, this research is not attempting to develop a grounded theory. It is in the interpretive tradition which seeks to understand subjective human experience. The researcher chose a sample size of eight interviews. This sample size was considered to have a sufficient degree of saturation to enable him to gain insights into the practices of digitally fluent educators in a diversity of higher education settings in Ireland as detailed in the next paragraph.
The researcher selected eight participants for interview from a range of disciplines and institutions as described in table 4 below. These participants were selected as leading practitioners who would speak from their own experiences rather than giving an institutional perspective. Institutions employing greater numbers of digitally fluent educators, were preferred as participants from those institutions were considered more likely to have successful experiences of developing colleagues and also more likely to be engaged with policy. The potential for snowballing would also be greater in such institutions. The consultant was also chosen as he is associated with a largely online private institution and is involved with policy development. Five of the participants were male and three were female. In the end four of these participants were contacted through snowballing and four were contacted directly from the list of conference presenters. Of the eight participants selected, the researcher knew one professionally through the Irish Learning Technology Association and knew one slightly from meeting at conferences and similar events. The research participants are listed in table 4 below. All were given pseudonyms to preserve their confidentiality. Their gender is preserved in their pseudonym.

<table>
<thead>
<tr>
<th>#</th>
<th>Pseudonym</th>
<th>Discipline</th>
<th>Gender</th>
<th>Inst.</th>
<th>Res.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Margaret Thompson</td>
<td>Digital Marketing</td>
<td>F</td>
<td>IoT</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>Michelle Delaney</td>
<td>French</td>
<td>F</td>
<td>Uni.</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>Brian Power</td>
<td>Computing Statistics</td>
<td>M</td>
<td>T3</td>
<td>N</td>
</tr>
<tr>
<td>4</td>
<td>Kevin Doyle</td>
<td>Education</td>
<td>M</td>
<td>Uni.</td>
<td>Y</td>
</tr>
<tr>
<td>5</td>
<td>David Toomey</td>
<td>Biochemistry &amp; Biotechnology</td>
<td>M</td>
<td>IoT</td>
<td>Sec</td>
</tr>
<tr>
<td>6</td>
<td>William Cleary</td>
<td>Education</td>
<td>M</td>
<td>Consult</td>
<td>Policy</td>
</tr>
<tr>
<td>7</td>
<td>Tony Grant</td>
<td>Biochemistry &amp; Biotechnology</td>
<td>M</td>
<td>Uni.</td>
<td>N</td>
</tr>
<tr>
<td>8</td>
<td>Maria Gallagher</td>
<td>Computer Science &amp; Engineering</td>
<td>F</td>
<td>Uni.</td>
<td>Y</td>
</tr>
</tbody>
</table>

Table 4: Research participants

Of the participants, four worked in universities (or institutes connected to universities) (Uni.), two worked in an institute of technology (IoT) and one each in a tier three college (T3) and in consultancy. Three of those working in the university and the consultant engaged in research (Res) in TEL or related to TEL, in the case of David Toomey this was a secondary interest to his disciplinary research. As a consultant, William Cleary’s, research was applied to government reports and policy development.

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Some other potential participants were also identified in case the chosen participants declined to participate. However, as no one who was contacted by the researcher declined to participate in the research, their participation was not ultimately required.

A network of digitally fluent educators, such as the EdTech presenters, who may influence policy and practice, could be described as an elite (Visser, 2001). In this study, the researcher works as an educational technologist in higher education in Ireland and could, therefore, be a considered an insider, a fellow member of the elite. He is aware of the “insider-outsider” dichotomy in elite interviews as described by Visser (2001) in his work on post-apartheid South African local government reform. According to Visser (2001), the research participant considers the researcher to be an “insider” when both share a similar background. In this case, the research participant is likely to talk freely and give more information to their fellow insider. However, the research participant may doubt an insider researcher’s motives, fear his criticism and be concerned about the potential impact of the research on the participant’s own career (Visser, 2001). To reduce the potential disadvantages of being an insider and to comply with the university’s ethical guidelines, the researcher did not select any participants from the institution where he is employed. When interviewing participants in this study, the researcher was mindful of the potential strengths and weaknesses of being an insider.

Before contacting the participants for interview, the researcher needed to prepare for his field work. As the influence of policy on digitally fluent educators (and equally their influence on policy) was one of his sub-questions, he continued with an investigation of a significant policy document. The analysis of this policy document and the design of the interview are described in the next two sub-sections.

3.3 Analysing a policy document

To gain an overview of policies related to digital fluency in higher education in Ireland, the researcher started by reviewing the Principles and First Insights from the Sectoral Consultation on Building Digital Capacity in Irish Higher Education (Digital Roadmap – Phase 1), hereinafter, it is referred to as the digital roadmap or just the roadmap, from the National Forum for the Enhancement of Teaching and Learning, hereinafter referred to as the National Forum or Forum (NFETLHE, 2014b). Such an analysis of documents is a frequent starting point for TEL research as it can help to
provide context and insight into attitudes and practices (Benson et al., 2011; Blin & Munro, 2008; Buchan, 2011; Galvin et al., 2010). Blin and Munro (2008) analysed operational documents in their institutional-level investigation of the changes brought about by TEL while (Benson et al., 2011) analysed the blended learning strategy of the institution to provide a background to their research into attitudes to TEL at a departmental level. In both these cases, this analysis was used a secondary method, providing context and potential additional insights to data gained from VLE usage, surveys and semi-structured interviews. In their research, Galvin et al. (2010) analysed policy documents as one of many sources of data in their evaluation of the impact of TEL in secondary schools in Ireland while Buchan (2011) examined a range of documents including plans, policies and user surveys as a secondary resource to complement interviews in her research into the transformational impact of TEL in an Australian university.

The digital roadmap builds on previous reports such as the National Strategy for Higher Education to 2030, also known as the Hunt Report, from the Department of Education and Skills in Ireland (DES, 2010) and the European Commission’s Digital Agenda for Europe (European Commission, 2010a). The digital roadmap is a document which intends to inform policy regarding TEL in higher education in Ireland by providing “preliminary recommendations and actionable first steps” (NFETLHE, 2014b). As such, it is highly relevant to this research. It would be interesting to see what input the digitally fluent interviewees had into the roadmap and what impact (if any) the roadmap had on the digitally fluent educators.

The authors of the roadmap intended it to be evidence-based and inclusive. They took a “bottom-up” approach to writing the report, drawing extensively on practitioners’ experience. To that end over 1,000 people involved in higher education were interviewed, including lecturers, students, support, administration and management. The intended readership of the digital roadmap was likely to be involved in designing and implementing digital capacity in institutions of higher education in Ireland. The roadmap identified a series of seven “actionable” first steps which could help to start the process of increasing digital capacity in Irish higher education. Funding was to be made available to support initiatives which facilitated the implementation of these steps.
In order to investigate both the ideas expressed by and the underlying values of the Roadmap authors, the researcher conducted a thematic analysis of the roadmap. This is an inductive approach where the researcher derives themes from a detailed labelling or coding of the text. These themes should help to address the research question by capturing the essence of a document (Braun & Clarke, 2006). Thematic analysis was chosen for its flexibility as it does not necessarily require a detailed theoretical or technological knowledge of a particular approach such as grounded theory and, as such, is considered suitable for early career researchers (Braun & Clarke, 2006). However, despite its ease of use, thematic analysis can provide a complex, rich and detailed account of a document (Braun & Clarke, 2006).

Thematic analysis is widely used by researchers in educational technology. It is explicitly mentioned and used as a research method by Kirkwood and Price (2013) who examined the meaning of the term “enhancement” in research literature on TEL, by Slowey, Kozina, and Tan (2014) in their analysis of open survey questions for a report on the perspectives of Irish academics on their own professional development, by Q. E. Wang et al. (2013) and R. L. Wang et al. (2012) in their development of models for digital fluency from an analysis of the research literature and interviews with mature students respectively, by Veletsianos (2012) who analysed tweets from scholars to develop themes describing online social network practice and by Kubler and Sayers (2010) in their investigation of scenarios for the future of higher education. While not explicitly mentioning thematic analysis, other researchers in educational technology describe a similar approach. Baran et al. (2013) coded and categorised interview scripts to derive themes on the transfer of teaching practice from the classroom to online, Bain and McNaught (2006) used codes and categories to examine the relationship between beliefs and practice by academics in their use of technology in teaching and learning and Kitchenham (2006) looked for themes relating to transformation in his analysis of semi-structured interviews with teachers.

3.3.1 Coding the roadmap

Coding is a technique which helps researchers to understand and analyse qualitative data. It is not an exact science but an interpretative act (Miles, Huberman, & Saldana, 2014). Coding aims to break text in a document into small chunks and label them with code words. There can be several passes through the document to refine the codes until the researcher is satisfied with the results. Once the coding is complete, the
The researcher started by reading and annotating a hard copy of the roadmap with potential codes. For more detailed analysis he worked with a digital version of the contents of the roadmap. To carry out this analysis, the roadmap was exported from PDF to text format. This facilitated the breakdown and coding of the text. The entire corpus consisted of 26 pages. The first four pages including the cover, title, preface and contents pages were omitted as were the final four pages including references, bibliography, team membership and back cover. Pages 5 to 22 were extracted for analysis by coding. The most frequently occurring words in this data set were “digital” (175 mentions), “education” (110 mentions) and “learning” (107 mentions).

Like Buchan (2011), this researcher used Excel as a tool to code documents. The text of the roadmap was copied into Excel with each sentence appearing on a row. Descriptive, also known as Topic, coding is often the first step in data analysis and is popular with novice researchers (Saldaña, 2013). This researcher assigned one or more nouns to each sentence as descriptive codes (Saldaña, 2013). Codes were also assigned to each item in bullet lists where appropriate. In Vivo codes were also used in the first pass to capture the spirit of the document in its own words. According to Lichtman (2006), coding in educational research can generate eighty to one hundred unique codes. In the first pass of this research, 211 items were coded with 113 unique codes. Examples of the descriptive and in-vivo codes applied include:

“Irish higher education needs to set its own agenda, in the context of the existing EU framework, and to chart its own deliberate course “ which was given the descriptive code “Strategy” while “The relentless stream of innovation in the digital world and the interests of commercial enterprise are increasingly dictating the pace of change and the process in how higher education makes use of technology ; whether this is the best way forward is open to question” was coded with the in-vivo code “Relentless Stream”.

Sentence fragments which did not add any additional meaning were not coded. Examples of such fragments include “Several additional consultation activities were also completed during the same timeframe to target the voice of key groups.”
The word cloud in Figure 1 presents the first pass codes in a clear, visual manner. The size of any word is directly proportional to the frequency of its use as a code. As can be seen, “Collaboration”, “Students” and “Strategy” were all chosen frequently as codes.

![Word Cloud Image]

**Figure 1: Codes – size proportional to frequency**

Once the researcher was satisfied with his codes, he started to combine similar codes, reducing the total to 154 pieces of text coded with 35 unique codes. For example, the codes “Agenda” and “Alignment” were both re-coded as “Strategy”. These codes were then condensed into thirteen unique categories as can be seen in Appendix 5. The numbers of categories lies just below the range of fifteen to twenty, a guideline suggested as appropriate by Lichtman (2006). Nevertheless, the researcher considered that the thirteen categories adequately represented the coding of the data set.

### 3.3.2 Deriving themes

In the final stage of the coding process the categories were synthesised into themes. The theme is a word or phrase describing the data or its significance (Saldaña, 2013). Themes can be either manifest (directly observable) or latent (underlying) (Saldaña, 2013, p. 139). The manifest themes derived from this analysis aim to describe the essential meaning of the roadmap. The “Current Context” category was broadened to include the existing “Skills”, “Technology” and “Support” to create a theme based on the current position. Using the roadmap goal of moving “from pockets to networks of innovation”, this theme is called “Pockets”. The roadmap postulates that there is a gap or digital divide which we, the “Stakeholders”, can cross by providing “Leadership” through “Action” in “Collaboration” while bearing in mind our “Values” (such as “Open Education”) and the “Evidence” from research. The theme of crossing this gap is called the “Divide”. Through stakeholder deliberations we will produce a “Strategy” that will have an “Impact”. This
impact will ultimately be the development of “networks of innovation” hence the third theme is called “Networks”. These networks will provide a “Coherent, consistent and seamless digital experience” for students (NFETLHE, 2014b).

Figure 2: Deriving themes from categories

The theme of a journey across a gap matches the concept of a roadmap as in the document’s title. Note that “we” represents the stakeholders. Assumptions both about the “Pockets” or present situation and the “Networks” or desirable situation are implicit in the roadmap. This concept of a journey is explored in depth in the context of Landscapes of Practice (Wenger-Trayner et al., 2015) in Chapter Five.

Up to this point the research has investigated the themes that are manifest in the roadmap. However, techniques such as coding and critical discourse analysis can also help to identify the values underpinning the roadmap, which, in turn, can help to understand how “best practice” is interpreted (Simons, 2009, p. 63). The findings from this latent coding are discussed in section 4.7.2 of the next chapter.

An analysis of a document such as the roadmap, can act as a helpful precursor to interviews as it suggests possible issues and provides a context for interpretation (Simons,
2009, p. 63). Both the use of language and the themes identified in the analysis of the roadmap fed into the design of the interview questions as described in the next section.

During the analysis of the roadmap, the researcher made presentations to his fellow PhD students in UCD, to doctoral students’ conferences in 2013, 2015, 2016 and 2017 and to the Standing Conference on Teacher Education, North and South (SCoTENS) in 2016 and 2017. Preparing for these presentations and answering questions afterwards helped the researcher to develop his own ideas. Having completed his thematic analysis, the researcher had gained insights into policy drivers affecting TEL in higher education in Ireland.

3.4 Interviews and their analysis

To address his research questions the researcher needed to investigate the practices and thinking of digitally fluent educators in higher education in Ireland. Interviews are a widely-used method of data collection which provide an opportunity for detailed questioning of a small number of participants (Simons, 2009). Therefore, they provide a suitable method for an in-depth investigation of the practices of the small number of digitally fluent educators. Interviews are a widely used method in TEL research. For example, interviews have been used in mixed methods case studies on educational technology in two secondary schools (Galvin et al., 2010), to explore the role of educational technologists in the implementation of a learning management system (Hannon, 2012), to investigate the practices behind blended learning implementation in a business school (Benson et al., 2011) and in a narrative inquiry into the process of adapting to digital change in a humanities department (Cousins & Bissar, 2012).

Researchers can use non-structured interviews to gain non-standard, personalised information on a participant’s views (Simons, 2009). Semi-structured interviews follow an interview guide where topics to be discussed are decided in advance. However, the interviewer can follow emergent issues with deeper questions. This interview style resembles a conversation, giving the participants an opportunity to expand on topics of interest. The semi-structured approach ensures that all participants provide similar basic information while giving scope for additional insights. However, any additional information makes comparisons and generalisations more difficult. Semi-structured interviews were used by Benson et al. (2011) to gather data in their research on blended learning in a UK business school and by R. L. Wang et al. (2012) to record doctoral
nursing students’ experiences with mobile learning devices. To help address the research question, qualitative data, such as interview transcripts, can be analysed using coding (Miles et al., 2014; Saldaña, 2013).

Coding is an interpretative act rather than an exact science (Miles et al., 2014). During coding, researchers break text in a document into small chunks, labelling them with appropriate code words. Statistical software such as NVivo can help with this process. In data-led methods, such as descriptive and in-vivo coding, codes are drawn from the data rather than from the research question or other prior sources. This helps to ensure that the coding reflects the participant’s voice. Several methods of coding can be combined to give a “rich” description of the data. Researchers usually make several passes through a document, refining the codes until they are satisfied with the results. The process of coding and recoding can help to shape and reshape the researchers’ perspectives on the data and provide new insights into the research question. To develop these insights, researchers organise and reorganise their codes to consolidate them into overarching categories.

These codes and categories can be further analysed using techniques such as thematic analysis, where researchers attempt to derive latent themes from the categories. These themes should help to address the research question by capturing the essence of a document, thus highlighting underlying processes and values (Braun & Clarke, 2006). Thematic analysis is a flexible approach which can provide a complex, rich and detailed account of a document (Braun & Clarke, 2006). It is widely used by in educational technology research including Kirkwood and Price (2013), Slowey et al. (2014), Q. E. Wang et al. (2013), R. L. Wang et al. (2012), Veletsianos (2012) and Kubler and Sayers (2010). While not explicitly mentioning thematic analysis, other researchers in the field such as Bain and McNaught (2006); Baran et al. (2013) and Kitchenham (2006) describe similar approaches.

In this study, the researcher used semi-structured interviews to explore his research questions. To devise his interview questions/prompts, the researcher returned to his research questions and reviewed the themes drawn from the analysis of the roadmap. To test his study design he conducted a pilot interview with a digitally fluent educator in his own institution. Prior to starting his field work the researcher obtained exemption
from full ethical review for his research. He also engaged a colleague to act as a “critical friend”, advising him on his research methods and findings.

All the research participants were drawn from a pool of frequent speakers, or recommended by those speakers, at EdTech conferences as previously discussed. In terms of the roadmap, they could be described as stakeholders who had created “pockets of innovation”. The interviewees would be asked their views on moving from “pockets to networks of innovation” and about their input into the roadmap or other policies and the effect, if any, of such policies on their professional practice. Once the interviews were completed, they were transcribed and analysed using a range of coding techniques which helped the researcher to identify underlying themes.

The following sub-sections discuss the development of interview questions, framing and supporting the research process, designing, conducting and evaluating a pilot interview, conducting the research interviews, transcribing and editing the interviews and coding the transcripts and developing a thematic analysis.

3.4.1 Developing the interview questions

Drawing on his analysis of the roadmap, his research questions and his literature review the researcher devised questions suitable for use in his interviews. All interview participants were to be digitally fluent educators who could be considered stakeholders in the roadmap’s terms. Their selection is described in the section 3.2.2. As his anchor question was “How can the development of digital fluency among academic staff in institutions of higher education in Ireland be understood, facilitated and fostered?” he wanted a broad opening question which would get the participants talking. As all interview participants would be digitally fluent, he decided on the following as his opening interview question:

I understand that you are using technology-enhanced learning as part of your professional practice. Can you tell me how and why you use TEL? - Researcher

For purposes of clarity, this was preceded by a statement from the National Forum defining technology-enhanced learning as “the use of any technology to support teaching and learning in all contexts” (NFETLHE, 2014a). To facilitate discussion, a paragraph introducing definitions of digital fluency was also added to the start of the interview guide.

Having written the opening question, the researcher devised further questions which could be used to prompt discussion on issues not covered by the interviewees in
their initial response. The follow-up interview prompts are described in Appendix 2 while the interview guide including the interview questions can be found in Appendix 3.

Before interviewing the participants, the researcher decided to conduct a pilot interview to review his questions, his techniques for analysis and general approach to interviewing. To do so he needed to obtain ethical approval from the university.

3.4.2 Framing and supporting the data collection process

Prior to contacting the interview participants, the researcher obtained exemption from full ethical review for his research from the UCD College of Social Sciences and Law. His work was determined to fall into this category through discussions with his supervisor. As part of the exemption, he agreed to obtain any necessary approvals from the research participants. The participants would be able to withdraw at any stage prior to the interview data being anonymised and coded. Participants would not be identified and would be given a pseudonym for purposes of the research. The interviews were to be conducted in accordance with the ethical approval and the UCD Code of Good Practice in Research. This was to be explained to the participants prior to the interview. Having obtained ethical exemption, the researcher was in a position to proceed with the pilot interview.

Before starting his research, at his supervisor’s recommendation, the researcher engaged the assistance of a colleague within the field or “critical friend” to give advice on his research, in particular to help with the analysis of the findings. A critical friend brings their own perspective to the research. They may ask provocative questions and critique the researcher’s findings (Costa & Kallick, 1993). They understand and support the researcher’s goals (Costa & Kallick, 1993). For example, as the work takes shape, the researcher could discuss his categories, themes and memos with the critical friend who would help the researcher to reach alternate interpretations by asking critical questions. This type of “triangulation” is often used in qualitative case studies to aid in the validation of research findings (Simons, 2009). This validation will only take place when the researcher has completed his initial analysis and interpretation. Following an introductory meeting with his critical friend, the researcher began his field work.
3.4.3 Pilot Interview

A pilot study is recommended to test and refine the study design, providing an opportunity to test areas such as field work, data collection and analysis (Yin, 2015). With a view to testing his methods, the researcher conducted one pilot interview in his own institution prior to commencing the research. This interview was with a digitally fluent academic known to the researcher. Data from this interview was not used in the research.

The interview took place in the participant’s office. It opened with the researcher briefly explaining the nature of the pilot and his research, obtaining the participant’s informed consent and permission to record the interview. The researcher estimated that the interview would last between 40 and 45 minutes. However, due to the participant’s enthusiasm it lasted about 50 minutes. The questions used in the pilot interview are in Appendix 1.

Drawing on his analysis of the roadmap and his literature review the researcher had devised four central questions for use in the interview as described in sub-section 3.4.1 above. The researcher started the interview with a broad opening question on the participant’s use of TEL. As it was a semi-structured interview, the participant’s responses were then used as a basis for selecting further questions from the interview guide. As the participant spoke freely, many issues were covered without further prompting. Where necessary, the interviewer returned to the sub-questions in the guide to gather additional information.

Once the interview was complete, the researcher thanked the participant and confirmed that he had permission to use the interview in his research. The participant declined the offer of a transcript. The audio recording was sent to a typist for transcription. On its return, the researcher read the transcript and made a small number of necessary corrections. He then listened to the recording and compared it to the transcript. There was a good match. A few minor edits were made such as changing “patience” to “patients” and “asychronist (sic)” to “asynchronous”.

The next stage was to code the transcript. The transcript was printed and coded by hand. To manage the process better, the transcript was then imported into Excel with a paragraph in each cell. The researcher used structural codes derived from the research questions for initial coding. Such an approach to coding is driven by the researcher’s
interest, aiming to answer specific questions in detail but tending to provide a less rich description overall (Braun & Clarke, 2006). It is often followed by a more detailed analysis (Saldaña, 2013). First pass coding produced 34 codes. This was probably due to the choice of structural coding as a method. The first pass codes were clustered into 10 codes in the second pass by combining any overlapping and/or infrequently used codes. All the codes concerning colleagues were merged into one, for instance, including his perception of colleagues’ views.

The structural coding seemed to miss some important emergent trends from the interview, namely, the importance of the interviewee’s personal beliefs about both technology and education and the effect of technical constraints on the implementation of TEL. A new code TELSelf was introduced to combine the benefits and problems in TEL for him with his personal beliefs on technology and education while a “Technology Barriers” code was introduced to cover more general technical constraints. A number of other emergent codes were added using in-vivo language such as “champions”, “cynics” and “Inefficiencies of scale”. In an attempt to describe the interviewee’s underlying attitudes and beliefs, the text was also coded for his values. Despite generating a relatively small number of codes, the structural coding was time consuming.

As there was only one transcript and a small number of codes, the researcher then moved directly to themes. The researcher drew the following themes from the codes: strong views on TEL based on his own practice, enthusiasm marred by frustration with technical and institutional constraints, unsustainable development in his school due to lack of commitment from senior colleagues, “inefficiencies of scale” in the university with patchy TEL implementation and skills and little personal interest in official policy and inter-university projects.

Technological barriers and pedagogy were discussed extensively despite not being covered by specific questions in the interview guide. When the researcher mentioned policy, the interviewee thought of accessibility and universal design rather than institutional or governmental policies as intended. The interview questions were redesigned to reflect these findings for the actual research interviews.

In summary, after reviewing the coding process, the researcher decided to start with descriptive rather than structural coding in the research. Descriptive coding allows the researcher to take a step back from the research question and, thereby, gain a richer
picture of the data (Saldaña, 2013). The pilot interview helped the researcher to refine his interview questions and coding techniques and alerted him to potential themes for his actual research. Having completed the pilot interview, the researcher was ready to contact the participants for his research interviews.

### 3.4.4 Conducting the interviews

Having selected the participants and reviewed the results of the pilot interview, the researcher was ready to start the interviewing process. Potential participants were contacted by email, either directly in the case of the conference presenters or initially through the heads of units for those who were snowballed as previously described.

Once contact had been established, a time and place for the interviews was agreed between the researcher and the interviewee. For the first three interviews, the participants were asked if they would like to see the interview guide in advance. As those who read the guide beforehand came better prepared to the interviews, it was decided to send the interview guide to all participants in advance. This is common practice in professional interviews (Simons, 2009, p. 48).

All interviews took place during working hours. Two were held in the researcher’s workplace, the reminder in the interviewee’s. All were in quiet rooms to minimise possible disruption. The interviews took place over approximately two months.

The interviews opened with the researcher briefly explaining his research, obtaining the participant’s informed consent and permission to record the interview. The participants were informed that they could withdraw at any stage prior to the interview data being anonymised and coded. It was estimated that the interviews would last for between 40 and 45 minutes with an additional 15 minutes for introductions. Cousins and Bissar (2012) allowed for sixty (60) minute research interviews but found that they completed the interviews satisfactorily in about 30 minutes. However, Simons (2009) found that interviews frequently continued well beyond the hour she had originally suggested due to the interest of the participant. This researcher’s experience was similar, finding that many interviews lasted longer than the proposed hour as the participants were enthusiastic.

The questions used in the interview are described in the “Writing the Interview Questions” section and the complete interview guide can be seen in Appendix 2. Once introductions were complete, the researcher read the definitions of TEL and digital
fluency and answered any questions on them. The researcher opened the interview with a broad question on the participant’s use of TEL. This was a straight-forward opening for the interview, which both helped put the participants at ease, and started to address core questions early on. As it was a semi-structured interview, the participant’s responses were then used as a basis for selecting further questions from the interview guide. As the participant spoke freely, many issues were covered without further prompting. Where necessary, the interviewer returned to the sub-questions in the interview guide to gather additional information.

The interviews were audio recorded using an Olympus digital voice recorder. During the interview the researcher wrote notes by hand to support the audio recordings. Such notes can help both to highlight issues and to document body language and other non-verbal elements of the interview (Simons, 2009). The researcher typed up and edited the notes shortly after the interviews. University College Dublin (UCD) ethical guidelines were followed at all times. All the participants were enthusiastic, and several interviews exceeded the allocated time of one hour. Some had to be finally terminated by the interviewer. On conclusion the participants were again asked for their consent to use the recorded interviews for the interviewer’s research. No participants withdrew their consent during or after the interview. Participants were offered the opportunity to review the typed transcript and suggest minor amendments.

Once the interviews were complete, the researcher verified that they were correctly recorded. To keep the workflow on track, he engaged a secretary to transcribe the audio recordings. This secretary had previously worked for him and was known for the high standard of her work. The researcher emailed the audio files to her. He also prepared a glossary of technical terms used in each interview to aid with the transcription. When complete, she emailed the transcripts back to him as Word documents. As in the pilot interview, the researcher checked the typed transcripts for accuracy and completeness. There were very few errors. First, he read the transcript, noting any obvious typos or other errors. Then he listened to the recording and compared it to the typed transcript, correcting any remaining errors as he went. The interview transcripts were now ready to act as the basis for further analysis. Appendix 11 contains a sample anonymised interview transcript included with the interviewee’s consent.
3.4.5 Preparing the transcripts

The researcher intended to analyse the interview transcripts to interpret the views expressed by the participants and uncover underlying themes. These themes would help him to answer the research questions. To identify these themes, the researcher coded and categorised the contents of the interview transcripts. First, the transcripts needed to be prepared for coding.

To prepare for analysis, the participants were anonymised in the transcript and the pseudonyms described in the Participant Selection section were applied. Any named colleagues were also anonymised. Specific references to their workplace were generalised, for example, changed to “this university” or “this school”. Any disclosures that might allow the identification of an individual or an institution were removed to comply with UCD’s ethical guidelines. Nothing troubling in ethical or moral terms arose in any of the interviews. In a few cases the texts were edited to improve readability without altering their underlying meaning. Pauses and non-verbal cues were recorded in the interview notes. The researcher added them to the transcript where appropriate. Transcripts and field notes were stored and backed-up securely as in the university’s data storage and retention guidelines.

At the end of the interview, the researcher had asked the participants if they wished to review the transcribed interviews. Three of the interviewee’s chose to do so and made minor modifications to the transcripts. Such respondent validation helps both to ensure the accuracy of the transcript and to equalise the relationship between the participant and the researcher (Simons, 2009, p. 131). The researcher re-read the modified transcripts to ensure the changes did not fundamentally alter the transcript. He was then ready to start the process of analysis by coding his data.

As in his analysis of the roadmap, the researcher chose thematic analysis as his research method. This helps to minimise the effect of any preconceived views, as the researcher starts his analysis by drawing on the participant’s own experiences (R. L. Wang et al., 2012) This researcher’s takes a semantic approach to codes and themes where meaning is derived from the participants’ own experiences and motivations (Braun & Clarke, 2006). Coding is the first step in organising the data set for thematic analysis.
3.4.6 Coding the interviews

The approach to coding the interviews builds on the techniques for coding the roadmap described earlier in this chapter. As there were eight interview transcripts to code, the research required two cycles of coding; the first to code the individual documents and the second to compare and combine codes between the documents and build them into categories.

Descriptive, initial, in vivo, structural and values coding are all suitable methods for first cycle coding of interview transcripts (Saldaña, 2013, p. 51). In descriptive coding the researcher assigns a phrase, often a noun, to the data extract, while in initial (also known as open) coding the researcher assigns a code based on his first impression, “in vivo” coding uses words or phrases from the interview as codes, which help to capture the interviewee’s own experience, while values coding assigns a value or judgement to part of the text (Saldaña, 2013, p. 51). These are all data-led methods where codes are drawn from the data rather than from the research question or other prior sources. Structural coding is driven by the research question and topic. It uses content-based or conceptual codes and can be a foundation for later detailed coding (Saldaña, 2013, p. 51). In his analysis of the digital roadmap the researcher used descriptive and “in vivo” coding. In coding the interviews, he also used initial and structural coding to describe broader concepts. To get a rich, thick description of the interview data, the researcher used a combination of these coding methods as appropriate.

The researcher had completed all the interviews before starting the coding process. He began by re-reading the transcripts of the interviews along with the relevant field notes. This helped him to familiarise himself with their content. He noted what he considered to be important points and interesting ideas in a Word document. Based on the advice of his supervisor, he chose the Computer Assisted Qualitative Data Analysis (CAQDAS) software tool, NVivo, to code and analyse the interview transcripts. NVivo has been used by many researchers in the field of TEL (Buchan, 2014; Gillies, 2016; Ooms et al., 2008; Stieler-Hunt & Jones, 2015). Prior to starting his analysis, he obtained some advice and training from an NVivo consultant who gives workshops in the university where the researcher works.

The researcher’s first step was to create a folder called “Interviews” into which he imported the eight interview transcripts. To create a profile of his participants, he set up
“Case Profiles” under “Node Classification”. There he recorded the participant’s pseudonym, discipline, gender, institution type (IT, University etc.) and whether they were research active in TEL as in Table 4 earlier in this chapter. All of these factors could be used to distinguish between the participants and could be relevant for the findings.

This researcher worked through the interviews sequentially. He opened each interview in NVivo and as he read through it, he assigned one or more nouns or phrases to the data as codes. In his first attempt at coding the researcher identified twenty (20) codes. These codes are listed in Appendix 6. One of these “Approach to teaching & prof practice” was used 106 times, while “Colleagues” was used 90 times. Deep coding in educational research can generate eighty to one hundred unique codes (Lichtman, 2006). Since the researcher had much fewer codes and those codes could be considered as too close to his research question, he decided to code again, to get a deeper and more detailed perspective on the interviews. Such detailed coding facilitates the emergence of themes from the data rather than from any preconceived ideas in the research question (R. L. Wang et al., 2012).

At the second attempt and following several iterations, the researcher derived 125 codes from his analysis of the eight transcripts, with the more frequently used codes from the first attempt being divided into sub-codes. These codes are listed by frequency in Appendix 7 with a code book of definitions in Appendix 8. For example, “Approach to teaching & prof practice” was broken down into “Approach in Practice”, “Beliefs about TEL”, “Personal Background” and several other codes. New codes were introduced such as “Assessment” which was applied in thirty-seven (37) places and was used in six of the eight interviews, “Pockets to Networks” which was applied in twenty-three (23) places and was used in seven of the eight interviews and “Feedback Students” which was applied in seventeen (17) places and was used in four of the eight interviews.

NVivo organises data into nodes or collections of references. A node can be a document, a participant profile or a code. For example, in the first pass coding the researcher chose “Twitter”, “Creating Resources”, “Self-Reflection” and “Professionalism” among many others as codes based on his reading of the first transcript. He created a node using the names of these codes. Each node was given a description explaining its meaning. This helped to ensure consistency of coding across the interviews. Each piece of text described by a code can be found at the node of that name. For example,
three mentions of Twitter were coded in the first transcript. These can be found at the Twitter node as follows:

I would use Twitter more to highlight things for the students but also for myself. - Mention 1

Me, completely, and I think people don’t even necessarily know I’m using them, so it’s completely myself (choice of tools - Twitter, wiki etc.). I don’t think we ever sat at a meeting and said we should use something with these students, not really. – Mention 2

So, it was learning about all the online things helped my teaching in a practical way, so it also meant that I could use Twitter. The mystery was disappearing, and I thought nobody knows the answer, its ok to admit that you don’t know it. – Mention 3

It should be noted that some of these mentions were also coded under different nodes. While Twitter is a descriptive code, initial codes were often used to describe an underlying process. For example, mention 1 above was also coded under “Student Learning” and “Self-Development”. Some of these nodes were later aggregated as part of the iterative process of coding. For instance, the “Twitter” and “Wiki” nodes along with nodes for other named technology tools were aggregated under the parent node “How TEL Used”.

As the researcher coded the transcripts, he added Annotations in NVivo, which allowed him to append comments and observations to specific pieces of text, such as:

Key person is technology person – Annotation

Really “with it” for knowing how to do comment in Word (according to colleague) - Annotation

For more general observations and to document the coding process, the researcher wrote an analytical Memo for each interview script. Their purpose was to act as an aid to reflection and to record any issues, challenges or observations that arose during coding. Some candidate themes were identified during this process. These themes were noted for further analysis.

Importance of coaching specific to needs for her colleagues. Hard to transfer from training course to practice. Colleagues interest and skills vary- Memo

She is the least digitally fluent of the educators and sees her own lack of skills as an impediment to progress. She does not immediately recognise the term “educational technologist”. Initially lacking in confidence with technology in front of students - Memo

There were several iterations of the first cycle to breakdown some larger codes, eliminate rarely used codes and combine several similar codes. At the end of the first pass of the first cycle there were a total of 1,108 nodes and 4,544 references in the eight interviews. The number of nodes includes the case nodes and any other relevant nodes.
The number of references is greater than the number of nodes as many pieces of text have been coded at more than one node.

<table>
<thead>
<tr>
<th>Name</th>
<th>Nodes</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview 1 Transcript</td>
<td>119</td>
<td>509</td>
</tr>
<tr>
<td>Interview 2 Transcript</td>
<td>167</td>
<td>576</td>
</tr>
<tr>
<td>Interview 3 Transcript</td>
<td>140</td>
<td>647</td>
</tr>
<tr>
<td>Interview 4 Transcript</td>
<td>149</td>
<td>734</td>
</tr>
<tr>
<td>Interview 5 Transcript</td>
<td>143</td>
<td>522</td>
</tr>
<tr>
<td>Interview 6 Transcript</td>
<td>146</td>
<td>583</td>
</tr>
<tr>
<td>Interview 7 Transcript</td>
<td>124</td>
<td>581</td>
</tr>
<tr>
<td>Interview 8 Transcript</td>
<td>120</td>
<td>392</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,108</strong></td>
<td><strong>4,544</strong></td>
</tr>
</tbody>
</table>

Table 5: Nodes and references from first cycle coding

Once the researcher was satisfied with his first cycle coding, he proceeded to recombine the codes and memos to group them into new categories in the second cycle (Saldaña, 2013). The researcher used focused coding as a second cycle coding method. Focused coding is used to aggregate the most significant initial codes into categories and helps the researcher with cross-case analysis (Miles et al., 2014, p. 86). Themes can be derived from a repeated analysis of these categories. After several iterations, the codes from the first cycle were derived into fifteen (15) categories as detailed in Appendix 9. These were somewhat similar to the twenty codes identified in the first attempt at first cycle coding. He grouped them into seven candidate themes “Development Factors”, “Institutional Role”, “Professional Network”, “Research”, “Teaching Practice”, “Terminology” and “Tools”. These in turn were further combined into five candidate themes “Development Factors”, “Institutional Role”, “Professional Role”, “Terminology” and “Tools”. Further review of the transcripts suggested “Professionalism”, “Lifelong learning” and “Dealing with change” as possible candidate themes, drawing on categories and codes such as “Role”, “Self-development” and “Change”. Meanwhile, on the advice of his critical friend (Costa & Kallick, 1993) the researcher started to write his findings chapter. This helped to develop his thoughts. Such writing is itself part of the analysis and helps the researcher move from description to analysis (Miles et al., 2014, p. 127).
After re-reading and reflecting on the transcripts and the literature review, the researcher made several further iterations through his codes. This process with its multiples passes takes time and can seem to take longer than it does in reality (Miles et al., 2014, p. 93). However, with practice the researcher developed his approach and he became more confident with the depth of the representation generated through the codes and coding process. During this process, the researcher reorganised these categories into five candidate themes, naming them using gerunds as proposed by Saldaña (2013). The themes of “Believing”, “Practising” and “Organising” drew on manifest categories around professional beliefs and values, professional practice and development and organisational structures and values respectively. “Enabling” and “encouraging” drew on the language of the roadmap to describe how digitally fluent educators and higher education institutions might influence their less digitally-engaged colleagues to develop their digital fluency and make use of TEL. These two categories drew on codes which also appeared under the other three categories.

Bringing all aspects of the candidate themes together, the researcher settled on two themes which best represented his analysis of the literature. These were both latent themes which, while moving away from the wording of the research question, helped to address the issues raised in an original manner. These two themes were “Professional Role” and “Institutional Structures”. Following discussion with his supervisor these were changed to the final themes of “Professional Identity” and “Institutional Culture”. This change of wording broadened the themes to better include the beliefs and values of both the educators and the institutions where they practice. These two themes are used to analyse the research findings in the chapters that follow.

3.5 Summary: Research methods

This research takes an explanatory case study approach to the investigation into the development of digital fluency among academic staff in institutions of higher education in Ireland. The cases were eight digitally fluent educators drawn from a range of disciplines and institutions of higher education in Ireland. Five of the participants were male and three were female. They were selected by purposive sampling, using a combination of frequent speakers at educational technology conferences and recommendations from speakers at those conferences. For an in-depth investigation of the questions in the authentic voice of the participants, the researcher chose semi-structured interviews as a research method.
Prior to the interviews and following discussions with his supervisor, the researcher obtained exemption from full ethical review for his research and selected a “critical friend”, who could bring another perspective to the research and help to validate the research findings. To inform his interview questions he conducted a thematic analysis of the Digital Roadmap from the National Forum, a government policy document on the development of digital fluency in higher education in Ireland. To test out his interview protocol, he conducted a pilot interview. This led to some minor changes to the interview questions. As a practising educational technologist in an Irish university, the researcher was aware that participants might see him as an “insider” and that this could influence their approach to the interviews.

The interviews followed the ethical guidelines and participant consent was obtained both before and after the interview. They were audio-recorded, and the recordings transcribed. The participants were given pseudonyms in the transcripts and any potentially identifying information removed. The researcher conducted an analysis of the interview transcripts with the aim of identifying any themes which could provide insights into the research question. To derive themes, he coded the interview transcripts using NVivo. The coding process went through many cycles to combine the codes into categories and to draw themes from those categories. The outputs of that thematic analysis inform the chapters that follow.
4. Findings & Initial Discussion

4.1 Introduction to the findings

This chapter presents and initiates a discussion of the research findings. It is based on the interviews with the digitally fluent educators and references both the literature and policies from the National Forum for the Enhancement of Teaching and Learning in Higher Education in particular its Principles and First Insights from the Sectoral Consultation on Building Digital Capacity in Irish Higher Education, otherwise known as the Digital Roadmap - Phase 1 (NFETLHE, 2014b). The findings in this chapter are presented in the context of the purpose statement and research problem as stated in Chapter 2 using the methods discussed in Chapter 3. These findings are presented in order, with each section including its own introduction and conclusion.

The opening section reviews the concept of digital fluency and explains how the interviewees can be considered as digitally fluent. It then explores the findings in relation to each of the research sub-questions with an initial discussion of their meaning. This is further developed in Chapter 5, the Analysis Chapter and concludes in Chapter 6 where the overall conclusion draws the findings from the sub-questions together with the Analysis and presents them in the context of the purpose statement and overarching research problem.

4.1.1 Demonstrating the participants’ digital fluency

The participants who were interviewed for this research were selected based on their digital fluency, which has been extensively discussed in Chapter 2. A robust research protocol – as outlined in Chapter 3 - has made it possible to explore the nature, acquisition and development of digital fluency. The central purpose of this chapter is to discuss the research findings. However, it is useful to first rehearse the concept of digital fluency with a view to illustrating how the interviewees can be considered as digitally fluent. Their fluency was demonstrated and is discussed largely in terms of evaluating and creating digital resources for their professional practice. In other words, their development of technology-enhanced learning (TEL) activities for their students. TEL is defined and discussed in Chapter 1.

All the interviewees were able to show that they had integrated the creation and evaluation of digital technologies into their professional practice. The verbs create and evaluate signify learning at the higher levels of the revised Bloom’s Taxonomy (L.
Anderson & Krathwohl, 2001), which has been updated to account for learning opportunities facilitated by digital technologies by Churches (2008).

Fluency can be described as the *unconscious competence* of an expert (Dreyfus, 2004). This view of fluency is shared by the interviewees in this research project:

Technology is working best when you don’t notice that it is there - Kevin Doyle (University lecturer in Education)

I suppose fluency means something else has been internalised and automated - Michelle Delaney (University lecturer in Languages)

Digital fluency is used to describe such expertise in the effective use of information and communications or digital technologies (Briggs & Makice, 2012; Hsi, 2007; Resnick, 2001). To confirm that the interviewees were at the fluent end of the *digital spectrum* (Lenhart & Horrigan, 2003), the opening question in all the interviews was:

I understand that you are using technology-enhanced learning as part of your professional practice. Can you tell me how and why you use TEL? - Interviewer

Looking at evaluation first, the digitally fluent educator can evaluate technological tools, selecting the most appropriate for a particular pedagogical goal (Briggs & Makice, 2012). For example, David Toomey mentioned the ability to evaluate resources and integrate them into practice:

So, half the skill, I suppose, in this area in the fluency is to be able to know where to go and look for these resources and be able to grade what’s good, bad and indifferent and how you can integrate it to your teaching - David Toomey (IoT lecturer in Biotechnology)

While giving her rationale for replacing wikis with Google Docs in many of her classes Margaret Thompson reflected on her growing experience in the evaluation of tools:

When I started the MSc in Applied eLearning, I started using eLearning for everything and (now) I’ve pulled back where I felt there was little benefit or that the benefit has changed over the years. - Margaret Thompson (IoT lecturer in Marketing)

Based on create and evaluate, Hsi (2007) defines digitally fluent educators as gaining their expertise and developing new practices by critiquing, designing and developing teaching and learning materials with digital media. This could describe Michelle Delaney’s and Tony Grant’s practice. She has drawn on both theory and practice in her design of an interactive learning environment for her students, while Tony has critiqued and transferred practices from one domain to another:

I’ve developed a model for a flipped classroom where all my courses are supported by an interactive WordPress site that I developed myself … I use an activity theory approach
to design… the students always have an artefact to build. - Michelle Delaney (University lecturer in Languages)

It’s not difficult to make a wedding video - if you can make a wedding video you can make an instructional video - Tony Grant (University lecturer in Biotechnology)

All the above representative quotations from the interviews suggest that all the participants were using TEL in their practice to evaluate or create digital resources and tools and were, therefore, digitally fluent. This research aims to investigate how the development of digital fluency can facilitate and foster the effective use of TEL in higher education.

4.1.2 Digital fluency and technology-enhanced learning (TEL)

Digital fluency gives educators the expertise and confidence to choose suitable approaches and tools for use in TEL (Briggs & Makice, 2012; Hsi, 2007). The concept of technology-enhanced learning (TEL) what it lacks and what it means in theory and in practice has been discussed by Kirkwood and Price (2013) Before examining how the participants developed their digital fluency, it is worth briefly reviewing our understanding of what is meant by technology enhanced learning (TEL) and comparing it with the perspective of the interviewees. As Kirkwood and Price (2013) stressed in their review of the academic literature, technology does not necessarily enhance learning nor is it always clear what is meant by the word enhanced. Both Brian Power and William Cleary shared this concern:

It (TEL) implies that we’ve had a deficit that we moved from the term eLearning to technology-enhanced learning. My issues are around “enhanced” because I don’t think we are necessarily enhancing learning all the time when we are using technology - William Cleary (Independent Consultant Teacher Education)

Would my students be just as knowledgeable if I did a stand-up presentation with no notes, with them writing down as you and I did in our day… whether it is enhanced or not is the big question and it is my firm belief and hope that it has done so. - Brian Power (College lecturer in Computing)

Having raised the issue of enhancement, William goes on to explain how he sees that technology can enhance both learning and assessment:

We can do things with digital technology that we previously could not do with analogue technology, so it allows us to design different types of learning experiences and assessment experiences that are probably more engaging and are more meaningful for learners - William Cleary (Independent Consultant Teacher Education)

Kevin Doyle makes a similar point on the use of the term enhanced and then explains how he considers technology can enhance learning by providing opportunities
for people to learn both inside and outside of formal education (Beetham et al., 2009; Kozma, 2011):

I think what technology does is open up a lot of opportunities for people to engage with information and to engage with processes, engage in activities which are conducive to learning … in the context of preparing students for lifelong education I think that’s a really, really important part of it. - Kevin Doyle (University lecturer in Education)

While technology can open new opportunities for learning, it is important not only to understand how to use technology but also why it should be used, in other words, how it will enhance learning (Kirkwood & Price, 2013):

I often say this about technology enhanced learning, there’s an awful lot of focus on the how and that’s natural. There has to be a focus on the how. I think we need more focus on the why. I really believe that. - Kevin Doyle (University lecturer in Education)

Kevin Doyle’s emphasis on the “why” more than the “how” is the difference between skills or digital literacy and digital fluency in the terms of Briggs and Makice (2012), who defined digital fluency as knowing when to use a tool (or not) and why it should be used. William Cleary goes on to describe the why in terms of the definition of digital fluency given by Hsi (2007) “using digital tools to gather, design, evaluate, critique, synthesize, and develop digital media artefacts” and higher order thinking skills as described by Meyer (2010) in her research on the use of Web 2.0 tools by doctoral students:

I think the digital technology enables our students to think, it allows them to have access to a wide range of sources so higher order thinking skills, synthesis, etc. we can actually set them tasks where they can engage in that kind of practice and step back. - William Cleary (Independent Consultant Teacher Education)

In respect of their digital fluency, the interviewees match the profile of innovators and early adopters in Rogers (2003) theory of Diffusion of Innovations, as they can understand and apply complex technical concepts to their practice. For them, digital technologies have a perceived usefulness (Davis, 1989) or a high performance expectancy (Venkatesh et al., 2003). Such a profile leads them to be the first to adopt innovations such as TEL (Rogers, 2003).

The digital fluency of the participants is particularly significant because, as innovators and early adopters, they may influence colleagues (Porter & Graham, 2016; Rogers, 2003) and may have a wider influence on institutional and national policy. The National Forum’s Digital Roadmap recognises the importance of stakeholders already engaged in TEL in higher education. Digitally fluent educators are or should be among
these stakeholders. The issue of stakeholder identity is discussed in more detail in Chapter 5. Based on its extensive consultations with those stakeholders, the roadmap sees changes in educational practice as inevitable. It advocates that this change is driven by the approaches and values of stakeholders; otherwise those changes may be dictated by commercial or other external interests:

It is not a question of whether or not digital technology will transform Irish higher education, but rather it is a question of who will lead that transformation (NFETLHE, 2014b, p. 6)

As digitally fluent educators have the knowledge and experience to guide such a major transformation, it is valuable to understand how digital fluency develops and how it relates to professional practice. This practice is influenced by the educators’ professional identity and institutional culture.

4.1.3 Introducing professional identity and institutional culture

The quotations in the previous sub-section suggest that William and Kevin, who are both teacher educators, and Brian, who is a computing lecturer with a background in the TEL industry, suggest a professional identity that is strongly linked to TEL. Such an identity enables them to describe a broad frame for the effective use of TEL in higher education and how it relates to digital fluency.

Professional identity and institutional culture were identified as two of the overarching themes in a thematic analysis of the interview transcripts. Professional identity includes elements of technical and interpersonal skills, good reasoning and judgement, critical self-evaluation and a commitment to self-development (Trede et al., 2012). It also includes the embodiment of the attitudes, beliefs and standards of the profession (Trede et al., 2012). Digital literacy is part of this literacy identity (Lankshear & Knobel, 2008)

Professional identity varies among academics as it may focus on either a disciplinary or a teaching identity (Slowey et al., 2014). It may be influenced by their institutional identity and employment status (Cheng, 2014) and is developed through participation in professional networks (Veletsianos, 2012). Due to quality and audit processes and new ways of teaching and assessment, it has come to include an identity based on pedagogy, or a teaching identity (Cheng, 2014). However, teaching identity among academics in research-led institutions is a complex construct which is under-
researched (Skelton, 2012). Some academics draw on internal values untroubled by institutional culture while others wish to change that culture (Skelton, 2012).

This and subsequent chapters draw extensively on these themes of professional identity and institutional culture to discuss, analyse and interpret the research findings.

4.1.4 Summary: Introduction to the findings

Having confirmed the digital fluency of the interviewees, reviewed their understanding of TEL, briefly considered their potential role in influencing colleagues and policy development and introduced the themes of professional identity and institutional culture, we can now proceed with the findings, starting with an examination of how and why the research participants became digitally fluent and the relationship between their digital fluency and their teaching and professional practice.

4.2 How the participants developed their digital fluency

Having confirmed the participants’ digital fluency and reviewed their understanding of TEL, we continue by examining the factors influencing its acquisition and development and how it is manifested in teaching and professional practice. Digital fluency does not develop in a random manner; it is shaped by various influences and opportunities and affects the teaching and professional practice of the educator. To explore the factors influencing the development of the digitally fluent educators’ own fluency, this research draws heavily on their voice as expressed in the interviews and relates it to the literature and work of the National Forum for the Enhancement of Teaching and Learning in Higher Education (NFETLHE), hereinafter referred to as the National Forum. In this section, the role of personal enthusiasm, experimenting and self-teaching, self-efficacy, educational qualifications and career, formal courses and events and informal learning and networking in the development of digital fluency are discussed in turn. All these factors are examined through the themes of professional identity and institutional culture.

4.2.1 Personal enthusiasm leading to professional interest

Personal interest and enthusiasm can motivate people to make use of digital technologies and start them on their journey towards digitally fluency (R. L. Wang et al., 2012). The interviews clearly illustrated this in terms of the participants’ enthusiasm and interest:
I was very interested in the area, and back in 2001/2002 this (TEL) was still fairly new stuff- Kevin Doyle (University lecturer in Education)

I’ve always been quite interested in computers and making them work but not in programming them myself but in how you can use them to be creative. – Tony Grant (University lecturer in Biotechnology)

For some of the participants, their enthusiasm seems to draw on a high performance expectancy (perceived usefulness) in the terms of Davis (1989); Venkatesh et al. (2003) of digital technologies in their professional practice:

I am a strong advocate of technology enhanced learning. In a previous life I worked for an e-learning company and saw the value of people using technology. So, I decided when I was working as a lecturer … that I would practice what I preached - Brian Power (College lecturer in Computing)

I’ve always enjoyed using whatever technology was available to me if I thought it added to the learning and the teaching, for example, I was an Open University tutor in the 1990s… I was a tutor on DT200… it was the first OU module that used an online conferencing system. - Maria Gallagher (University lecturer in Computing)

I fell into language teaching by accident because I needed money to stay in Ireland, but initially I trained as a Mathematician and Economist but that’s a very long time ago and I was always interested in technology and it seemed the way to go and I knew it was going to kind of take-off big time even 30 years ago. - Michelle Delaney (University lecturer in Languages)

In at least one case, their seemingly minor interest led to an early transformative experience:

I trained as a Primary Teacher and I remember the late President of the College received a Macintosh, it must have been around 1984 and it was in the art room and he and I and a couple of other enthusiasts used to play with it. I was always interested from that moment. - William Cleary (Independent Consultant Teacher Education)

In several cases their interest and enthusiasm led the participants to developing careers in TEL, in others it led them to see the potential value of digital technologies to their teaching practice. In all cases, experimenting and self-teaching played a large part in the development of their digital fluency.

4.2.2 Experimenting and self-teaching in the development of digital fluency

The digitally fluent have a personal interest in and enthusiasm for technology which leads them to experiment and tinker with new tools and technologies (Resnick, 2001; Resnick & Rosenbaum, 2013). Tinkering is an iterative, bottom up approach where the learner continually reflects on and reassesses their goals and behaviours, exploring and imagining new possibilities (Resnick, 2012a; Resnick & Rosenbaum, 2013). In this sense, tinkering can reasonably be considered to involve analysis, evaluation and creativity or learning at the higher levels of the revised Bloom’s Taxonomy (L. Anderson
& Krathwohl, 2001). The following quotations illustrate how the participants’ practice has developed through tinkering and experimenting:

I love just signing up for an online tool… doing a bit of investigation to see what’s being done with it, and then I try to connect, how can I bring that in to my kind of teaching or more to the point, how do I bring it in to students learning. - Kevin Doyle (University lecturer in Education)

I was always kind of tricking around with bits of technology myself, making little home videos, putting pictures together into slide shows and that kind of stuff so I was naturally orientated to it (TEL)- David Toomey (IoT lecturer in Biotechnology)

Tinkering and experimenting can lead to learning (Resnick, 2012a; Resnick & Rosenbaum, 2013). It is often through tinkering and experimenting that the digitally fluent teach themselves about new digital tools and technologies. The participants in this study were no exception:

All the VLEs, I started with Top Class, nearly 30 years ago. I did it completely on my own, Web CT, Moodle… WordPress I taught myself. - Michelle Delaney (University lecturer in Languages)

Self-taught, completely self-taught - Brian Power (College lecturer in Computing)

Most of my own learning in the area has been self-taught and there has been experimentation, it has been trial and error - Kevin Doyle (University lecturer in Education)

Really, I very much ferret it out and search around and find interesting things - Maria Gallagher (University lecturer in Computing)

Their ability and willingness to tinker and to teach themselves suggests that the participants have a high perceived ease-of-use in the terms of Davis (1989) or low effort expectancy in the terms of Venkatesh et al. (2003) of digital technologies in their professional practice. Like tinkering, developing digital fluency is an iterative process, the more someone experiments with and reflects on their use of new technologies the more fluent they become (Meyer, 2010). As such, the development of digital fluency can reasonably be viewed as an aspect of lifelong learning:

I think what keeps me going is that I never finish learning… I think if you stop learning, the use you make of technology is not going to be innovative or even very good. - Michelle Delaney (University lecturer in Languages)

Even with stuff that’s old, like I’ve been doing Peerwise for four or five years now and I’m still able to throw a new element to it and I’m interested in trying those out. I don’t think I will ever stop tweaking things. I’d get bored if that was the case, I like the challenge. - David Toomey (IoT lecturer in Biotechnology)

The beginning of the journey… firstly experimenting with clickers and thinking about the positives and negatives - Tony Grant (University lecturer in Biotechnology)
Even the digitally fluent educators find it challenging to keep abreast of changes in technology and the affordances underlying the latest designs. However, their experience, self-confidence and willingness to tinker enable and encourage them to experiment:

I certainly don’t think I know the answer. I’ve learned more things that don’t work than do work. - Tony Grant (University lecturer in Biotechnology)

I’m switching from an iPhone to a Windows Phone. That is going to pose some challenges for me to both create and manage my own content from that device which I can do with my iPhone quite well. - Brian Power (College lecturer in Computing)

4.2.3 Self-efficacy in the development of digital fluency

In their research, Q. E. Wang et al. (2013) and Briggs and Makice (2012) stressed the importance of self-efficacy and a positive mindset in the development of digital fluency respectively. Self-efficacy is related to perceived ease-of-use (Davis, 1989) or effort expectancy (Venkatesh et al., 2003), in that, those with high self-efficacy are likely to believe that they will be able to use an innovation without much difficulty or at least that they will be able to overcome any stumbling blocks as they were coded in this research. This is particularly important for educators operating outside of the norms of institutional support. It is a characteristic of innovators in the theory of Diffusion of Innovations (Rogers, 2003).

A positive approach to tinkering and self-teaching requires a certain level of self-efficacy. Most of the participants exhibited such self-confidence with digital technologies:

My background is engineering and IT, so I have never been afraid of technology in any sense. I would always be someone who would jump in neither am I someone who feels like I’m always an expert but I’m happy to jump in, give something a try, use it or not use it. - Maria Gallagher (University lecturer in Computing)

I’m very good at breaking platforms, pushing it (technology) to its limits. - Michelle Delaney (University lecturer in Languages)

Such self-efficacy can be reinforced by successes and can withstand the occasional failure. It would seem to form part of the professional identity of the digitally fluent. In response to a question on barriers to the use of TEL in their practice, Michelle Delaney (her emphasis) and Brian Power stated that they always managed to get around technical problems. These problems may stem from institutional culture, illustrating a lack of commitment to investment in infrastructure for TEL:

We didn’t have the hardware (in the language lab), we didn’t have web cams so every time some session with the French partners I needed myself to plug in all the web cams… but we manage. - Michelle Delaney (University lecturer in Languages)
The blocks that are there I overcome by going around them, for example, I am sure we will get to a conversation about video… I don’t use any college system or recording studio, I just don’t use it. I use YouTube. - Brian Power (College lecturer in Computing)

While already confident with technology, David Toomey found that the postgraduate course in “Applied eLearning” helped to increase his self-efficacy. Margaret Thompson was the only research participant relatively new to learning technologies; with her first significant contact on the master’s course in “Applied eLearning” in her own institution. She was also the only participant to mention a lack of confidence or fear about technology. Margaret reported initial concerns when using technology with students particularly when they raised questions in class, describing her own IT capabilities as a major stumbling block:

You stand in front of the class and brief them and tell them it’s possible and really even if you have used it yourself, they will ask you something like, “Will it work in Safari?”, and you say, “Which one is Safari?” - Margaret Thompson (IoT lecturer in Marketing)

She goes on to say that, while she finds it “difficult to manage the learning on top of the job”, her self-confidence has increased over the years of using technology in her teaching and that she is now better able to make decisions about its use:

Now I would be more confident but, in the beginning, I was nervous about presenting it to students and whether it will work and the problems that can occur. - Margaret Thompson (IoT lecturer in Marketing)

Margaret has largely managed to overcome her initial lack of confidence by developing her own practice through experience. Now she can confidently say:

I think I am probably one of the people who is using many tools in many different ways - Margaret Thompson (IoT lecturer in Marketing)

Based on these quotations, Margaret can now be considered digitally fluent. Margaret’s and David’s self-efficacy has increased from applying the master’s degree to their practice and reflecting on the outcomes. These findings also seem to confirm the results of Q. E. Wang et al. (2013) and Briggs and Makice (2012) who stressed the importance of self-efficacy and a positive mindset in the development of digital fluency. As their digital fluency grew, the participants were increasingly confident in their ability to work around stumbling blocks in their professional practice.

In several cases their interest and enthusiasm led the participants to developing careers in TEL, in others it led them to see the potential value of digital technologies to their teaching practice. Some participants in both groups went on to gain formal academic qualifications in TEL related subjects.
4.2.4 Educational qualifications and career in the development of digital fluency

Personal enthusiasm and interest in digital technologies may enable and encourage participation in further education and career development. This in turn can increase enthusiasm, interest and the development of a professional identity. Like enthusiasm and interest, education and career can have a positive influence on the development of digital fluency (Q. E. Wang et al., 2013; R. L. Wang et al., 2012). In particular, it is interesting to consider the extent to which the research participants were formally educated or trained in educational technology rather than their original discipline as a possible influence on the development of their digital fluency and their professional identity as educators.

While, as might be expected, all eight of the interview participants had a master’s degree, only four of the eight participants had completed master’s degrees related to technology enhanced learning as seen in the Methods Chapter. Two of the interviewees, Margaret Thompson and David Toomey, undertook a part-time M.Sc. in Applied eLearning in the institution where they worked as lecturers. Their motivation in taking the degree was to improve their own professional practice. Margaret Thompson, the only participant who was relatively new to digital technologies, studied to update both her own disciplinary practice in digital marketing and her teaching practice. In the interview, Margaret Thompson said:

For me it was really important because I teach digital marketing and I felt I didn’t understand that well enough, so it was learning about all the online things helped my teaching in a practical way. - Margaret Thompson (IoT lecturer in Marketing)

David Toomey has an academic background in Biochemistry. He started his professional development in higher education with the Postgraduate Diploma in Higher Education before going on to take an M.Sc. which helped to develop his interest and enthusiasm for digital technologies and to increase his confidence in his own practice:

I did the Master’s in eLearning two years ago but in doing that I was already engaged in a digital world, I had dipped my toe in the water, I had done the PG Dip. – David Toomey (IoT lecturer in Biotechnology)

The Master’s in eLearning helped me, it gave me a wider connection to a larger network… it didn’t change dramatically what I was doing, just confirmed that I was doing things right and allowed me to explore, be confident in exploring different areas and to become self-sustainable. - David Toomey (IoT lecturer in Biotechnology)
The two others, Kevin Doyle and William Cleary, with master’s degrees related to TEL are lecturers in teacher education and completed the master’s prior to their current employment. Unlike David and Margaret, they have been building a professional identity around technology in education since the early stages of their careers as trainee teachers. Development of digital fluency was as essential part of this career. From this beginning, both Kevin and William have gone on to develop their respective careers as a lecturer and consultant in TEL. Kevin has a PhD in Education based on an online environment that he developed while William has a professional doctorate based on his work on developing practice among teachers using synchronous online tutorials.

Of those who did not have a TEL related master’s degree, Michelle Delaney was always interested in technology. She became involved in language teaching and developed a research interest in TEL in language education. This led to her completing a PhD in Educational Technology with the Open University, while working in her current lecturing position. Her topic was learner autonomy in computer assisted language learning. Maria Gallagher also took an indirect route, through working in industry and community education to lecturing in information technology. She has master’s degrees in both systems engineering and women’s studies and is currently taking time out from her lecturing job to study for her doctorate in the area of open education, an interest which she has developed through her professional practice.

Neither Brian Power nor Tony Grant have degrees related to TEL. Tony’s doctorate is in Biochemistry while Brian’s is in Zoology. Tony has used his interest and enthusiasm for technology to develop his digital fluency in his lecturing job, while Brian developed his digital fluency and interest in TEL while working in the e-learning industry.

In brief, four of the eight participants (William Cleary, Kevin Doyle, Michelle Delaney and Maria Gallagher) have developed and are developing their academic careers around TEL and might be expected to be digitally fluent, as would Brian Power who developed his fluency through working in the e-learning industry. Their professional background and identity make it seem likely that they would be digitally fluent. However, Margaret Thompson, David Toomey and Tony Grant do not come from an academic or professional background in TEL and describe other reasons for developing their digital fluency. Tony and David were always interested in experimenting with technology and saw a role for it in their teaching practice. Margaret developed her fluency in response to
her need to keep up with the increasing digitalisation of her discipline, marketing. This suggests that the extent to which the participants were formally educated or trained in educational technology rather than their original discipline may not have a significant influence on the development of their digital fluency but may have a strong influence on their professional identity. This point is further considered in the Analysis Chapter.

4.2.5 Formal learning in the development of digital fluency

Apart from formal degree courses, as tinkerers and experimenters, the eight digitally fluent participants largely taught themselves about digital tools and technologies and their application in practice. Some participated in in-house and online courses, however, they did not in general consider that such courses played a significant role in the development of their digital fluency. This is not to say that educators who are less advanced on the digital spectrum, might not benefit from such courses, which are considered to help academics successfully develop online teaching (J. C. Moore, 2011).

However, these in-house courses often concentrated on the functionality of a tool or system rather than on its effective and efficient integration into practice (Blin & Munro, 2008). The participants described their attitude to institutional courses in their own words:

I went to the summer schools in this institution… a lot a number of years ago for that kind of information. I’m probably due to go again (laughs). Refresh myself. - Margaret Thompson (IoT lecturer in Marketing)

I think our Teaching and Learning Centre is good for generic stuff, but I think language is very specific because you need to completely integrate language as a tool an as object and technology, so it does complexify the situation. - Michelle Delaney (University lecturer in Languages)

I did some courses in DCU, but primarily I am self-taught. - William Cleary (Independent Consultant Teacher Education)

I’ve done a couple of teaching and learning courses I guess, like basic sort of things. My entire theory, understanding of teaching and learning was gotten in three days 20 years ago - Tony Grant (University lecturer in Biotechnology)

William Cleary was the only participant who found the shortage of good courses an initial impediment. He overcame this barrier largely through self-study and further education:

I think initially in my career a lot of times the type of courses that I would have liked to have participated on weren’t available. I think that was one of the biggest things (barriers). - William Cleary (Independent Consultant Teacher Education)

While the participants generally considered institutional courses to be basic, several gained more from attending external courses, mostly online. These courses
seemed to be more advanced or specialised than the in-house courses. Michelle Delaney learned a lot from an online course in Second Life and both William Cleary and Maria Gallagher have benefited from participating as learners in MOOCs. William gave the reputation of the course leader as a reason for participating in a vocational education MOOC, while Maria focused on the opportunities for professional networking:

I am doing a MOOC at the moment that is being led by Professor Diana Laurillard. - William Cleary (Independent Consultant Teacher Education)

I mean latterly I would have signed up for a few MOOCs and things and met some like-minded individuals there. - Maria Gallagher (University lecturer in Computing)

Courses, conferences and professional associations can all provide an environment to build on institutional connections and experience, where educators can learn both formally and informally from their peers. This environment can contribute to the ongoing development of digitally fluency and help the educator to develop their professional practice and to build a professional identity.

4.2.6 Informal learning in the development of digital fluency

Several of the participants in this study found that participating in formal events either as a student or as a presenter, gave them access to a wider professional network which then helped to develop their digital fluency. These networks can help educators to exchange ideas and share. Belonging to such a network was important to many of the participants:

The Masters in eLearning helped me, it gave me wider connections, it reaffirmed what I was doing… and allowed me to explore, be confident in exploring different areas and to become self-sustainable if I went off piste. - David Toomey (IoT lecturer in Biotechnology)

So, personally, I really wanted to share things… I would be invited each year by the Teaching and Learning Centre to speak with academics who are on the Diploma and the Cert in academic practice. So that sets up nice connections for all of us. - Maria Gallagher (University lecturer in Computing)

Brian Power and William Cleary, who have built careers around TEL, mentioned the value of attending conferences to keep up-to-date, to make useful contacts and to learn what is happening in other countries. David Toomey spoke very favourably of the value in participating in educational technology conferences, stressing their value for networking:

When I went to a few conferences … I felt comfortable at EdTech chatting to people who were more experienced than me… they were willing to share their time and expertise
through coffee conversations and chatting over dinner. - David Toomey (IoT lecturer in Biotechnology)

Michelle Delaney expanded on this point by stressing the importance of linking formal and informal learning for herself, her colleagues and her students:

We have to explore the bridge or bridges between informal settings and formal settings because I think that there’s a big gap between what’s happening between the four walls of a classroom or a VLE because it’s the same in most cases and what people do outside. - Michelle Delaney (University lecturer in Languages)

In a study of professional development among Open University tutors, Knight, Tait, and Yorke (2006) found that while formal learning plays a significant role both in learning to teach and in learning to function in a specific system, much of professional development in higher education takes place outside of formal events. This may be the most significant means of professional development for many academics (Slowey et al., 2014). Such informal learning may take place through professional and personal networks which may develop from contacts made at virtual and real world events (Rajagopal, Joosten–ten Brinke, Van Bruggen, & Sloep, 2011). These networks allow practitioners to exchange ideas and support each other on an ongoing basis (Siemens & Tittenberger, 2009). They can provide the facilitating conditions and social influences which can help to foster professional development (Rajagopal et al., 2011). Such networks may be internal or external as illustrated in the respective quotes from Maria Gallagher and David Toomey below:

I developed alliances, personal alliances with the Teaching and Learning Centre here at this university because they were also interested in that, so I suppose that was the most important thing for me, my personal learning network. - Maria Gallagher (University lecturer in Computing)

David took some time to develop his network and struggled at first without it. Based on his prior experience, David was confident of his technological skills but, when starting to develop his fluency in the context of his professional practice, he found that he was held back by the absence of colleagues in his own institution with similar interests:

This was a mission that I went on my own. I’ve ploughed a lonely furrow for a long time now, trying to figure things out. - David Toomey (IoT lecturer in Biotechnology)

However, he found that by participating in the postgraduate course in Applied eLearning, he learnt how to apply theory to his practice, to build his network and to make links between his formal and informal learning. This increased his self-efficacy.

The Masters in ELearning helped me, it gave me a wider connection to a larger network… it didn’t change dramatically what I was doing, just confirmed that I was doing things
right and allowed me to explore, be confident in exploring different areas and to become self-sustainable. - David Toomey (IoT lecturer in Biotechnology)

In the only potential reference by the participants to learning design (Laurillard, 2012), David mentioned that he would have liked to have colleagues with whom he could discuss his lesson designs:

In my head it was a great design but in practice it maybe didn’t come out the way that I wanted it… but I had no one to talk to about it, was this a problem that was noted before, how could I make this better. – David Toomey (IoT lecturer in Biotechnology)

He came up with a solution through reflecting on his own practice. Later, he managed to develop external professional networks to meet this need.

By having this network outside of the institute, I could develop my practice from speaking to other likeminded people. I look out more than in, definitely connected with learned bodies… I look out for support and guidance for help. – David Toomey (IoT lecturer in Biotechnology)

Baran et al. (2013) suggest such informal networks can provide advice and encouragement to academics wishing to develop their online teaching practice. Maria Gallagher shares this view:

So, as I discovered sometimes those Personal Learning Networks that I developed online they embolden you. You think, wow someone else is trying this. - Maria Gallagher (University lecturer in Computing)

Such personal learning networks can help to maintain self-efficacy and sustain digital fluency and can play an important role in professional development and in the development of a professional identity. These networks often operate through social media such as blogs (Giarré & Jaccheri, 2008) or Twitter (Veletsianos, 2012) where they can be used to create and manage personal learning environments (Dabbagh & Kitsantas, 2012; Watson, Watson, & Reigeluth, 2015). Twitter is a popular social media tool for networking in higher education as it enables educators to exchange information, request and offer assistance, make connections and highlight their activities (Veletsianos, 2012). Informal learning through social media can increase digital fluency (Rajagopal et al., 2011). Four of the participants Margaret Thompson, David Toomey, Kevin Doyle and Maria Gallagher all explicitly mentioned Twitter in this respect. Both Kevin and Maria discussed it in detail as part of their professional practice, as Maria said

You knew that there were teachers out trying these things using Twitter for teaching, exploring digital identities with students, all the things I felt were really important, but I didn't see anybody immediately around me developing, so Twitter was an important tool for me. - Maria Gallagher (University lecturer in Computing)
Kevin teaches his education students about the value of Twitter as part of his course *Teaching and Learning with Web 2.0*. He has also managed, after overcoming a very sceptical response, to convince colleagues about the benefits of Twitter which he sees as a “serious tool for teaching and learning” as it facilitates access to so much information.

However, Brian Power had tried but discontinued Twitter as he found it of little benefit. He prefers to use his *YouTube* channel and his *LinkedIn* page for professional communication. Brian also writes a blog which contains a mix of the personal and professional articles. In his own words:

> I also started blogging at an early age as well. I have had a YouTube channel for over ten years now. For a while I used Twitter - it didn’t really add much value to what I was doing. - Brian Power (College lecturer in Computing)

Though *YouTube* and blogs are also used to share information, Brian’s approach would seem to suggest that he values one-to-many communication or building content rather than connecting people (McVerry, Belshaw, & O'Byrne, 2015). Both Brian and Kevin’s practice shapes their choice of tools, while the tools in turn shape their practice. The other three participants made no explicit mention of Twitter though all were engaged in professional networks which can help to provide the social conditions which help to build a professional identity and foster innovation.

The participants have taken their own approaches to the use of social media in blending formal and informal education and professional development. This has enabled and encouraged them to develop and sustain their digital fluency. Their digital fluency has been an influence on their professional practice, which in turn positively influences their fluency.

### 4.2.7 Summary: How the participants developed their digital fluency

In summary, enthusiasm, educational qualifications and prior experience of digital technologies were found in this study to be major influences in developing digital fluency for most of the participants. This corresponds to the findings from a comprehensive literature review (Q. E. Wang et al., 2013) and from a study of mature nursing students (R. L. Wang et al., 2012). All the participants were intrinsically motivated to develop their digital fluency, suggesting that digital fluency formed part of their professional identity. This aspect of professional identity relates to *compatibility* in *Innovation Diffusion Theory (IDT)* (Rogers, 2003) where an innovation is compatible with existing
attitudes and interests. Most participants had postgraduate qualifications in a TEL-related subject. Kevin, Maria, Michelle and William all have (or are studying for) TEL-related doctorates. They received support from their employer as did David and Margaret who have a master’s in *Applied eLearning* from their own institution. This suggests that supporting accredited courses and higher degrees in areas related to TEL forms part of the institutional culture in their work place. The four participants with or studying for TEL-related doctorates all have built careers around TEL as has Brian Power, who has extensive industry experience. Margaret Thompson was the least technologically experienced of the participants and initially lacked confidence and experience with technology. However, she succeeded in developing her own fluency through the master’s degree, experimentation and practice. All the participants were largely self-taught, developing their fluency through trial and error in experimenting with technologies. This is frequently how the digitally fluent develop (Resnick, 2001; Resnick & Rosenbaum, 2013).

Most of the interviewees saw non-accredited in-house courses as basic and focusing on tool use, having little impact on their digital fluency; a view shared by Blin and Munro (2008). Much professional development in higher education is informal, taking place through conferences, professional associations and networking (Knight et al., 2006). In the absence of colleagues, David found it initially difficult to develop his fluency. However, in-house courses helped him and Maria to start a professional network. Maria and David went on to develop a broad, external network of like-minded peers through conferences and events. While the research participants tend to describe themselves as early adopters in their own institutions, they have the broad, cosmopolitan social networks typical of innovators (Rogers, 2003). A mix of formal and informal learning can lead to the creation of personal learning networks with interested colleagues around the world (Dabbagh & Kitsantas, 2012; Rajagopal et al., 2011; Veletsianos, 2012). Such networks are often based around social media and can help to increase digital fluency (Hsi, 2007). Such networks helped to enable and encourage them to develop their digital fluency by providing both guidance and motivation. Such commitment to continuing professional development suggests that digital fluency is part of their professional identity.

Interestingly, the participants had high levels of *performance expectancy* and low levels of *effort expectancy* (Venkatesh et al., 2003) which along with their self-efficacy
led to confidence in their own digital fluency (Q. E. Wang et al., 2013). As such they were experienced explorers (Fischer & Köhler, 2011). Five of the participants (Brian, Kevin, Maria, Michelle and William) have developed their careers around TEL. It is part of their professional identity. David, Margaret and Tony have developed their careers in their own discipline and use TEL as part of their teaching practice thus increasing their digital fluency. In this sense, they can be considered as innovators or early adopters of the practice of TEL in terms of the theory of Diffusion of Innovations (Rogers, 2003). While this section examined how the participants developed their own digital fluency, the next section examines how this digital fluency effects their teaching practice.

4.3 The relationship between digital fluency and professional practice

While the previous section concentrated on the development of digital fluency, this section focuses on how the participants’ digital fluency influences their teaching and professional practice. A few of the participants described their practice in theoretical terms such as activity theory (Engeström, 2001) or digital identities (Goode, 2010; Hsi, 2007). Others talked in broader terms about their approach to developing higher order learning using active and collaborative techniques. For those participants working in teacher education and computing, TEL seemed to be an essential part of what they did. TEL, through teaching and modelling, was their job, while the others used TEL for a variety of reasons such as improving their own time management, supporting distance students, making classes more engaging, collaborating with students in other institutions and co-creating resources with their students.

4.3.1 Teaching approaches in theory

Among all the participants, language lecturer, Michelle Delaney has developed the most theoretical approach to her teaching practice. Like Kevin, Maria and William she has extensive experience in TEL. It is embedded in her teaching and research practice and forms part of her professional identity. Her approach is based on activity theory which draws on the work of Engeström among others (Engeström, 2001):

I use an activity theory approach to design and they (students) always have an artefact to build, either individually or collaboratively and they use technology to prepare the artefact, to produce it, to research ideas, to look for language items that are going to be used. - Michelle Delaney (University lecturer in Languages)
Michelle reports that the students initially find this approach demanding but they mostly appreciate its value and learn to appreciate its wider application in their studies and careers:

Well the main difficulty they have, they say it’s a lot of work… They usually respond quite well and see the added value of what we are doing… they usually see very quickly that it can be useful too… especially in a professional context but also for other modules.
- Michelle Delaney (University lecturer in Languages)

Understanding and developing digital identity or identities can be useful lenses for exploring digital fluency (Hsi, 2007). Digital fluency can be considered an aspect of digital identity (Lankshear & Knobel, 2008). Whether collaborating on artefact production or using social media we are all represented by our digital identities (Goode, 2010; Greenhow, Robelia, & Hughes, 2009; Hsi, 2007; Tess, 2013; Veletsianos, 2012). This concept of digital identity provides a theoretical basis for both Maria Gallagher’s research and her teaching. In her module on Professional Skills, she helps students to understand how their use of social media can help to shape their own digital identities, while Kevin Doyle shares this concern, giving the example of dormant Bebo accounts:

So, before I invited students to participate in any open online spaces like Google Docs, Twitter or other tools like that, we did a lot of work around inviting students to explore their current digital identities - Maria Gallagher (University lecturer in Computing)

So, we used Twitter, I learned that the digital identity discussion had to come first because we needed to offer students a chance to reflect. Do they want to use their existing Twitter account, or do they want to create a mock one? - Maria Gallagher (University lecturer in Computing)

So, most of you used Bebo and then went to Facebook, is that right? When you moved to Facebook did you close down your Bebo? Silence – silence in the room, and you actually see some people, the colour drained from their faces… all that stuff that I put up is still there to be found by someone - Kevin Doyle (University lecturer in Education)

Both Kevin and Maria believe that digital identity is not only an issue for students in university but also for academics and should be part of lifelong learning for everyone (Beetham et al., 2009; Kozma, 2011). Digital literacy Digital identities increasingly form part of professional identity:

“Should I use Twitter for my teaching? I have a Facebook friend request from my Ph.D. student, will I accept that?” … Academic staff, staff all across the university, and students are dealing with these collisions and this tension all the time. - Maria Gallagher (University lecturer in Computing)

That should be great learning for students because as I said when they step out of their degree they are going to have to deal with those issues. - Maria Gallagher (University lecturer in Computing)
Such concerns about privacy are noted by Moran, Seaman, and Tinti-Kane (2011) in a review of the use of social media by academics. Awareness of these concerns is considered an important aspect of digital competency (Abdous, 2011; Greenhow et al., 2009) or digital fluency (G. K. White, 2013) in higher education. Unlike some of her colleagues, Michelle felt that it was inappropriate to use Facebook with her students:

Students use Facebook, but students do not like using Facebook for teaching. They keep telling me and I tell them well I won’t use Facebook because that’s your private sphere and a big smile and they say thank you, but colleagues would force them to use Facebook without the whole question of privacy and how it’s managed, what it means for students or whatever. I think there’s loads of issues there. - Michelle Delaney (University lecturer in Languages)

Personal learning environments (PLEs) can help both lecturers and students to recognise the value of learning from social media and other informal sources and integrate it with formal learning from lectures and accredited courses (Dabbagh & Kitsantas, 2012). Many are unaware that they have such PLEs:

There is a lot of work done on personally learning environment and I think students do have PLEs big time, but they are not aware of it, so I think the thing is maybe to make them aware of it and make teachers aware of how they construct their own learning environment. - Michelle Delaney (University lecturer in Languages)

One of the big challenges for Higher Education in general into the future, and particularly with regard to technology enhanced learning, is personalised learning. I think personalised learning is going to be a bigger and bigger thing to be quite honest with you. I think it is already quite a substantial thing. - Kevin Doyle (University lecturer in Education)

Kevin Doyle is a teacher educator, who encourages teachers to make changes to their personal practice in small steps. He bases this practice on the Substitution Augmentation Modification and Redefinition (SAMR) framework (Puentedura, 2013) and the similar 3E (Enhance Extend Empower) framework (Smyth, 2011). These both focus on a series of small changes, each of which only requires a modest addition to workload and, as such, are relatively easy for teachers to implement. While this may temporarily take the focus off “why”, it has the practical of an easy to implement “how”:

The first step in just getting you to use some of this technology. Let’s look at the substitution, which is really just swapping out this for that and you’re really not changing a whole lot other than taking the book out and putting in a little bit of a digital something.” - Kevin Doyle (University lecturer in Education)

Kevin believes that it is particularly important that he models good use of technology in teaching to the trainee teachers in his class. Similarly, Valtonen et al. (2015)
found that such authentic practice led to an increased confidence in using TEL among pre-service teachers:

I really believe that one of the strongest influences that shapes how somebody is going to teach is how they were taught themselves … most of my students have not really been taught by teachers who are using a lot of technology in the classroom - Kevin Doyle (University lecturer in Education)

William Cleary was the only other participant to mention a specific, theoretical framework. He found the TPACK (Technological, Pedagogical and Content Knowledge) framework, which seeks to integrate content, pedagogy and technology, helpful in teacher education (Koehler & Mishra, 2009; Mishra & Koehler, 2006) but did not give any instances of its application.

While the literature review discussed learning design theory (Dalziel et al., 2013; Laurillard, 2012), which takes a highly structured approach to designing learning, it was only mentioned once in passing by one interview participant, David Toomey. For the others, it was either unknown to or not considered to be important. This may be due to their preference for informal learning and that learning design may be well-known by those who are not teaching and learning or TEL professionals.

The rest of the participants did not mention specific theories or frameworks but discussed their practice in more general terms, often based around, in their own words, constructivism or social constructivism. Like activity theory, these practices involve active and collaborative learning either in class or online.

4.3.2 Teaching approaches in practice

The research participants had all developed practical approaches to the use of technology in their teaching and had a rationale for using them. Their reasons included making classes more engaging, widening access to allow participation by students overseas, providing feed-forward to assist further learning (Duncan, 2007) and collaborating with other institutions. William Cleary suggests that educators who believe in learning as an active process, will use technology in a more creative manner from those who take a more didactic approach:

If we believe that learning is something that we do to somebody, then I think the way we use technology will be very different from if we believe that learning is an active process where we can co-construct knowledge. – William Cleary (Independent Consultant Teacher Education)
According to William, such a creative approach is likely to be active and collaborative while a didactic approach frequently leads to *Death by PowerPoint*. Unlike William, Kevin and Michelle, TEL does not form a significant part of Tony Grant’s or David Toomey’s professional identity. They both started their professional careers with conventional ideas of lecturing but gradually moved towards more active and collaborative approaches:

I realised after a couple of years was that you stand up at the front and no matter how nice you make the slides, how well you try to enunciate, how clear you try to make things, the students are still sitting there with their heads in their hands and so I thought there must be something better than this - Tony Grant (University lecturer in Biotechnology)

It was like the way I was when I started off, I was “chalking and talking” but once I saw the light and seen how I could build the classroom environment I then realised that technology was one thing I could use. - David Toomey (IoT lecturer in Biotechnology)

David describes his approach as constructivist. He focuses on group work in virtual classrooms and giving feedback in real-time:

The way that the learning is structured is that it is very much constructivist, they have to work together, they have to work to build their knowledge and the tools and technology that I use allow me to see them doing this and also allow me to give feedback in real time through that process. - David Toomey (IoT lecturer in Biotechnology)

Both David and Tony went on to develop learning activities with student response systems or *clickers* in class. Bojinova and Oigara (2013) found that *clickers* increased engagement and resulted in higher course grades in a study of undergraduate students in Economics and Geography. Tony also claims that his students found clickers to be much more engaging:

I started experimenting with clickers and I found that they were wonderfully successful in engaging students … previously it was fun but so unidirectional… and contemporary learning is far more interactive - Tony Grant (University lecturer in Biotechnology)

Kevin Doyle finds clickers a good way to “get the mood in a room”, while David Toomey who also used clickers in his classes has gone on to use a more powerful tool, *Nearpod* which allows him to give real-time feedback to student annotations on PowerPoint slides. He prepares notes and activities on his slides in advance and shares these with students:

I am using NearPod quite a lot. It’s quite good in terms that it is a two way dialogue software, it’s basic PowerPoint but the students can annotate onto the slides and then they can send the slides or annotations to you and then you can see the whole class in real time, what they are annotating on a slide - David Toomey (IoT lecturer in Biotechnology)
So, for me for organic chemistry or for biology or biochemistry it’s a very visual subject area so, “Can you point out the active site of the enzyme, please” and they can circle so you can see in real time how many students are getting it, how quickly they respond, it can even get them to work in groups - David Toomey (IoT lecturer in Biotechnology)

Among many other tools, he is also using Peerwise which allows his students to design and evaluate their own assessment:

I get the students to have a bit of design and critique of their own questions in Peerwise so in assessing their learning by doing the quizzes, but they are also learning in designing the quizzes as well in Peerwise, so it’s a kind of a three way approach and it’s all technology based - David Toomey (IoT lecturer in Biotechnology)

To help his students learn from others, whom he says may be a bit more advanced, he has developed a collaborative project in Peerwise with a similar institution:

I’m looking at opening up a closed group of Peerwise to a colleague who is teaching in the UK on a similar course and the students would then be anonymously working together with a group of students in the UK, so we can have conversations across the water. - David Toomey (IoT lecturer in Biotechnology)

Likewise, technology has allowed Michelle Delaney’s language students to practice their language skills with students in France, who are in turn practicing their skills in teaching French:

We had a tele-collaborative project with the University of Lyon where students from the Masters of Teaching French as a Foreign Language from Lyon were tutoring one of my second year groups desktop via video conferencing - Michelle Delaney (University lecturer in Languages)

Margaret Thompson has used her VLE to allow her own students who were in employment or on overseas placements to participate in activities. Some of which were collaborative, involving project work in wikis or Google Docs. She gives formative feedback or feed-forward (Duncan, 2007) which the students can incorporate into their project work:

I have a complex four-staged project that I coordinate through eLearning. I’ve 80 students in eight countries. They submit into a wiki where the supervisor gives them feedback and then they resubmit accordingly - Margaret Thompson (IoT lecturer in Marketing)

Brian Power makes YouTube videos of concepts in mathematics and statistics. Student viewing of YouTube videos is one of the most popular uses of social media in higher education, though not many educators make their own videos (Moran et al., 2011). In an example similar to the flipped classroom (Roehl et al., 2013), Brian’s students can view his and other appropriate videos out of class while they carry out practical activities in class:
Students are much more inclined to go to YouTube to learn something rather than to say find a journal article or webpage or something. So, I use video a lot as a support for students and I usually make my own. - Brian Power (College lecturer in Computing)

What I am doing is I am essentially creating a topic that involves a practical skill that you need to do using a computer, mostly the likes of Excel and PowerPoint and statistical tests… (I have made) about 120 videos on YouTube explaining all of those things. - Brian Power (College lecturer in Computing)

Kevin Doyle uses a wide range of tools which allow his students to create artefacts and work collaboratively. He aims to demonstrate good practice to student teachers; practice which they can then use in school. Powtoon and Padlet are just two of the tools he uses. They are free which makes it easier for teachers to use them:

We would use a lot of digital video tools, a lot of the kind of tools that would allow them to create and generate learning artefacts, things like Powtoon… A very common task that I would do with them would be using Padlet for brainstorming a task or mind mapping. - Kevin Doyle (University lecturer in Education)

Margaret Thompson and David Toomey expressed a belief in students co-creating resources. Siemens and Tittenberger (2009) and Gan and Zhu (2007) see co-creation as helping students to develop critical thinking and higher order learning skills. David Toomey mentions a triple benefit of co-creation, not only do the students learn in producing the resource and from his feedback but these resources can be used with future classes, thus saving him time. Students can learn both from the process of creating the resource and from using it as a product. Co-creation is efficient:

I’m a believer in students as producers, students as co-creators, so I’m thinking how can I integrate the technology in those spaces to make my life easier, make the students’ learning experience better… hopefully have a digital asset or resource? – David Toomey (IoT lecturer in Biotechnology)

The way that the learning is structured… they have to work together, they have to work to build their knowledge and the tools and technology that I use allow me to see them doing this and also allow me to give feedback in real time through that process. - David Toomey (IoT lecturer in Biotechnology)

As well as co-creators of resources, students were seen as potential co-solvers of problems, helping each other with technical problems in a Bring Your Own Device (BYOD) class. This again can save the lecturer time:

Some students were disadvantaged because they could not log on during class and how they overcame it was at the suggestion of another student in the class and that was they tethered their laptops to their own mobile phones and got to the web through their own mobile phones – Brian Power (College lecturer in Computing)
Tony Grant raised the issue of quality and what is *good enough* in the context of co-creation of content, deciding that it was not critical that chemical formulas were correctly subscripted:

There’s understanding the balance between that the quality that you would expect of yourself and not being an unnecessary perfectionist, so an example of that is we have made a few videos of leaving cert biology experiments - Tony Grant (University lecturer in Biotechnology)

Maria Gallagher also sees production quality as relatively unimportant when sharing resources with peers. Many writers, such as Rolfe (2012) do not share this view. Clements and Pawlowski (2012) suggest that trust is a significant factor in determining quality of open educational resources. Professional networks may offer this level of trust:

The production value is not the important thing. It’s, actually, the content and the fact that it’s small portable and openly licensed that people can use however they want. – Maria Gallagher (University lecturer in Computing)

Brian Power raises the issue of *good enough* quality standards (Masie, 2011) in his own output. He does not have access to professional quality production facilities and so does everything himself at his desk. The quality is acceptable to his students and his followers on YouTube:

I do it myself. So I make the recording and I use YouTube to deliver it, to host it, to render it, to tag it, to label it and then I link to it from Moodle and say here guys here’s a video, revising what we did last night, showing you how to do a T-test in Excel... – Brian Power (College lecturer in Computing)

Linked to the idea of *good enough* quality, is the importance of being concise and producing, for example, short *YouTube* videos. Brian Power describes how he had learnt this through industry experience. He produces small learning objects (or resources) to cover a single learning outcome:

It made me good at explaining things in the shortest possible time because in online learning you don’t have the facility to spend half an hour explaining something to a student who can’t understand it, you’ve got to do it in five minutes or ten minutes max. – Brian Power (College lecturer in Computing)

To help students develop good quality in their own practice, they need to see and experience good practice:

I really believe that one of the strongest influences that shapes how somebody is going to teach is how they were taught themselves… most of the students who come in to me have not really been taught by teachers who are using a lot of technology in the classroom. - Kevin Doyle (University lecturer in Education)

These are just some of the examples of active and collaborative learning used by the participants. In terms of the typology of Benson et al. (2011) the interviewees could be described as *Purely Pedagogic* as they used teaching innovations to facilitate effective
student learning. Of the four adopter types identified by Fischer and Köhler (2011), the participants seem closest to Experiened Explorers who are described as having extensive experience of teaching and of e-learning, and give average values for the motives of performance of duties, increase in performance and career advancement and below average values for social reputation. Among these motives for the uptake of e-learning identified by Fischer and Köhler (2011), Increase in Performance producing better learning activities or being more efficient teachers, seems closest to the profile of these educators. Purely Pedagogic, Experienced Explorers can be considered as other terms for digitally fluent educators who can evaluate and create digital technologies in their teaching practice. Thus, digital fluency and the use of TEL form part of their professional identity.

4.3.3 Professional values and professional identity

Not only does digital fluency affect the participants’ teaching practice but it also influences how they see themselves as professionals. This section examines their attitudes to their profession and their relationship with the wider community. Their values of community and sharing, job satisfaction and concern for students all influence how they share the outputs of their digital fluency.

For some of the participants using TEL was about improving their own teaching and professional practice, for others it is an intrinsic part of their role, career and professional identity. For Michelle Delaney, TEL was both part of her teaching practice and a research interest:

Both a research area and practice and I use it for language teaching and learning and I’ve been using it for the last 30 years. - Michelle Delaney (University lecturer in Languages)

As Kevin Doyle, a teacher educator, and Margaret Thompson, a marketing lecturer, pointed out, using TEL was part of their job. They both wanted to model good practice with technology to their students:

One of my main roles is as a teacher-educator so I do most of my work with student teachers… So, I am actually tasked with the responsibility of helping them to develop their own digital skills - Kevin Doyle (University lecturer in Education)

Because I teach digital marketing and digital marketing communications, so I’d see that as showing a level of expertise with social media tools, that’s partly why I use that (TEL) so extensively. - Margaret Thompson (IoT lecturer in Marketing)

While Kevin and Margaret needed to use technology as part of their professional identity, David Toomey was the only interviewee to find that his digital fluency helped
to reduce his workload, by enabling him to re-use some resources from year to year. This made his teaching practice easier and more efficient:

The “why” is primarily to make my life easier. There is a massive increase in student numbers … it just became unsustainable to continue on. Simple things like giving feedback became monsters so I looked towards technology. - David Toomey (IoT lecturer in Biotechnology)

It’s time investment. For example, if you set up a bank of MCQs in the VLE it takes a long time to create the bank, to have good distractors, have good question design, but it’s done and you can add 10 to 15 questions every year to it, it keeps it alive, it keeps it fresh but the majority of the work is done so it’s definitely front-loaded. - David Toomey (IoT lecturer in Biotechnology)

I am comfortable with the group numbers now, I am comfortable with the technologies, how they work, how they integrate, how they map on to the tasks that I want the students to do and how I can provide feedback through these tasks. It just means that my life is easier - David Toomey (IoT lecturer in Biotechnology)

William Cleary feels that as professionals, educators should be committed to their own lifelong learning (his emphasis), whatever their age:

A key part of what a professional is that you are a learner, a life-long learner - William Cleary (Independent Consultant Teacher Education)

Brian, Kevin, Tony, David, Maria and Michelle were all advocates of the free sharing of information and educational resources with their colleagues or the wider community. Openness fits with the idea of a public remit and sharing resources with schools and the wider community. This is increasingly seen as one of the roles of Irish universities (IUA, 2014). An idea that particularly appealed to Tony Grant, who has published biology videos on the web:

An example of that is we have made a few videos of leaving cert biology experiments in part because I see the students and the experiments, and I think they are not particularly well explained – Tony Grant (University lecturer in Biotechnology)

Such a commitment can lead to a belief in sharing open educational resources on the web with few copyright restrictions; thus making them available to anyone anywhere (Caswell, Henson, Jensen, & Wiley, 2008). Michelle specifically mentions acknowledging the author in this case, while David Toomey is concerned about professional recognition:

I mean we are a public institution so I’m more on the open source side of that (copyright) argument. - Tony Grant (University lecturer in Biotechnology)

If you are really into open education, you have to be open… As long as it is attributed, I have no problem giving out my stuff, and I think that is only way you can change things is by making your stuff available. – Michelle Delaney (University lecturer in Languages)
I suppose to want to contribute back to that community and to get into this area and develop things and resources and then become the person that shared back with other people and act as a champion. – David Toomey (IoT lecturer in Biotechnology)

When I started blogging, I didn’t feel like it was something that I had to do... I just realised, well these people are sharing simple things and I can do that too … and so that was why openness was always a key piece of it for me. – Maria Gallagher (University lecturer in Computing)

Michelle shares Maria’s enthusiasm for open education and has a similar vision for future policy on openness. Their enthusiasm is shared by David and Tony. However, they are aware of the competing demands of commercialisation:

“One of the barriers to sharing is … “Could I make money from this?”… or my department head is saying “We can make money from this”, so let’s not share.” - Maria Gallagher (University lecturer in Computing)

“There’s a big tension there, with patents and this and that but I think if you are really into open education you have to be open…”– Michelle Delaney (University lecturer in Languages)

Brian Power, a college lecturer, makes videos on computing, mathematics and statistics to help his students. He shares these videos on his public YouTube channel. For ethical reasons he is careful not to specifically recommend his own videos, suggesting alternatives such as the Khan Academy to students. As an experiment, he turned on advertising and was pleasantly surprised to find that he could make money from his growing audience:

About 120 videos or so on YouTube explaining Excel and Statistics and every single one of them… I use in my own classes and that many people outside my own classes find useful and since it’s on YouTube they can find it. - Brian Power (College lecturer in Computing)

I decided to turn it (advertising) on just for a few days, just to show people how little you earn on this and I earned something like $100 in a couple of days, so I was amazed at that and thought, let’s leave this on and see what happens - Brian Power (College lecturer in Computing)

These quotations suggest that sharing with colleagues and with the wider community forms part of the professional identity of these digitally fluent educators. Such sharing is consistent with institutional culture where outreach forms part of the vision of the organisation.

Despite their enthusiasm for the use of TEL, participants saw boundaries as to their role. This seems to be shaped by their professional identity. The introduction of BYOD marked one such boundary for Brian Power. He felt that helping the students configure their own computers was not part of his role nor could he afford to devote class
time to it. However, he worried that students expected him to solve these problems and foresaw technology management becoming a future role for lecturers:

I found myself becoming a technology manager in the class and because students were saying, how do you connect to Citrix and what do you do and how do you download to Citrix client and all this kind of stuff and eventually after about two or three weeks in the semester I drew a line and I said, look I am the educator here, I’m not trying to fob you off but I am not a Technology Manager. – Brian Power (College lecturer in Computing)

So, I believe lecturers will eventually become technology managers in the classroom as well and many already are. I’m not there yet but you know, and it is unfortunate… I cannot help a student in my class who cannot connect. I don’t know what their problem is. – Brian Power (College lecturer in Computing)

The research participants were motivated to develop their digital fluency and make use of TEL for a range of reasons relating to their professional practice. These included a research interest, making their teaching practice more effective and efficient, modelling good practice to their students and sharing resources with a wider community. Such reasons were informed by their professional identity, which also provided some boundaries to their use of digital technologies in their teaching practice.

4.3.4 Summary: The relationship between digital fluency and professional practice

This section examined how digital fluency influenced the participants’ teaching practice and how their teaching practice influenced their digital fluency. For some of the participants TEL was a research interest which they had developed early in their careers. All the participants believed that their teaching practice could be enhanced by the use of TEL (Kirkwood & Price, 2013) and that this enhancement would involve developing engaging and meaningful learning activities. Some couched this belief in terms of a theory or framework such as activity theory (Engeström, 2001) or digital identity (Goode, 2010; Hsi, 2007), while others expressed a more general belief in helping their students to develop higher order thinking by becoming active and collaborative learners (Meyer, 2010). The participants described using activities ranging from clickers in class to developing videos and giving feedback online. Motivations included feedback for group work among students on work placement and collaboration with students in other institutions. Students were reported as finding some of the activities demanding but worthwhile.

Many of the educators wanted to practice what they preach by demonstrating good practice with technology and social media. For those lecturing in computing and teacher education this was considered part of their job. Participants also saw a long-term
value in giving the students the ability to make appropriate use of technology in their own, future professional practice and personal lives; thus helping to develop the students’ own digital and professional identities (Beetham et al., 2009; Kozma, 2011). Despite their enthusiasm for TEL, their professional identity led them to set boundaries to their role. They did not see themselves as becoming technology managers who solved students’ technical problems. Some participants were interested in sharing resources with colleagues or the wider community. This could be a good match between their professional identity and the outreach and collegiate culture of their institutions. All the interviewees were willing to advise and support colleagues in their own institutions.

4.4 Sharing practice with colleagues

In this study, the digitally fluent educators were interested in and, mostly, had considerable experience of technology prior to using it in their teaching practice. They had a strong intrinsic motivation with most having studied for postgraduate qualifications in a TEL related subject. Their knowledge, experience and beliefs led them to see a role for technology in helping their students to become active and collaborative learners. This also led them to experiment with technologies in their teaching practice and to develop networks with like-minded colleagues. Both of which then helped them to overcome difficulties; thereby further increasing their digital fluency. Their descriptions of developing and applying digital fluency correspond with the literature (Q. E. Wang et al., 2013; R. L. Wang et al., 2012).

While there are no simple solutions to professional development in TEL in higher education (Beetham & Sharpe, 2007; Cousins & Bissar, 2012), digitally fluent academics can play a formal or informal role in helping their less technologically proficient colleagues. Many of these colleagues may not share the digitally fluent educators’ self-efficacy, enthusiasm and expertise but are still interested in making use of technology in their teaching practice (Benson et al., 2011; Slowey et al., 2014). Neither a pattern for developing an understanding of perceived affordances, nor a pattern for the successful use of digital education has yet been established (Baran et al., 2013). However, helping learners to learn “with” and not just “about” technology and defining learner needs are part of the process (R. L. Wang et al., 2012). According to the Roadmap from the National Forum, eighty percent (80%) of the lecturers surveyed were comfortable with technology though many were unsure of its benefits (NFETLHE, 2014b). This would suggest that they have low or uncertain performance expectancy and a low effort expectancy.
(Venkatesh et al., 2003). While this sample may well not be representative of higher education at large, it seems to offer a promising starting point. Digitally fluent educators can act as champions and pioneers of TEL encouraging its uptake in their own departments and schools (Cousins & Bissar, 2012; Rolfe, 2012).

Based on the interviews and the research literature, this section draws on the concepts of enabling and encouraging in discussing how digitally fluent educators can help their less technologically-proficient colleagues to develop their digital fluency. It begins with an examination of current practices in TEL based on the interviews and the research literature.

### 4.4.1 Reviewing current practices in TEL

The findings for this section start by examining the similarities and differences between the digitally fluent educators and their less technologically-engaged colleagues. Theories of innovation such as the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) and Diffusion of Innovations (Rogers, 2003) can help here. The less technologically-engaged colleagues of the digitally fluent educators are at varying stages on the digital spectrum ranging from the “pre-literate” and “anti-literate” minorities in the terminology of Briggs and Makice (2012) to those who have adopted or experimented with technology enhanced learning. Those towards the lower end of the spectrum, the “pre-literate” or early and late majority in the terminology of Rogers (2003) can easily be discouraged by perceived stumbling blocks. In terms of UTAUT, their effort expectancy is high, while their performance expectancy may be low (Venkatesh et al., 2003), as they may not value the proposed changes to their teaching practice. They may also expect financial incentives or other awards as noted by Cook et al. (2009).

While the digitally fluent educators interviewed were not motivated by institutional recognition or rewards for their teaching practice, this might not be the case for their colleagues. As they are not intrinsically motivated, social influence such as recognition or rewards by management might encourage these colleagues to spend more time in investigating and implementing TEL in their teaching practice. However, it is important to note, as Tony Grant stated, that nearly all lecturers want to teach students well:
I do believe there is a genuine desire of almost everyone to teach students well. - Tony Grant (University lecturer in Biotechnology)

William Cleary goes on to suggest that most educators are concerned with learning in their own discipline and may not see a role for technology in their practice:

I think one of the major challenges here is that most people in higher education are interested in learning and they very much consumed with their own content area..., they are not technologists. - William Cleary (Independent Consultant Teacher Education)

Or as Tony Grant described some colleagues were still teaching as they were taught as students:

The area (disciplinary content) is truly evolving quickly, but the basics, the foundation of knowledge hasn’t changed since I was a student, but what has happened is the presentation of it has changed, but the problem is that many academics are still teaching as though they were still students. - Tony Grant (University lecturer in Biotechnology)

Unlike the digitally fluent, most third-level educators have not formally studied learning technologies or education, may not have much enthusiasm for tinkering with technology and may have limited experience with technology in their personal and professional lives. As a result, the less technologically engaged educators often find stumbling blocks more difficult to manage than their digitally fluent counterparts. This is especially the case where educational technology and teaching and learning support is poor or non-existent. Some of these educators are very wary of technology (Benson et al., 2011). William Cleary, who works as a consultant in education, sees such wariness and fear of technology as deprofessionalism of the educator:

“Oh, no, no, no, I’m useless at technology.” There’s a deprofessionalism immediately taking place. - William Cleary

Some of the interviewees can relate to these fears, having started at a similar position on the digital spectrum to their less technologically engaged colleagues. They developed their digital fluency with the aim of engaging their own students and improving those student’s performance. Through education and experience they have moved towards the fluent end on the spectrum (Haythornthwaite & Andrews, 2011; Lenhart & Horrigan, 2003). Of these, Margaret Thompson started with the least technical experience and lowest level of confidence. Both factors that were likely to make her use of TEL more difficult (Teo, 2011; Q. E. Wang et al., 2013). She was afraid of things going wrong in front of a class and she experienced technical difficulties with Blackboard. Because of this, she can relate to some of the pressures facing her less technologically engaged colleagues:
People will often learn about one area and use that, that’s what I find. It’s difficult to manage the learning on top of your job. - Margaret Thompson (IoT lecturer in Marketing)

While an interest in experimenting and the confidence to do so are generally seen as factors in the development of digital fluency, there has been considerable debate about the ability of older people to adopt new technologies. Age was originally suggested as a barrier to understanding new technology by Prensky (2001) in his seminal work on digital natives. However, subsequent researchers (Cousins & Bissar, 2012; Q. E. Wang et al., 2013; R. L. Wang et al., 2012; D. S. White & LeCornu, 2011) and more recent work by Prensky (2009) have found that age has little impact on digital fluency when older people are experienced users of technology; in this case, they can be considered as digital residents (D. S. White & LeCornu, 2011) as they are familiar and comfortable with digital technology. The participants in this research ranged in age from their mid-thirties to late fifties. Therefore, the findings of this research largely correspond with the work of R. L. Wang et al. (2012) who, in a study of the use of mobile devices, found that digital fluency in mature nursing students was due to their previous experiences with technology and their personal skills and interests. Age was not a factor. This finding was borne out by Watts (2014) in his research on student bloggers where he found that mature students were more frequent and reflective bloggers. In this context, R. L. Wang et al. (2012) noted that research on mature learners’ experiences and perceptions was limited.. Their observations suggest that age is not an impediment to digital fluency and that the digitally fluent can be considered as mature learners in their own practice.

Only two of the research participants mentioned age as a negative factor in the development of digital fluency. Brian Power and Michelle Delaney felt that older colleagues were reluctant or less able to make use of technology. Brian talked about the younger lecturers’ competence with basic tools compared to their older colleagues:

I do see, particularly with the newer lecturers, a much, much higher level of literacy, so basics like Office and Mail and using Moodle and so on… but I do find myself with many of our middle aged and older lecturers, they come to me … and a lot of it is basic stuff. - Brian Power (College lecturer in Computing)

Some of our older lecturers are using Adobe Connect for distance learning classes, primarily for business courses - they are basically using PowerPoint and using voice overs. Whereas our student support people and some lecturers will do tutorials online and so they are giving and taking student feedback. - Brian Power (College lecturer in Computing)

Michelle Delaney, who is close to retirement, has found a complete unwillingness on the part of some of her older colleagues to engage with technology at all:
Older colleagues are very, very resistant and to the point that they would do anything to avoid it and come up with arguments that are not really valid I don’t think. Some people don’t like technology and (say) we didn’t have technology before to learn. - Michelle Delaney (University lecturer in Languages)

These colleagues would seem not to be experienced users of technology and it may be this rather than their age that is the significant factor (Prensky, 2009; R. L. Wang et al., 2012; D. S. White & LeCornu, 2011). Michelle also suggests that this is because they, unlike her, are no longer interested in learning:

I think what keeps me going is that you are never finished learning, and I think that’s one of the problems with colleagues, is that if you are not into learning about all those things, it’s going to be very difficult to make innovative or even very good use of technology. - Michelle Delaney (University lecturer in Languages)

Their lack of engagement may be due to their professional development priorities changing with age, though age itself is not a barrier to informal learning (Knight et al., 2006). However, Michelle goes on to somewhat excuse them by emphasising the wider changes both in their discipline (modern languages) and in institutional practice:

But it’s not just the technology, it’s the change of paradigm in education and the way we look at communications in general and language in general. See all that has changed completely and so I think it’s a lot to take in for older colleagues. - Michelle Delaney (University lecturer in Languages)

Perhaps, related to their age or a reluctance to change, some colleagues were described as still teaching as they were taught as students:

The area (disciplinary content) is truly evolving quickly, but the basics, the foundation of knowledge hasn’t changed since I was a student, but what has happened is the presentation of it has changed, but the problem is that many academics are still teaching as though they were still students. - Tony Grant (University lecturer in Biotechnology)

Maria Gallagher also reports that time is an issue for many of her colleagues, as part of *doing more with less*, an expression associated with new managerialism in higher education (Deem & Brehony, 2005). However, that they change their behaviour through social influence (Venkatesh et al., 2003) as they see a practice, such as using *Twitter*, becoming more widespread and, therefore, worthwhile for communicating and exchanging ideas:

Most people in the department are using Twitter now in relation to their research projects or to the department itself, they see their peers in other universities and other research groups and teaching situations using it - Maria Gallagher (University lecturer in Computing)

Like Margaret, neither David Toomey nor Tony Grant had a background in TEL. Both learnt about TEL, while working as lecturers. Many teachers teach as they were
taught (Cachia et al., 2010). Both David and Tony started their lecturing careers by teaching as they had been taught, but then began to see weaknesses in their practice. They started to look at ways to improve their classroom practice, for example, by using clickers to make their classes more engaging before moving on to experiment with other uses of technology (Bojinova & Oigara, 2013). Their initial, traditional approach to lecturing may make it easier for them to relate to their less technologically-engaged colleagues. Tony describes himself as an early adopter and goes on to describe the difficulties of transferring his practice to colleagues:

I have been quite keen to support clickers, so that’s got embedded but a lot of other initiatives haven’t really gone as far… there’s a nucleus of people, say 25% of people, in science who are doing a lot of contact teaching who would use them actively but I’d say still the majority of people don’t or think they are too complicated… so it’s very, very difficult to move this conservatism with the style of teaching. - Tony Grant (University lecturer in Biotechnology)

Using the technologies involved in blended learning, such as a VLE, can be time consuming (Benson et al., 2011). When she started in TEL, Margaret Thompson found that her lack of experience led to her to set unrealistic expectations of herself. For example, when she first tried wikis while her students, she underestimated the time involved, despite initial training:

To some extent if you create a Wiki you are promising that you will look at it and I found that I wasn’t always able to do that so I moved away from it on some courses and said, no I can’t fulfil that promise. - Margaret Thompson (IoT lecturer in Marketing)

To avoid problems with the wikis, Margaret started to use Facebook groups to communicate with her students while they were on placement. Some educators are attempting to engage students by offering a familiar environment for learning outside of the institutional systems (Flavin, 2012; Minocha, Schroeder, & Schneider, 2011). Social media tools such as Facebook and Twitter seem to promise such a familiar and friendly environment which could be serve as a collaborative place for student projects (Roblyer et al., 2010; Tess, 2013) and which focus on the student rather than the teacher (Watson et al., 2015). However, enthusiasm for social media does not necessarily mean students enjoy using technology in education or even know how to use other tools and technologies. Familiarity with social media does not necessarily transfer to the effective use of technology for teaching and learning (Bennett et al., 2008; Hosein et al., 2010). The use of social media and Web 2.0 tools for academic work also raises concerns about privacy.
(Greenhow et al., 2009; Roblyer et al., 2010). Michelle Delaney shares their concern for student privacy:

Colleagues would force students to use Facebook without the whole question of privacy and how it’s managed, what it means for students - Michelle Delaney (University lecturer in Languages)

Even within institutional systems, some colleagues have taken approaches to implementing new technologies which the digitally fluent educators in this research consider to be unsuitable. This may be due not to a lack of experience or an absence of motivation among the educators, but due to the design of the technologies themselves. Lecturers in an Irish university reported that advanced tools in a VLE had complex interfaces and were difficult to use (Blin & Munro, 2008). Virtual learning environments (VLEs) such as Blackboard and Moodle often act as little more than a means for distributing slides and lecture notes according to research and reports on Irish higher education (Blin & Munro, 2008; Devine, 2015b; Donnelly & O'Rourke, 2007) in the UK (Rientes et al., 2014) and in the USA (Dahlstrom et al., 2014). As Michelle Delaney puts it:

Moodle is web 1.0 it’s not web 2.0 and people use it as a filing cabinet - Michelle Delaney (University lecturer in Languages)

William Cleary goes on to state that many academics consider such storage and distribution inappropriate and are therefore reluctant to use VLEs:

I think we need to be clear on why we are using VLEs. I think all too often they are seen as a repository… I think a lot of people are very anti them because they see they are being forced to put up content. - William Cleary (Independent Consultant Teacher Education)

According to William the academics would get more benefits from the VLE if they focused on developing appropriate learning activities for the medium rather than on content. This change of approach can make online learning more active or collaborative. He describes how he struggled when he was designing and teaching a course on teacher education for an online college, Albany College:

They had an excellent team of people to design the content, but I think all too often in online there is too much emphasis on the content. I think where we struggled, and I struggled was in how do you mediate the asynchronous the synchronous? I know my colleagues found that as well. – William Cleary (Independent Consultant Teacher Education)

As William has described, even the digitally fluent can find it difficult to develop online learning activities. As a result, educators developing classes for the VLE or the web often start out by trying to transfer their existing classroom practice to the online and
blended environments without any modification (Baran et al., 2013). This does not require much redesign work and has the benefit of familiarity for the lecturers, that is, lectures at a fixed time for a fixed duration where the lecturer does most of the talking (Baran et al., 2013; Power, 2008, 2011). William Cleary suggests this may be in part due to financial concerns:

I think all too often lecturers, in online anyway, are afraid that Joe Bloggs is paying €9,000 to do his Master’s, I had better talk at him for the hour, we can’t have silence. - William Cleary (Independent Consultant Teacher Education)

There may also be pedagogical concerns. While silence is an acceptable part of classroom activities where the lecturer can observe the students and see how they are engaging with an activity, this cannot readily be replicated online where silence may mean the students are not engaged at all or even present (Salmon, 2004). Such a lecturing approach does not foster active or collaborative learning, which are considered advantages of TEL (Baran et al., 2013; Blin & Munro, 2008):

I think one of the big problems is that a lot of people tend to replicate or want to replicate what they do in the classroom with an online platform … this idea of if you want to teach online you just have to record yourself giving your lecture. - Michelle Delaney (University lecturer in Languages)

However, William Cleary talks about one such colleague, an enthusiastic teacher, who was committed to project-based learning. She was initially terrified of technology, but then found that her pedagogical approach transferred successfully from the classroom to the online environment:

She was a very strong believer in project based learning and cooperative learning in face to face and she made a comment that she was scared of the technology … but quickly found that her pedagogical approaches actually migrated quite nicely online - William Cleary (Independent Consultant Teacher Education)

In William’s case, his colleague seemed to be using active and collaborative learning in both environments. She seems to be an exception, as Michelle comments on the large number of blended courses in her institution that make no use of any of the active or collaborative features of the VLE:

I see the Moodle courses that colleagues have. I mean it's quite amazing the number of courses where you don’t even have a forum, the assignment is not managed using the platform. Basically, it is links, Word documents and PowerPoint presentations. - Michelle Delaney (University lecturer in Languages)

Despite the availability of many tools for active and collaborative learning in the VLE (Blin & Munro, 2008), both lecturers and students have found it difficult to make
effective use of asynchronous communication tools and in some cases have abandoned them, reverting to using the VLE as a repository (Donnelly & O’Rourke, 2007). Yet educational research recommends that online learning should be active and collaborative (Laurillard, 2012; Vaughan, 2007). This is frequently not the case in practice:

But what we’re seeing and I’m seeing this not just in Albany College, is that all too often in online learning we are using the technology to talk at learners, that online learners actually are all too often are passive, they are being bombarded with content. - William Cleary (Independent Consultant Teacher Education)

This approach may, in part, be a response to the constant changes in the tools and technologies used in higher education. Such changes can make it difficult for academics to develop and maintain a sense of digital fluency, particularly, those in the middle of the digital spectrum, who have managed to develop conscious competence in current technologies (Dreyfus, 2004). It could be considered that the underlying conceptual model or perceived affordances of digital technologies are evolving too rapidly for many educators or perhaps that they have not fully grasped the fundamentals in the first place. This may be due to, as both William and Michelle Delaney (earlier) suggested, a wider problem, that academics generally pay little attention to academic research in education:

I looked at professional practice and within medicine the profession is engaged in the research and they are actually taking it on board as opposed to education where we kind of look at it - William Cleary (Independent Consultant Teacher Education)

To overcome their lack of engagement with educational research William suggests that guidelines would help those colleagues. Such quality guidelines are recommended in the National Forum report A Roadmap for Enhancement in a Digital World 2015-2017 (NFETLHE, 2014a):

I think they need clear guidance on what is expected, what does quality learning look like say in UCD for example, in a particular faculty and that everybody signs up for this, not just one person, because the danger is if one person signs up, they will be treated as a maverick. - William Cleary (Independent Consultant Teacher Education)

Finally, constant technical change, the short life span of many learning resources (Rolfe, 2012) and the general difficulty of sustaining an e-learning innovation (Ooms et al., 2008) add to the workload of many lecturers, both digitally fluent and otherwise.

But every year for the last five years when I go to do WordPress in September/October, it’s changed. It’s not the same as what it used to be - Michelle Delaney (University lecturer in Languages)

You can invest an awful lot of time in producing a resource or an approach for one particular group of students and then you realise that 12 months later that’s not working any more. - Kevin Doyle (University lecturer in Education)
One of the great problems with any sort of initiative is that there’s this level of experimenting and trying to develop things, develop knowledge but actually getting things that stick and stay and continue is remarkably difficult and so, for example, the clickers here at this university have taken off. - Tony Grant (University lecturer in Biotechnology)

All of these issues can be seen as part of the problem in moving from the early adopter to the early majority phase (Rogers, 2003). However, problems of this type with technology are not necessarily due to the nature of the technology. Instead, they may be due to how the technology is introduced and explained to the educators by the institution and possibly by the digitally fluent educators.

Most of the interviewees tried to encourage an engagement with technology enhanced learning among those of their colleagues who, according to Tony Grant, find technology too complicated. If successful, this would lead to the diffusion of TEL practices from the early adopters to the majority of lecturers. Next this thesis examines the theories and practices espoused by the digitally fluent educators in working with their colleagues as well as the approaches they avoid.

4.4.2 Broad approaches to helping colleagues

As discussed earlier, digitally fluent educators have expertise in TEL. This sub-section examines the interviewees approach to helping their colleagues with both the technology, “how”, and the pedagogy, “why”, of TEL; in cases where the colleagues are interested in such advice and help; thus, moving those colleagues’ position on the “digital spectrum” towards greater digital fluency (Haythornthwaite & Andrews, 2011; Lenhart & Horrigan, 2003). Such a development takes a bottom-up approach to helping institutional culture move from “pockets to networks” of effective use of technology in practice (NFETLHE, 2014b).

Many of the digitally fluent educators share the views of Benson et al. (2011); Blin and Munro (2008) who found that there was too much focus on how to use technology rather than the ways to use it for improving learning. This may be due to media hype (Greenhow et al., 2009; Weston & Bain, 2010). Kevin Doyle agrees that hype about technology may be a barrier to good use:

The Gartner hype cycle, how do you get people past the hype part into the more sustained type of thing? – Kevin Doyle (University lecturer in Education)

To get over the hype, Kevin thinks that it is important for lecturers to understand why to use technology and not just how to use it (his emphasis):
I think that helping staff understand why it is important to use technology is - I don’t know if it is as important - but it is certainly a big part of it, and not just the how to use technology. I think that’s a really big part of it. - Kevin Doyle (University lecturer in Education)

Highlighting the benefits of TEL rather than the features of technology is more likely to convince sceptical colleagues of the benefits of TEL (Benson et al., 2011). David Toomey takes this approach with his colleagues by focusing on how technology adds value to teaching practice, giving examples from his own experience:

If you can show a demonstrable benefit for having to integrate technology through teaching you will win people over, but if your saying now here’s the latest fad, try that in class and see what happens. - David Toomey (IoT lecturer in Biotechnology)

I sit down with somebody and say “I’m using NearPod this semester” and they go, “oh that’s great”, but I say to them, “Look you need to think how and why you want to put it into your classes”, so look at the pedagogy first of all, how could it knit in, how could it add value. - David Toomey (IoT lecturer in Biotechnology)

He points out that the reasons for using the technology will remain the same even when the technology itself changes:

So, I think the technology should be secondary, convincing people to teach differently, would primarily be the target, because the technologies will change but if you changed their way of thinking then you have them converted. - David Toomey (IoT lecturer in Biotechnology)

William Cleary sees that a disconnection between TEL and the everyday practice of most educators makes this approach difficult and as a result that educators are continuing to focus on the tools. This disconnection can be considered as a boundary condition, which is difficult to cross, in terms of landscapes of practice (Wenger-Trayner et al., 2015) as discussed in detail in the next chapter:

Most teachers and most lecturers are always asking me, what is the device, what apps should I use. They’re not asking, why should I use it - William Cleary (Independent Consultant Teacher Education)

TEL is seen as a whole new set of skills, whereas really what we are talking about is people who are experts in a particular field and who are experts in teaching that field and we need to have technology in the mix - William Cleary (Independent Consultant Teacher Education)

A lack of connection between current professional practice and technology along with media hype on technology can lead to a concentration on technical skills, knowing how, rather than developing a fluency or what Michelle Delaney describes as “literacies” and this research calls “digital fluency”. She sees this as particularly worrying at third level, leading to the technological focus discussed by Blin and Munro (2008) and Lane (2009):
Teacher education programmes at universities are about computer skills… What can you do with Moodle… there is no kind of reflection of what it means? Very often it is seen as skills and not literacies. - Michelle Delaney (University lecturer in Languages)

She takes this point further, claiming academics are not applying a researcher’s attitude to their teaching practice. Rather than taking an investigative, critical or reflective approach, academics are often choosing an easy option that is easy to implement and fits well with their existing classroom teaching practice:

When it comes to educational technology researchers in other areas do not adopt a researcher attitude which is quite surprising in a way… the first thing that people that go for is drill and practice, everybody was moving away from that, technology arrives, and people go back to that because it was easier. - Michelle Delaney (University lecturer in Languages)

To implement new approaches, Michelle Delaney considered an understanding of the academic context to be essential and that timely coaching was a better approach than formal training courses, as it could be difficult to transfer what is learnt on the course to actual practice:

Training people before they do something, I think that's long gone. So, it has to be embedded. - Michelle Delaney (University lecturer in Languages)

Several participants felt that they could help their colleagues by offering reasons and benefits for using digital technologies rather than how to perform particular tasks. Reasons and benefits would outlive the current tools and technologies. This can be considered as going from digital literacy to digital fluency or taking a researcher’s approach.

Rather than taking an abstract approach, most of the interviewees described how they worked with colleagues in a practical manner, describing interventions such as demonstrations, presentations and coaching. Some gave more formal lectures and courses which naturally included theoretical and philosophical elements.

4.4.3 Helping colleagues in practice

In research into the adoption of blended learning in an US university, Porter and Graham (2016) found that their academic colleagues from the late majority were more likely to want training and support than innovators or early adopters. The late majority were the largest group in their survey (Porter & Graham, 2016). Formal courses can help such academics to develop their online teaching practice (J. C. Moore, 2011). In this research, the digitally fluent educators helped their colleagues in a variety of practical ways both formally and informally. These ranged from demonstrations to individual
colleagues to lectures to large groups. For example, Brian Power described how he makes himself available to show colleagues how to use technologies:

Well first of all, I make myself available to people, I have a certain reputation for all of this… But, if somebody comes up to me and says, Brian, I saw your video, how do you do that and is that easy to do, I would absolutely trip over myself to try and help them—Brian Power (College lecturer in Computing)

Brian will initially direct his colleagues towards online resources which he has created but is also happy to demonstrate technologies to them face-to-face:

“Well, I’ve heard that you can embed a video in a PowerPoint presentation. Could you show me how to do that?” I refer them to the video where I show people how to do that, but I am also quite happy to go to their office and show them how to do it as well. - Brian Power (College lecturer in Computing)

Michelle Delaney also describes this kind of informal support:

It’s a lot by example… very often colleagues would come to me before they go to anybody else… a lot of holding hands and just being available for them, to students as well. - Michelle Delaney (University lecturer in Languages)

Tony Grant is more pro-active. As he put it an email (personal correspondence) to the researcher he tries to raise interest in teaching innovations with colleagues informally over coffee:

I try to contribute to a background of enthusiasm about teaching innovations so that colleagues are aware of teaching ideas that might be new to them. Times like coffee breaks and faculty meetings are examples of “times for telling”. - Tony Grant (University lecturer in Biotechnology)

As his colleagues are scientists, he aims to appeal to their rational minds, by offering inputs that have some intellectual appeal and are based on quantitative data while keeping within the bounds of his own knowledge of pedagogy. He goes on to describe what he does in these informal settings:

If you can get colleagues to understand that modern learning is interactive, it’s not a one way dispensing of facts and if you just constantly give them examples… they’ll think, well I respect Tony’s teaching and people say it’s interesting so maybe I’ll give that a go and so you find this receptiveness. - Tony Grant (University lecturer in Biotechnology)

He describes this as creating, in his words, a “shop window” for teaching innovations where colleagues are regularly exposed to new ideas. When colleagues develop an interest, they may come “inside the shop” and participate in more formal activities such as courses and workshops organised by the Teaching and Learning Centre. He is an occasional presenter on such courses but believes that his ongoing background activities are of more value as they can spark an interest among his colleagues. Tony
describes himself as an early adopter. As such, he would be respected by his colleagues and considered to make sensible innovation decisions (Rogers, 2003). As in learning design his processes are shareable; however, unlike in learning design, they are rarely documented or formalised (Laurillard, 2012). Tony goes on to describe how his practice can lead to a wider diffusion of good practice:

> It becomes an exponential process because if there’s a few people and then they get a few more people who are trying things out, sooner or later they influence more people and you can have lots of innovation going on. - Tony Grant (University lecturer in Biotechnology)

David Toomey takes a similar approach to Tony. He gives demonstrations or “showcases” in his words to his colleagues over coffee, showing them examples on his smartphone or laptop. David focuses on the “why”, the benefits of integrating technology, rather than on the “how”, the technology itself:

> What I tend to do is to showcase the benefits of integrating technology, how it can primarily save time, increase student engagement, improve grades - if you can show a demonstrable benefit for having to integrate technology through teaching you will win people over - David Toomey (IoT lecturer in Biotechnology)

Using showcases, David has convinced three other lecturers (including one from another discipline in another institution) to use NearPod and is awaiting their feedback with interest:

> I’ve actually convinced two other lecturers to try it (NearPod) out in their classes as well and a staff member in another institution so hopefully I’m going to get a bit of feeling from that… how it works in engineering in the other institution and then biologists here - David Toomey (IoT lecturer in Biotechnology)

More formally both Tony Grant and David Toomey give lectures and demonstrations to their colleagues at events organised by their institutional teaching and learning centres, as does Maria Gallagher. Some of these events are part of diploma or degree courses run by their institutions. Maria takes a broader approach than Tony or David, discussing the philosophy underpinning her practice, where she considers it appropriate. This suggests that her professional identity and values differ from those of Tony and David:

> The Teaching and Learning Centre invite many people (including Maria and Tony) who they see as doing innovative work in various ways to come in and speak with academics who are on the Diploma and the Cert in academic practice - Maria Gallagher (University lecturer in Computing)

> I still do that (give lectures at the Teaching and Learning Centre) at least once a year, as well as other workshops for staff, for students. If that’s the forum then I will be quite clear
about my values and practices because people are coming to hear that. - Maria Gallagher
(University lecturer in Computing)

Brian Power also mentions giving occasional lectures and courses to his colleagues:

The one thing I have done is that I do guest lectures. I’m doing one next week as it happens on video and education, video and the classroom and some analytics as well, so guest lectures - Brian Power (College lecturer in Computing)

Looking specifically at training in technology, Margaret Thompson, found one to one coaching helpful with her less technologically-engaged tutors, while William Cleary considered that timely interventions were generally required:

It took them (course tutors) three years to get to grips with using the Wiki … so I had to show them how to copy and paste to get it into Word, so they could print it, so they need someone sitting beside them to help them essentially. - Margaret Thompson (IoT lecturer in Marketing)

They (academics) don’t want general help, so if my Google isn’t working, I need help and I need it now and I need somebody who can come and talk to me one on one or who can set up groups. – William Cleary (Independent Consultant Teacher Education)

Margaret goes on to say that what is learnt by training and coaching needs to transfer to and become embedded in actual practice to be of benefit (Beetham et al., 2009; Watts, 2010). Follow-up sessions can help such transfer (Watts, 2010). In Margaret’s opinion, this increases self-efficacy as well as enabling the development of skills and literacies. All of which contribute to the development of digital fluency (Teo, 2011; Q. E. Wang et al., 2013).

I think the hardest part is to translate that into the action after you go away and its time but it’s also confidence and knowing that you can go back, and you can ask the questions, so its follow up. - Margaret Thompson (IoT lecturer in Marketing)

Kevin Doyle shared Margaret’s belief in the value of follow-up activities and ongoing support:

It is really important to work with staff after that initial point… they do a workshop and they get two or three ideas for it and that’s great… allow time to come back and say, well how did that work for you. - Kevin Doyle (University lecturer in Education)

Kevin goes on to suggest the value of “learning clusters” as he calls them for ongoing support and the exchange of ideas:

Little learning clusters… this is what I tried, and this is what I found, and this worked, and this is what didn’t and, I had the same experience as that but, it worked for me, those little clusters are important - Kevin Doyle (University lecturer in Education)

Learning clusters can form part of a professional network such as “Teachmeets”, described by Kevin Doyle, as organised but informal meetings where teachers give short presentations on any aspect of education. They can also lead to the development of
personal networks, often facilitated through tools such as Twitter, which can help enthusiastic colleagues to continue their own development. The role of such networks in the development of digital fluency has been discussed earlier.

The digitally fluent educators interviewed were all happy to help their less technologically-engaged colleagues through their choices of informal and formal methods. Informally, Brian, Margaret and Michelle showed colleagues how to use particular technologies while David and Tony gave brief demonstrations at coffee breaks and staff meetings. Rather than giving courses, Michelle, Margaret and William saw a greater value in more contextual and personalised interventions such as just in time coaching. Margaret and Kevin stressed the importance of transfer from course to practice with Kevin suggesting the formation of learning clusters to provide ongoing support and peer learning. William endorsed this approach. More formally Brian, David, Tony and Maria gave organised demonstrations, lectures, courses and workshops to their colleagues.

4.4.4 Issues with the experts

In their research on academics uptake of TEL in Australia, Bain and McNaught (2006) suggested that in some cases non-adoption of technology could be due to a mismatch between the perspectives of the academic and the academic developer. Practice can often be led by deterministic expectations of technology rather than from an identified educational requirement (Kirkwood & Price, 2013). This can lead to unrealistic expectations of the technology, with the adoption of TEL focusing too much on the excitement of the latest technology - “Technology is All” in terms of Benson et al. (2011). This may be due to the experts focusing on the wrong area as William Cleary said:

I think all too often TEL is misconstrued with an over..., and I think it’s partly our fault, me being one of the people involved in this space, it’s overly aligned with technology - William Cleary (Independent Consultant Teacher Education)

Technology experts and enthusiasts can fail to communicate their expertise to their less technologically engaged colleagues. As William Cleary puts it, we (the digitally fluent academic developers) can be the source of the problem not the technology (his emphasis)

Initially I thought in the Albany College setting that the technology is the problem here, it’s actually us, it’s how we use the technology and I think we also need much more clear guidelines for the learners and for the tutors as to what we expect. - William Cleary (Independent Consultant Teacher Education)
Not only are guidelines required; but they need to be expressed in a manner that academics who are teaching a course can understand. These academics frequently do not have a background in educational research or learning technology and may not understand the terminology. This is not helped by inconsistent or unclear use of terminology by experts, for example, there is a lack of clarity as to what is meant by enhanced in technology-enhanced learning (Kirkwood & Price, 2013) or as quoted in *Towards a National Digital Skills Framework for Irish Higher Education* (NFETLHE, 2015, p. 12) there is often a “jargon jungle not easy to breach”. William Cleary reiterates this point:

I also think that the language can actually be a barrier to those in the profession…. I think the fact that we are talking in this kind of archaic language almost, you and I will use the term TEL. - William Cleary (Independent Consultant Teacher Education)

Once the experts realise that they have created these difficulties, they can be solved through appropriate interventions for their colleagues. One such approach as described by Kevin Doyle, is to focus on the “why – why it is important to use technology” not just the “how”. Blin and Munro (2008) refer to these respectively as “task-related competencies” and “tool-related competencies”. This approach can be implemented by giving a broad education in technology not just focusing on skills and tools:

Teacher education programmes at universities its computer skills… What can you do with Moodle or whatever but there is no kind of philosophical education reflection of what it means and the same with digital literacy. - Michelle Delaney (University lecturer in Languages)

However, pedagogical experts can present over-simplified approaches such as the division into teacher-centred and student-centred teaching whereas educators realise that practice is more complicated than that and includes a mixture of approaches (Bain & McNaught, 2006). Ideally, the institution should allow academics free rein to be creative and design their own activities:

I think we need to give faculty in Higher Education permission from a teaching point of view to be creative and to really design learning activities that will engage learners and technology can do that, we know that. - William Cleary (Independent Consultant Teacher Education)

However, they need pedagogical and technological expertise to do so effectively. In the terms of Blin and Munro (2008), they need both “task- related” and “metafunctional competencies” in addition to “tool-related competencies”.

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4.4.5 Colleagues and professional identity

Digitally fluent innovators are sometimes referred to as champions in reports and in the literature whose role is to take a bottom-up approach to the adoption of TEL (S. Brown, 2013; Cousins & Bissar, 2012; Mayes et al., 2009; Rolfe, 2012). David Toomey uses this term in a positive way when referring to the potential of his own role:

I want to contribute back to that community and develop resources and act as a champion because in our school now there are very few people who are fluent or even literate – David Toomey (IoT lecturer in Biotechnology)

However, the term can be used to refer to heads of schools (Newland & Handley, 2016; NFETLHE, 2014a) or a specialist employees in schools (Galvin et al., 2010) or educational technologists (Shurville, Browne, & Whitaker, 2009). Maria Gallagher refers to the term in the latter sense but with a slightly negative connotation, describing champions as being “technology is all” types (Benson et al., 2011):

I’ve been going to EdTech conferences for a long time now and I have met many (educational) technologists from the various universities and they are not just champions of technology. It’s all about technology and pedagogy… – Maria Gallagher (University lecturer in Computing)

In some institutions digitally fluent academics have been given an official role of champions to encourage a bottom-up approach “embodied in the academic identity” (Cousins & Bissar, 2012) which according to the authors has received positive feedback from colleagues. This is not the case for any of the participants or the institutions where they work. For these reasons, this research is reluctant to use the term champion to describe how digitally fluent educators work with their colleagues. Also, in most cases, it does not seem to fit well with their own view of their own professional identity. While the digitally fluent educators were happy to talk to their colleagues about their experiences and to encourage an interest in TEL, they were all reluctant to position themselves as evangelists for TEL. Tony Grant felt an overly enthusiastic approach was both inappropriate and unlikely to succeed:

So, my belief is - I don’t feel like some sense of messianic zeal (laughs) that I want everybody to do it my way, my way could be rubbish because I’m just finding my way around here, but I would like people to think, oh that’s an interesting idea, I might give that a go - Tony Grant (University lecturer in Biotechnology)

Maria Gallagher has similar views. However, unlike Tony, her colleague in the same university, she does not discuss her practice informally with departmental colleagues during coffee breaks. She feels that her approach to teaching and sharing ideas is very personal and not necessarily desirable or suitable for others. For those reasons she
does not share her values informally with colleagues in her own department. This suggests that Maria and Tony have slightly different professional values:

I was certainly never quiet about what I was doing, but I never saw myself as a cheerleader I was an advocate of open practices and TEL… but I think these things are very personal… So, I didn’t really put myself in the position of saying you must do this I mean that wasn’t really me. – Maria Gallagher (University lecturer in Computing)

Even worse, than “cheerleading” or “messianic zeal”, is to be seen to be suggesting to their colleagues that they (the digitally fluent) were better teachers:

I think that what you have to do is you have to show examples, so instructing people, right you’re obviously a poorer teacher if you’re not using clickers, that doesn’t work. - Tony Grant (University lecturer in Biotechnology)

Maria understands how easily one can become critical of one’s colleagues for not sharing an enthusiasm and the risks that this brings:

I have been in discussions with people who get turned on to using Twitter … and they just cannot understand why other people don’t do it. They might criticise people and say, “Why aren’t they doing this?” I wouldn’t be like that. I think, it’s very, very personal but it’s easy to slip in to that critical mode. - Maria Gallagher (University lecturer in Computing)

While academics are rarely convinced by personal enthusiasm, equally they are not convinced by arguments based on organisational authority (S. Brown, 2013), which, in any case, the participants claim do not work in practice:

You can make people do courses and you can say that all content has to be digital, there’s directives coming down and policies, but at the end of the day academic freedom and people’s own perspective are going to rule. - David Toomey (IoT lecturer in Biotechnology)

The digitally fluent educators did not see their roles as cheerleaders and certainly did not want to suggest that their use of technology made them better lecturers than their colleagues. Such a role did not form part of their professional identity. Even if they wanted to do so they had no power over their colleagues. They preferred to convince by example and illustration. This approach fitted better with their perception of their role.

4.4.6 Summary: Sharing practice with colleagues

This section examined how the participants could enable and encourage their less technologically-engaged colleagues to develop their digital fluency with a view to making more effective use of TEL in their professional practice. It started with a review of current practice. According to the participants, most educators want to teach well, yet many find change difficult and are not always convinced of its value. These colleagues may have a
low performance expectancy of digital technologies, not seeing their relevance for teaching in their discipline. This may lead them to teach in the way they were taught as students, rather than taking a researcher’s approach to practice. When using a VLE, they tend to focus on content and administration rather than on engaging learning activities and can be overwhelmed by technical challenges (Blin & Munro, 2008; Dahlstrom et al., 2014; Donnelly & O’Rourke, 2007; Rienties et al., 2014). Often they are trying to teach online or in a blended environment using their classroom teaching approaches, perhaps having failed to develop an understanding of the perceived affordances of the conceptual model underlying the digital technologies involved (Baran et al., 2013). Findings in this study suggest that while this is partly due to inexperience, technical constraints and poor communication with experts are also a factor. The structure of the VLE facilitates a certain approach to teaching while experts may focus too much on the tools without sufficient context for their effective use. However, formal and informal professional development can help these colleagues, regardless of their age, to evaluate both the experts and their tools. A commitment to professional development is more important than age.

While enthusiastic about their own use of digital technologies, the participants clearly state that they are not “cheerleaders” for technology and not in any way better teachers than their colleagues. Such an approach would be inconsistent with their and their colleagues’ professional identity. The digitally fluent educators help to enable and encourage their colleagues by responding to requests for help and advice. More proactively, they give practical, often informal, demonstrations of how they and their students benefit from the use of TEL. In their own words, they provide a “shop window” or “showcase” for their colleagues. The focus of these demonstrations is on why they use the technology rather than how they use it or in Michelle Delaney’s terms literacies rather than skills. This approach corresponds with the definition of digital fluency given by (Briggs & Makice, 2012; Hsi, 2007; Q. E. Wang et al., 2013; R. L. Wang et al., 2012). More formally digitally fluent educators help by giving courses and workshops in their institutions, some of which form part of an accredited programme. Some respondents felt that coaching, demonstrations and timely one-to-one interventions were more valuable than formal courses, as did Hannon (2008). Courses and coaching for small groups could lead to the development of learning clusters as suggested by Kevin Doyle. These clusters could in turn become the basis of a personal learning network which could further enable
and encourage those colleagues (Knight et al., 2006; Rajagopal et al., 2011). Institutional culture and structures can create an environment which supports educators in their development of digital fluency and use of TEL.

4.5 Institutional supports

This section presents relevant data from the research to examine how institutional culture can enable and encourage both digitally fluent educators and their colleagues to develop digital fluency and implement TEL by providing (or not) appropriate facilitating conditions and social influence (Venkatesh et al., 2003). Venkatesh et al. (2003) define facilitating conditions as a “belief that an organisational and technical infrastructure exits to support the use of the system” and social influence as “the degree to which an individual perceives that important others believe he or she should use the new system”. Facilitating conditions can enable educators to use TEL. They include adequate (or not) support services, funding, workload management, secure employment contracts, technology, infrastructure and support services. Problems with facilitating conditions are stumbling blocks which educators may be able to surmount using their digital fluency. Many of the participants mentioned a shortage of funds along with the desire “to do more with less” (Deem & Brehony, 2005) as an obstacle to making greater use of teaching innovations. The existence of such stumbling blocks may illustrate a lack of institutional commitment to the innovative development of TEL or just another attempt at doing more with less (Deem & Brehony, 2005). Because of their expertise and self-efficacy, these stumbling blocks do not generally prevent the digitally fluent from making use of TEL in their professional practice.

Institutional awards could provide a social influence (Venkatesh et al., 2003), encouraging educators to adopt TEL, as awards suggest “important others” would like them to use TEL. While Institute of Technology lecturers David Toomey and Margaret Thompson welcomed institutional awards and recognition of their teaching practice, university-based Tony Grant and Michelle Delaney did not, preferring to focus on their research interests. Both Tony and David share the same discipline, biotechnology. Their preferences suggest that they have absorbed the values of different institutional cultures into their professional identity.
4.5.1 Awards, rewards and identity

A lack of funding was mentioned as a significant difficulty by some of the participants in both the university and institute of technology sectors. This corresponds with doing more with less, an aspect of new managerialism in higher education (Deem & Brehony, 2005):

There is a need to do more, better and with less - Kevin Doyle (University lecturer in Education)

There is no budget now… It’s either buy consumables for the teaching labs - or buy software. It’s obviously the teaching labs that are going to be prioritised so it’s the lack of financial support that I find is the biggest factor. – David Toomey (IoT lecturer in Biotechnology)

However, there is a contrast between the views of the two biotechnology lecturers, Tony Grant in a University and David Toomey in an Institute of Technology as to what constitutes sufficient funding, starting with Tony’s views:

You can get research grants to do pure research and you can get students to do laboratory science in my area but it’s near to impossible to get significant amounts of money to support and drive these sorts of teaching and learning initiatives. - Tony Grant (University lecturer in Biotechnology)

I know the National Forum, for example, or NAIRTL before it, did have amounts of money but I had a NAIRTL grant that was worth €5,000. (Laughs) I mean that’s just a trivial amount of money on the scale of bench research science. You wouldn't even bother to list it. - Tony Grant (University lecturer in Biotechnology)

While Tony, who works in a university, considered €5,000, a derisory sum, David Toomey, who works in an Institute of Technology, was pleased that he was able to access a much smaller amount of money from his Teaching and Learning Centre:

The teaching and learning centre here are brilliant. They have small funds that are available quite regularly, €1000, €500, just enough to allow you to get what you need to try it out on a small scale and then you evaluate it and you can then justify the school investing in it in the future, NearPod for example. - David Toomey (IoT lecturer in Biotechnology)

This difference may be due to their professional identities and the culture of the institution where they work. While Tony in a university primarily identifies with research and raising funds to do research, David in an Institute of Technology primarily identifies with teaching. In both cases their professional identities seem to match institutional culture. Tony could be considered a “researcher who teaches” in the terms of Skelton (2012), an academic who identifies primarily with research but who enjoys teaching and would like to develop his teaching practice. David seems more like a “teaching specialist”, someone who spends a lot of time and believes that teaching should be more valued in
higher education (Skelton, 2012). As David participates in research into his teaching practice, he could also be considered a “blended professional” who equally values teaching and research (Skelton, 2012).

Other participants also mentioned small amounts of funding being made available from national projects such as the National Forum for the Enhancement of Teaching & Learning in Higher Education. Kevin Doyle mentioned that he tried “to avoid the financial side of the barrier”, partially, at least by using free and open source software. Some participants did not mention funding difficulties at all though they all seemed to operate under fairly, tight financial constraints. Related to the lack of financial resources, many participants mentioned their own increasing workload as a barrier to greater use of TEL.

In a study of three US universities, Cook et al. (2009) found that faculty in one institution were increasingly motivated by money or career incentives to develop online learning. More recently, Porter and Graham (2016) found that financial or career incentives had little effect on faculty use of TEL in a different US university. The latter also seems to be the case for the digitally fluent educators interviewed in this research. None of the interviewees were motivated by career or financial goals rather they were driven by personal and pedagogical values in their use of TEL, including a belief in contributing to the community, job satisfaction from using technology and a belief in the value of TEL:

I somehow believe that my role as an academic is a mixture of teaching of learning, and research and community type thing - Tony Grant (University lecturer in Biotechnology)

As for the teaching materials – I’m not doing it for profit - Michelle Delaney (University lecturer in Languages)

These comments by the participants support the observations of Fischer and Köhler (2011) who found that academics who were more motivated by the desire to improve their teaching practice rather than by rewards and status were more likely to use TEL. They categorised these academics as experienced explorers, which seems a fitting description of the interviewees. They seem to be innovators or early adopters who have a high performance expectancy (Venkatesh et al., 2003) and are intrinsically motivated to use digital technologies. However, the National Forum considers awards to be important and asks in its Roadmap:
Has consideration been given as to how the contributions of grass roots academic innovators, in developing and successfully implementing technology in teaching and learning, can be championed and recognised within institutional reward and recognition structures? - (NFETLHE, 2014a)

Clearly, the National Forum hopes that such awards will provide a social influence which will increase the likelihood of the adoption of the effective use of TEL (Venkatesh et al., 2003). This seems to be the case for those participants working in an Institute of Technology who appreciated those awards:

Well I would have got a Teaching Excellence Award… and there’s an initiative with the students abroad, there’s a recognition that was a lot of work and that I took it on and pioneered it - Margaret Thompson (IoT lecturer in Marketing)

In this institute, there was the President’s Teaching Award … and looking outside you have the Jenn Burke Award and then you have the Teaching Expert Award from the National Forum… that add more value to my CV - David Toomey (IoT lecturer in Biotechnology)

However, Tony Grant who, like David Toomey, is a biotechnology lecturer but in a university, compared the necessity and value of attending teaching and learning conferences (his words) to attending research conferences in his own discipline.

So, what the advice was effectively from that source (people he met at an EU funding conference) is that you had to start going into the teaching and learning conference circuit, treating it a little bit in the same way as your research interest, going regularly to conferences. - Tony Grant (University lecturer in Biotechnology)

Tony goes on to explain why he has decided not to follow this route. His reasons resemble those of the other research participants from the university sector, who considered there was a comparative lack of recognition for teaching innovation when compared to research activity. In this sense there was a disconnection between the values of the interviewees and the stated goals of the institution. It seems to suggest a clash between their professional identity and institutional culture. While the university participants valued teaching, prizes or awards for teaching were not considered to be important:

The tension between the teaching and research profile of staff - you get no recognition for teaching innovation, you get a prize or something like that, but when it comes to promotion the only thing that counts is your publications. - Michelle Delaney (University lecturer in Languages)

It (teaching) has to be properly resourced, and … it’s not that I don’t get a lot of recognition within the university but on the other hand publishing another research paper… relative recognition is where the problem is - Tony Grant (University Lecturer in Biotechnology)
You are of course going to follow this sort of research direction, which means that you intend to de-emphasise the teaching… and this holds back adoption of innovations. - Tony Grant (University Lecturer in Biotechnology)

This leads to an examination of the participants’ perceptions of their role in terms of professional identity (Trede et al., 2012) and its relationship with the culture of the institution where they work. These views from the university sector are consistent with the findings from a survey of professional development in Irish higher education, where awards were not considered to be worthwhile (Slowey et al., 2014). Reports from a post-1992 university in the UK show a more nuanced picture, where most award-winners valued the institutional recognition (Cheng, 2014). However, while they felt that the award increased interest in teaching, it did not increase the status of teaching (Cheng, 2014). A different culture prevails in the Institute of Technology sector, where lecturers are contracted to teach at least sixteen hours a week, leaving little time for research, which while encouraged is not considered essential (O’Byrne, 2014). This is exemplified by the views of Margaret Thompson:

There are different emphases (in this institution), a high emphasis on teaching and teaching quality and making sure that the feedback goes out to the students - Margaret Thompson (IoT lecturer in Marketing)

The cultural values of the universities, where greater value is placed on research than teaching, may be a major stumbling block in the wider adoption of TEL, as William Cleary puts it:

I think it’s very difficult for faculty who want to be more innovative and creative in their own practice to survive in higher education or any sector unless there is leadership from the university, from the faculty - William Cleary (Independent Consultant Teacher Education)

University culture seems to be different from Institute of Technology culture in this respect. While valuing teaching, participants in the university sector do not seem to value institutional awards for teaching and learning, their focus is more on research. Those in the Institutes of Technology seem to appreciate recognition for teaching excellence but then teaching is valued in their institutional culture. Their employment contracts usually specify a high number of teaching hours (Devine, 2015b). The participants seem to have absorbed this aspect of institutional culture into their professional identity.
4.5.2 Time and workload

Participants from both the university and institute of technology sector found that developing TEL for their teaching practice required more time than conventional lecturing. This corresponds with the findings of many TEL researchers (Baran et al., 2013; Ooms et al., 2008; Vaughan, 2007). This additional time increased their workload without any additional rewards and is considered part of doing more with less in higher education (Deem & Brehony, 2005):

Time. Time, that’s the big one (laugh) Now, I can’t speak for everywhere, I can certainly tell you being part of a smaller institution, time is probably a single greatest commodity we don’t have these days. – Kevin Doyle (University lecturer in Education)

I think the big problem is using technology to teach is very time consuming - Michelle Delaney (University lecturer in Languages)

The ability to manage them (learning activities) on an ongoing basis … if you create a Wiki you are promising that you will look at it and I found that I wasn’t always able to do that, so I moved away from it on some courses and said, no I can’t fulfil that promise. - Margaret Thompson (IoT lecturer in Marketing)

The pace of change is only accelerating. Academic staff are teaching more and more students with more and demands on their time. They’re under a lot of stress. - Maria Gallagher (University lecturer in Computing)

Like Margaret, David Toomey uses TEL to give feedback to his students. As described earlier, efficiency was one of his reasons for using TEL. Unlike his colleagues and the findings of many TEL researchers, he reports that TEL was a time saver as it enabled him to give effective feedback in real-time to more students as his class sizes increased:

The “why” is, I suppose, primarily, to make my life easier. There’s a massive increase in student numbers… it just became unsustainable to continue on. Simple things like giving feedback became monsters so I looked towards technology. - David Toomey (IoT lecturer in Biotechnology)

Even the labs it is 40 or so students and they all want to have time with you, they all want to have feedback so it’s trying to provide the resources that the students need in terms of feedback but also keep my sanity and have a life. - David Toomey (IoT lecturer in Biotechnology)

Using tools like Nearpod and Peerwise as described earlier, he has to prepare his materials in advance. This preparation time allows him to use his class time more effectively to give feedback. This allows applies to the development of multiple choice questions with the added of benefit of reusability, in this case:

It’s time investment. For example, if you set up a bank of MCQs in the VLE it takes a long time to create the bank, to have good distractors, have good question design, but it’s done, and you can add 10 to 15 questions every year to it. It keeps it alive, it keeps it fresh,
but the majority of the work is done so it’s definitely front loaded. - David Toomey (IoT lecturer in Biotechnology)

In line with the research literature, most of the participants found that using TEL in their teaching practice took more of their time than conventional lecturing. David Toomey was a notable exception reporting that TEL saved him time, made his working life easier and introduced efficiencies in giving feedback into his teaching practice. The difficulties caused by a shortage of time were compounded by an increasing workload due to cutbacks in funding for higher education. Such widespread changes to the educational system make it more difficult for educators to introduce changes to their teaching practice.

4.5.3 Employment status

Another significant facilitating condition (Venkatesh et al., 2003) is employment status. While the digitally fluent educators are mostly in secure employment, this is often not the case for their younger colleagues. Insecure employment can affect those colleagues in their use of technology in their teaching practice. It also indirectly raises age as a factor in the use of TEL in teaching practice.

By definition, younger lecturers were students more recently. This does not necessarily mean that they are more digitally fluent than their older colleagues. However, they are almost certainly more familiar with digital technologies and accustomed to virtual learning environments. This seems to suggest that they would be more likely to use digital technologies in their teaching practice. However, they are frequently employed on a part-time or temporary basis. An average of twenty-five percent (25%) of lecturers on core programmes in Institutes of Technology and an average of forty-five percent (45%) in universities are employed on part-time or fixed-term contracts (Cush, 2016, pp. 21-31). The figure ranges from ten percent (10%) to sixty-six percent (66%) in the Institutes of Technology and from nine percent (9%) to seventy-five percent (75%) in the universities depending on the institution (Cush, 2016, pp. 21-31). This increasing employment of academics on temporary contracts is indicative of new managerialism in higher education (Deem & Brehony, 2005). This introduces divisions between those employed in a permanent capacity and those on temporary contracts. Due to their temporary status these academics have little reason to invest any additional effort in their own teaching practice:
Some do (use technology), especially the younger ones but, unfortunately, they are not usually permanent members of staff or full-time. - Michelle Delaney (University lecturer in Languages)

They (part-time lecturers) are not encouraged to do anything extra themselves because they are only paid for the hours they spend in the classroom, so if they spend 10 hours preparing the lecture or 10 minutes preparing the lecture, they get paid the same. - Brian Power (College lecturer in Computing)

These statements, of course, imply that using technology takes more time, a view of all the respondents except David Toomey (as previously described), who saw time spent on technology as being front-loaded. If the younger lectures share the majority view, they are unlikely to make greater use of technology in their teaching practice, until they gain permanent or full-time employment status.

4.5.4 Infrastructure and technical problems

To implement TEL in practice, educators need appropriate room layout, functioning networks, hardware and software. Porter and Graham (2016) noted that problems with infrastructure were a significant impediment to the adoption of TEL. In their work with part-time doctoral students in nursing, R. L. Wang et al. (2012) noted that difficulties in using personal digital assistants and poor network connectivity were a significant barrier to their use. In this study, the participants reported difficulties with physical and technical infrastructure, difficulty accessing software and incompatibility between systems. Michelle Delaney found that the available rooms were unsuited for collaborative work, while Brian Power had problems with the room layout and the wireless connection for BYOD:

We don’t have good rooms to do that type of (collaborative) work. The only lab we have is kind of teacher fronted which is not really conducive to proper collaborative work. - Michelle Delaney (University lecturer in Languages)

There’re plugs everywhere and a big challenge in a BYOD environment in a tiered lecture theatre is during tutorials. What I do is I tell them, could you sit in every second row please so that I and my TAs can walk around and help somebody in the middle of the room. - Brian Power (College lecturer in Computing)

Most of the time they are able to log on, but they can’t connect to Eduroam (Wi-Fi). They can connect today but they can’t connect tomorrow. - Brian Power (College lecturer in Computing)

When lecturers go off piste, they may find that the necessary software is not always available or accessible to students and may require training to use:

The students wouldn’t have access to the video editing software and so then they would have to use demo versions of the software because the licensing is expensive - Tony Grant (University lecturer in Biotechnology)
Institutional technology itself is not always reliable or does not work as promised. Benson et al. (2011) report that VLEs technologies are “prone to failure” while Blin and Munro (2008) found that advanced tools in a VLE had complex interfaces which made them difficult to use. Similarly, Margaret reported technical issues with their VLE.

We had big problems with Wikis, we had problems with Blackboard, it kept deleting things and losing things. – Margaret Thompson (IoT lecturer in Marketing)

Apart from technical problems, technology can become a barrier to active learning. The default settings of many VLEs reinforce an instructivist approach to learning where lecturers post content and manage classes (Lane, 2009). VLEs may not be compatible with each other, making collaborative work between different institutions difficult as Kevin Doyle noted:

It actually turned out that both institutions were doing the same thing but using different technologies and, in that way, what actually ended up happening was the VLE ended up being a barrier - Kevin Doyle (University lecturer in Education)

Where novel or collaborative uses were required, technology problems made it difficult for the digitally fluent educators to use TEL. In many cases, their self-efficacy enabled them to overcome these difficulties or stumbling blocks (researcher’s emphasis):

In mine, no. Because I am fully autonomous with the use of technologies; so, I always find solutions. - Michelle Delaney (University lecturer in Languages)

What I am, and my colleagues are, doing now is we are looking at ways of going around BYOD problems. - Brian Power (College lecturer in Computing)

However, less technologically proficient colleagues are unlikely to have the expertise, willingness or the confidence to overcome such technical problems.

4.5.5 Institutional training and courses

The participants had views on how their institution should support the development of digital fluency. These ranged from accredited degrees through formal induction courses and badges to means of transferring new literacies from theory to practice.

The four participants who pursued or are pursuing doctorates in TEL-related areas have been supported by their employer as were David and Margaret in their part-time master’s in Applied eLearning. This suggests that their employer was enabling and encouraging them by providing facilitating conditions in running the course and social influences in encouraging them to participate (Venkatesh et al., 2003). This is evidence for an institutional culture that supports the development of digital fluency by means of
accredited learning in TEL. Many institutions give introductory courses on institutional technology to new staff. Brian Power was in favour of turning such courses into an opportunity for professional development, similar, to accredited courses in other institutions:

So, can we make it part of professional development? At the moment, I don’t know. Can we make it part of induction? I don’t know. Can we pay people to do it? I don’t know. - Brian Power (College lecturer in Computing)

Certificated or not, Tony Grant sees courses introducing the basics of pedagogy such as the use of learning objectives to be very helpful at the start of a lecturing career:

I think (Introductory) courses are really important for giving people - certainly science academics - some sort of a conceptual framework… teaching them some basic principles, Bloom’s taxonomy, learning objectives… – Tony Grant (University lecturer in Biotechnology)

Brian and Tony suggested that formal introductory courses on basic pedagogy would help new lecturers with TEL. Such courses could help to develop a clearer understanding of the affordances underlying digital technologies. These courses might be badged, certified or accredited. Tony and Kevin Doyle think that giving staff digital badges for such courses might act as a form of recognition and therefore encourage participation:

I think they (educational technologists) actually are handing out badges in that way which is very valuable, and they shouldn’t forget that role because that’s the leadership role that they have… What they have to do is to try and empower people like me, who are at the coal-face teaching my discipline, to go and do things. – Tony Grant (University lecturer in Biotechnology)

I’m very, very interested and enthusiastic in the concept of something like digital badges … We think about digital badges a lot with students, but maybe digital badges are something that can be done with staff as well… It’s not about the badge, it is some little form of recognition – Kevin Doyle (University lecturer in Education)

Introductory courses, accredited professional development and support for higher degrees are all ways in which an institution can support its educators to develop their digital fluency and make effective use of TEL.

4.5.6 Summary: Institutional supports

This section examined how institutions of higher education could foster and facilitate the effective use of TEL through the development of digital fluency by their academic staff. Institutions can do so by offering awards and rewards for developing teaching practice; thus providing both facilitating conditions and a social influence (Venkatesh et al., 2003). As noted in Fischer and Köhler (2011); Porter and Graham
(2016), the research participants did not seem to be driven by the prospect of career advancement in their use of TEL. The participants from the institutes of technology differed from their colleagues in the university sector in their attitude towards funding and recognition for the development of TEL. There was disagreement between two of the participants as to what constituted an appropriate level of funding with David Toomey an Institute of Technology lecturer in biotechnology being pleased to receive €500 while his colleague Tony Grant in a university considered €5,000 to be inadequate. A similar discrepancy was seen in the attitude towards awards and recognition; with participants in the Institutes of Technology valuing teaching awards and their university-based colleagues dismissing them. These attitudes to funding and recognition would seem to be related to the institutional culture of the universities, where less value or a lower social influence placed on teaching. The participants seem to have incorporated this aspect of institutional culture into their professional identity. This suggests that institutions should consider their own culture and the professional identities of their educators before offering funding or teaching awards.

Participants in both sectors considered that their employers were increasing their workload, thus adding to the time pressures they faced and reducing the amount of time available for the development of TEL. While David Toomey found that TEL had made his practice more efficient by allowing him to provide real-time feedback to his growing classes, most of the participants considered the development of TEL to be time-consuming, a view shared by many researchers (Baran et al., 2013; Ooms et al., 2008; Vaughan, 2007). In this case, the increasing number of lecturers who are on short-term or casual contracts are unlikely to invest their own time in the development of TEL whether or not they have the expertise to do so.

Institutional technologies such as the VLE can be difficult to use and prone to failure (Benson et al., 2011; Blin & Munro, 2008). In particular, the participants reported difficulties with collaborative work, networks and the VLE. Some participants tried non-institutional systems such as social media but found they had little support when they went “off-piste”. However, their self-efficacy and digital fluency enabled them to get around these stumbling blocks. This would not apply to their less technologically-engaged colleagues.
Irish higher education institutions can help to overcome some of these difficulties by offering professional development and institutional support through educational technologists, centres for teaching and learning and technical support. The next section examines how educational technologists in higher education can enable and encourage their colleagues to meet these challenges.

### 4.6 Educational technologists and support services

Support from specialist staff can enable and encourage digitally fluent lecturers and, even more so, their less technologically proficient colleagues, to make greater use of TEL in their teaching practice. As such it can provide a facilitating condition for the adoption of TEL in practice (Venkatesh et al., 2003). The presence (or absence) of effective support services is likely to have a much greater effect on the early and late majority (Rogers, 2003) than on the digitally fluent educators. This situation is described by Tony Grant:

> I think there are lots of enthusiastic university academics who with these sorts of supports could do all sort of innovative things, but the resources are not available. - Tony Grant (University lecturer in Biotechnology)

This support can be in the form of courses, advice and technical support. More broadly, support services can help to foster an institutional environment where teaching with technology flourishes. Educational technologists are the principal source of such support.

#### 4.6.1 How educational technologists can help

A previous section suggested ways in which digitally fluent educators could enable and encourage their colleagues to move further along the digital spectrum in both a practical and theoretical manner. Theory provides frameworks which can help educators to make changes to their practice in small steps. In practice, the interviewees gave informal support to colleagues when requested and gave casual demonstrations at occasions such as staff meetings and coffee breaks. Many also gave formal lectures and presented at institutional events. None of them wanted to be seen as pushing technology or implying that they were in any way better teachers.

Six of the eight interviewees work in universities or institutes of technology, where they have the services of educational technologists and teaching and learning centres to support them. Educational technologists may work in a central service such as
They are really lovely partnerships built up between people who are teaching and the learning technologists. - Maria Gallagher (University lecturer in Computing)

The academic staff who use the Teaching and Learning Centre really rely on the expertise of the learning technologists. I think they are really important… It’s all about technology and pedagogy supporting the work that academics and students are trying to do. - Maria Gallagher (University lecturer in Computing)

Such partnerships have been discussed in the literature, where writers such as Ellaway, Begg, Dewhurst, and Macleod (2006); Fox & Sumner, 2014; Hannon, 2008; Hannon (2012); Ooms, Burke, Linsey, & Heaton-Shrestha, 2008; Peacock, Robertson, Williams, & Clausen, 2009; Shurville, Browne, & Whitaker, 2009) have all discussed the role of educational or learning technologists in higher education and the complexities of their relationships with academic staff and with their institution as a whole. In the university, where Tony and Maria work, the educational technologists are based in the Teaching and Learning Centre, where they were seen as a source of inspiration and as such providing a social influence (Venkatesh et al., 2003) to encourage the digitally fluent:

I’d say what we do have is led by the Teaching and Learning Centre, we have people who are inspired about being inspiring let’s say - Tony Grant (University lecturer in Biotechnology)

They also give me, and this is valuable, the sort of recognition and self-confidence … when an educational technologist says, “Oh, that’s really good” or “Tony, why don’t you go and talk to”—then you feel proud of the effort of what you’ve made and it’s something valuable" - Tony Grant (University lecturer in Biotechnology)

As well as inspiration they are helping to facilitate connections that can lead to the development of learning networks (Dabbagh & Kitsantas, 2012; Rajagopal et al., 2011) among the colleagues:

They (Teaching and Learning Centre) invite many people who they see as kind of doing innovative work in various ways to come and speak with academics who are on the Diploma and the Cert in academic practice. So that sets up nice connections for all of us. - Maria Gallagher (University lecturer in Computing)

Such networks can further enable and encourage the educators. Drawing on innovation theory, the role of an educational technologist can be considered as that of a change agent (Rogers, 2003), working closely with academic staff to bring about changes in practice (Fox & Sumner, 2014). Kevin Doyle exemplifies this point of view, linking it
with his earlier points about the “why” or reasons for using TEL and its integration in practice:

I think there’s a very important role for educational technologists. Not just the how do I do it, as in well you click here, and you click there and you drag this and press submit and wow look at it, but actually helping work through it in terms of embedding it. - Kevin Doyle (University lecturer in Education)

Looking at their role as facilitators or change agents in practice, educational technologists can help both the digitally fluent and their colleagues to overcome some of the stumbling blocks mentioned previously. In terms of landscapes of practice they are acting as brokers, helping academics to cross a boundary into an educational technology community of practice (Wenger-Trayner et al., 2015; Wenger, 1998). One of these stumbling blocks is the shortage of time and money and the idea of doing more with less.

4.6.2 Resources - time and workload

Like academics, educational technologists can be affected by pressures of time and workload. As discussed previously, most of the interviewees found that using TEL in their teaching practice took more of their time than conventional lecturing, though David Toomey was a notable exception. This corresponds with the findings of Vaughan (2007) Ooms et al. (2008) and Baran et al. (2013) who found that the time required for development of TEL was frequently under-estimated. Some of the interviewees saw that educational technologists could help to reduce this workload for their academic colleagues, though they too, like the academics, were under-resourced:

The academic staff who use the Teaching and Learning Centre really rely on the expertise of the learning technologists… I just don’t think, particularly at this university, I don’t think there is enough funding for that kind of work. - Maria Gallagher (University lecturer in Computing)

Less research seems to have been published about the workload of educational technologists, but Ooms et al. (2008) have noted that e-developers (in her words), who were based in a central educational technology service, were under time pressure due to the demands of competing projects. Tony Grant has been helped by such educational technologists, but emphasises that they too are under time pressure:

So, I think I do get appropriate support from Learning Technologists, but I just think there aren’t enough of them and their day jobs, just with general sorts of things - they have a relatively small slice of stuff. - Tony Grant (University lecturer in Biotechnology)

In a centrally located service, their “day jobs” are generally connected with institution-wide systems such as the VLE. As Maria describes, educational technologists
may also be embedded in a particular school or unit where they are likely to play a different role, typically working more closely with their academic colleagues on specific projects:

There’s a role for educational technologists in a central organisation like the Teaching and Learning Centre but there’s a role that educational technologists can play embedded in schools. - Maria Gallagher (University lecturer in Computing)

Many educational technologists have to perform both an institutional and departmental role which can lead to tension between the two aspects of their jobs (Ellaway et al., 2006; Hannon, 2008) as is discussed in the next sub-section.

4.6.3 Enabling and guiding for sustainability

Three of the institutions in this study employed educational technologists (two universities, one institute of technology). Most of the educational technologists worked as part of the team in a central unit with responsibility for developing teaching and learning, always referred to as the Teaching and Learning Centre in this study. Their primary role seemed to be supporting the VLE rather than helping with more innovative aspects of TEL, as is borne out by quotations from five of the six relevant interviewees. This affects how they relate to their academic colleagues. In some cases, as digitally fluent educators, they did not require educational technologists or technical support, as they could perform that role themselves:

In coming from a smaller institution, I am somewhat of the educational technologist and the academic and the enthusiastic guy who tries to organise things. - Kevin Doyle (University lecturer in Education)

Michelle Delaney, working in a university, was largely self-sufficient in terms of educational technology:

All the learning activities and the resources are on an external server on WordPress. But I have no support for that I have to support myself completely. It is not supported by the university. - Michelle Delaney (University lecturer in Languages)

She claimed there was little educational technology support for more experimental projects and that the educational technologists focused on the VLE:

The barriers are that there are not enough resources within the university to support things that are not mainstream. - Michelle Delaney (University lecturer in Languages)

Working in the same institute of technology as each other, Margaret Thompson and David Toomey, found that the educational technologists were helpful, but, like Michelle Delaney, this help was largely confined to the institutional VLE:
(Helpful support) for say the day to day stuff in Blackboard, the VLE, definitely. How do I do whatever in the grade centre, they are great, at the end of the phone, answer your questions, no problem. When you go “off piste” a little bit, there’s little support there. - David Toomey (IoT lecturer in Biotechnology)

Tony Grant also found that educational technologists were focused on the VLE which he ascribed to time and funding pressures. While finding their support to be helpful, Margaret seemed to find the technical aspects of educational technology support to be more valuable than the pedagogical, perhaps showing a greater concern for the “how” than the “why”:

I did feel that they lost kind of one of the key people, the technology person, so they have the eLearning people who know the theory and ideas, but they’d lost the person who was the software person, which was a pity - Margaret Thompson (IoT lecturer in Marketing)

Kevin Doyle works in the same university as Michelle Delaney though not on the main campus. Like Michelle he is largely “self-sufficient” in educational technology, describing himself as “somewhat of the educational technologist and the academic and the enthusiastic guy”. Unlike the other interviewees, Kevin found that he had appropriate support from educational technologists and did not mention the VLE:

We do have support from educational technologists, they are very good and in particular very good in term of just general questions… tech support from a learning technologist’s perspective, not the, my printer is not working, side of things - Kevin Doyle (University lecturer in Education)

Five of the six interviewees felt that the educational technologists provided a valuable service, but their main area of expertise was institutional systems such as the VLE. William Cleary, who as a consultant has advised many educational institutions, thinks it is essential both to avoid a focus on tools and to avoid placing the use of those tools in the hands of specialists. The perceived focus of educational technologists on the institutional VLE and its technical aspects in particular could be seen as an example of such a focus. Instead, William thinks technology should be brought out of isolation into the centre of practice. He feels that he personally has made this mistake in his advice:

I think we tend to silo technology in teaching with specialists like educational technologists and we’ve kind of kept it out there and not brought it centre stage within teaching, within learning and assessment. - William Cleary (Independent Consultant Teacher Education)

As part of a centralised service, educational technologists and Teaching and Learning Centres risk being identified with university management who are enforcing part of the “doing more with less” culture. Tony Grant describes a recent case in his
university where academic staff were being asked to do additional assessment administration through the VLE:

There’s a big fiasco going on at the moment because the university has decided that Blackboard is going to be used to return all marks to the Exams Office… and while Blackboard is a tool that can do this. - Tony Grant (University lecturer in Biotechnology)

Tony goes on to say that this is the price for being part of the system and on a positive note it shows that they are considered to be important. It relates back to the wider issue of change agents, who is setting or seen to be setting their agency, the institution or the academics, and what is their ultimate goal.

The vast majority of the academic community has just got fed up with being told to do more and more and more with less and less and less and so it’s become, at least at the moment, a bit of a cause celebre for resistance against the system - Tony Grant (University lecturer in Biotechnology)

Training and staff development are a significant part of their role for many educational technologists (Ellaway et al., 2006; Fox & Sumner, 2014; Hannon, 2008, 2012; Ooms et al., 2008). Those working in a centralised service tend to prioritise training and development on institutional systems, while those embedded in schools or departments often focus more on the needs of their academic colleagues. These two approaches can be describing as guiding and enabling, that is, guiding academic staff towards particular technologies in their online teaching or enabling academic staff in their own use of learning technologies (Hannon, 2008).

The interviewees largely felt that educational technologists should take on the role of an enabler, working closely with academics, helping them to develop their own digital fluency without guiding towards any particular system or tool. As enablers, they can be considered brokers who support academics on their journey across the boundary to membership of an educational technology community of practice (Wenger-Trayner et al., 2015; Wenger, 1998). Tony Grant exemplifies this when he talks about empowering academics:

They are still specialists in educational technology and so therefore they are a support unit, so what they have to do is to try and empower people like me to go and do things, they can’t be a substitute for me doing it”. -Tony Grant (University lecturer in Biotechnology)

He goes on to say that research-oriented academics often find this difficult to grasp. In his research on educational technologists in an Australian university, Hannon (2008) noted that they preferred to give one-to-one coaching to their academic colleagues,
as they considered it more beneficial than the formal courses which they also presented. William Cleary sees a similar requirement:

I think educational technologists are very necessary because people need help, they need specific help. They don’t want general help. - William Cleary (Independent Consultant Teacher Education)

Less specific guided training could be followed by more specific follow-up sessions as suggested previously by Kevin Doyle. This may lead to the development of “learning clusters” and perhaps ultimately to personal learning networks. Educational technologists could help by facilitating the development of these clusters. Similarly, Ooms et al. (2008) discuss the sustaining role played by the e-developers in providing ongoing support to their academic colleagues in an UK university. In the absence of learning clusters or ongoing support, interest in an innovation may fade away according to Tony Grant:

Actually, getting things that stick and stay and continue is remarkably difficult and so, for example, the clickers here at this university have taken off. -Tony Grant (University lecturer in Biotechnology)

An ultimate goal may be for academics to become self-sufficient as described by David Toomey. Both formal courses and informal networks can help in this regard:

The Master’s in eLearning helped me, it gave me a wider connection to a larger network and allowed me to explore, be confident in exploring different areas and to become self-sustainable if I went off piste. - David Toomey (IoT lecturer in Biotechnology)

The interviewees considered that educational technologists were most useful when they played an enabling role with their academic colleagues, helping and encouraging them to move further along the “digital spectrum” towards fluency. Courses, coaching and clusters could all help academics with this rather personal journey.

4.6.4 Summary: Educational technologists and support services

According to the participants, they and their colleagues valued the practical support and encouragement from educational technologists, though the digitally fluent could manage without such support. Educational technologists can help time-poor educators with TEL (Ooms et al., 2008). However, there is a recognition that the educational technologists are also time poor and, when working centrally are often obliged to focus on the VLE, offering little support for more innovative activities. This was seen to have been due to organisational constraints rather than lack of interest. Such a focus on institutional systems can lead to guiding the academics in the technical aspects
of the tools rather than examining the how and why of developing their teaching practice (Hannon, 2008). The latter role would enable and encourage the educators’ own professional development (Fox & Sumner, 2014; Hannon, 2008) and help to sustain and embed innovations. This was considered preferable to “guiding” them in the use of the VLE.

Educational technologists play an important role in training and support. Ideally, this should enable and encourage the academics to develop their own expertise in TEL. In this way, TEL usage can become more sustainable in an institution, leading to the growth of “networks of innovation” (NFETLHE, 2014b), where digital fluency and the use of TEL become part of the institutional culture and part of the academics’ professional identity. Policy can facilitate such developments.

4.7 Views on institutional and national TEL policies

We have discussed how digitally fluent educators have gained their fluency, how they see their role in enabling and encouraging colleagues to become more digitally fluent in very practical ways and their views on support for the development of digital fluency. This section turns to policy, both institutional and trans-institutional, on the development of digital fluency. It examines the knowledge and opinions of the digitally fluent educators on policy and their role in its development. In drawing up its Digital Roadmap, the National Forum for the Enhancement of Teaching and Learning (NFETLHE) emphasised the importance of stakeholders in the planning the future of technology enhanced learning (TEL). This research considers that the digitally fluent interviewees should be considered as “key stakeholders” in this context:

We must acknowledge that the voices of key stakeholders in the sector are best placed to identify current needs, and thereby scope a future vision for technology-enhanced learning. - (NFETLHE, 2014b)

Many third-level institutions have developed policies and strategies in relation to the use of technology in teaching and learning. These policy and strategy documents have been investigated by many researchers in a variety of contexts. S. Brown (2013) investigated a multi-institutional, centrally funded JISC project focusing on curriculum design in the UK, while Devine (2015b) examined strategic and leadership views on the development of digital capacity in higher education in Ireland. At an institutional level, Newland and Handley (2016) examined the implementation of a Digital Literacy Framework for academic staff in the UK university where they worked, while Buchan
(2011) examined the transformational impact of learning technologies at both an institutional and individual level in the Australian university where she worked. Hannon (2008, 2012) examined how policies affected individual practice by educational technologists in the Australian university where he worked. Based on these papers it seems that neither academics nor educational technologists are much involved in the development of policy or strategy in TEL. However, given the importance of stakeholder views to the NFETLHE, it is worthwhile examining the views of digitally fluent educators on policies both within and beyond their own institution and their role (if any) in the development of these policies. Before doing so, it is worth clarifying what is meant by policy.

For the purposes of this investigation, the researcher’s intention was to investigate formal policies and strategies on the adoption of technologies in teaching and learning practice in the institution. In the words of the Digital Roadmap documents with “an emerging vision” showing how “digital technology could be utilised to enhance teaching and learning, to connect teachers and students, and to increase the level and quality of learning-related communication” and “digital literacy and digital skills for teaching and learning could be developed and supported” (NFETLHE, 2014b). However, some of the respondents had a broader understanding including Bring Your Own Device (BYOD), data protection and choice of tools. As David Toomey said (researcher’s emphasis):

We are a Google campus now so again that’s really good, if that’s considered a policy, that’s a really good policy because we have the Google Drive, Google Forms are unbelievably helpful for collecting student data, evaluating new teaching technologies and so on. - David Toomey (IoT lecturer in Biotechnology)

Bearing this range of definitions of policy in mind, the research will examine the digitally fluent educators’ attitude to and influence on both institutional and national policies in TEL. In both cases the interviewees included what could be called current policy enthusiasts and policy sceptics. Some in both categories are also visionaries with ideas about future policy development. This section starts by investigating institutional policies on TEL, examining the role of the enthusiasts, the sceptics and visionaries before looking at wider, national policies beyond the individual institutions.

4.7.1 Institutional policy - enthusiasts, sceptics and visionaries

Four of the interviewees, Kevin Doyle, William Cleary, Maria Gallagher and Brian Power have academic or professional backgrounds in TEL. They all expressed a positive attitude towards institutional policy but had varying degrees of involvement in
its development. For example, Kevin Doyle, was interested in policy but not directly involved in its development within his institution:

> I think policy is interesting. I think what tends to happen in terms of where or how does policy impact on the average person is something I think about a bit. - Kevin Doyle (University lecturer in Education)

William Cleary is also an enthusiast, though currently working as a consultant, outside of institutional structures. He has been reviewing policy and reflecting on his own practice to see how it can be improved:

> I sat down last year, and I wrote a document for myself about what are we doing wrong. I’ve been involved in this as a practitioner close on 30 years now and I’ve worked on policies with the Department going back 20 years… I just wonder what we are doing wrong here. - William Cleary (Independent Consultant Teacher Education)

Moving from reflection to action, Brian Power was the only interviewee who is specifically involved in developing broadly TEL-related institutional policies, though these are more in the areas of data protection and learning analytics than in improving teaching and learning practice:

> We have, of course, internal policies. We’re drawing up some internal policies on private data… we have a lot of access to student data… I have been asked to go on the committee for that which hasn’t formally met yet. - Brian Power (College lecturer in Computing)

Brian works in a small college with limited support services. His involvement in policy may be due to a combination of his background in the e-learning business and the size and nature of the institution where he works. Like Brian, Maria Gallagher has a role in policy development, though in her case it is more of an advisory nature. As a researcher and practitioner, she has been participating in meetings which may lead to the development of a policy on the use of social media by academics in her university:

> For staff, a couple of meetings but I don’t think we are at the stage of drafting policy. We’re still trying to sway hearts and minds to say that this is really important. This university is not at the forefront of this at the moment. - Maria Gallagher (University lecturer in Computing)

She goes on to explain why she is concerned about the absence of such a policy:

> Staff all across the university and students are dealing with these collisions and this tension all the time... Right now, higher education institutions are doing a good job of ignoring a lot of that stuff because it is very messy, and we don’t tend to have policies yet at institutional level about social media. - Maria Gallagher (University lecturer in Computing)

Maria is enthusiastic about policy development though her involvement is limited. It is strongly influenced by her research interests. She could be described as a visionary.
Both Brian Power and Michelle Delaney are concerned about the lack of policies in the related areas of open education and commercialisation. Unlike Brian, Michelle is sceptical of current institutional policy, because it is overly focused on the VLE and because it often follows what in her opinion are the latest fads, such as MOOCs:

> There’s (sic) loads of policy or whatever, for me it’s half-baked. I think that everything has gone into our VLE … You see sometimes people go with buzzwords and I think it’s not worth spending time on the likes of MOOCs. – Michelle Delaney (University lecturer in Languages)

Though sceptical about current an institutional policy, Michelle shares Maria’s enthusiasm for open education and has a similar vision for future policy on openness. Their enthusiasm is shared by David and Tony. However, both Maria and Michelle are aware of the competing demands of commercialisation and possible revenues from the sale of resources. Brian Power shares their concerns and while having no objection to free resources, he is earning royalties from his YouTube videos. He is concerned that there are no institutional policies, covering the commercialisation of teaching materials:

> There is no rule preventing me from putting content on YouTube. And that is content that I am paid to develop for the college to deliver in my class, so there’s an ethical and moral question to be answered there as well. - Brian Power (College lecturer in Computing)

Not all of the interviewees shared Brian, Kevin, Maria, Michelle and William’s level of interest or knowledge in current institutional polices. Two of the digitally fluent educators seemed to have little awareness of institutional policy regarding TEL. Margaret Thompson, had not given the matter any thought:

> They could well have, I wouldn’t know… I don’t think about it (policy). I suppose I have already accepted the eLearning question and I’m not in any debate about it. - Margaret Thompson (IoT lecturer in Marketing)

Nor did she and her colleagues ever seem to discuss it:

> It’s not something that would be brought up a lot at meetings, there would be no discussion of it at course committee meetings or anything like that. - Margaret Thompson (IoT lecturer in Marketing)

Tony Grant was also unaware of institutional policies, taking a rather cynical view. Such views may be an informal aspect of university culture:

> I’m sure they have (policies), like we have lots of vision statements and stuff like this - Tony Grant (University lecturer in Biotechnology)

Tony’s view seems to correspond with those noted by Mayes et al. (2009, p. 52) who report a disconnect between institutional e-learning strategies and innovation by
academics in UK higher education. This can be considered as a tension between professional identity and institutional culture. Mayes et al. (2009, p. 224) suggest that this may be due to the absence of a shared institutional framework which would explain the rationale for and encourage fundamental change. This, in turn, requires a shared institutional framework for understanding the rationale for change. While David Toomey was not so cynical, he felt that implementing policies was difficult and that a bottom-up approach was more likely to be effective than top-down:

Now writing it down on paper and actually executing it or two different things... Policies are great, but I think if you can motivate from the bottom up rather from the top down, I think it might be a better approach. - David Toomey (IoT lecturer in Biotechnology)

Such sceptical views are considered a common response to top-down e-learning initiatives (Hannon, 2012) and more generally to plans and strategies in higher education (Kubler & Sayers, 2010, pp. 45-46). However, despite their seeming negativity, both David and Tony had positive views of institutional practice regarding TEL. Tony went on to explain how he felt inspired by individuals, working in the Teaching and Learning Centre, and that their leadership, encouraged him in his own TEL practice:

What we do have is led by the Teaching and Learning Centre, we have people who are inspired about being inspiring let’s say. OK, so I’d say that what we do have is some leadership there… they don’t just jump on the latest bandwagon and when you get too full of yourself then they bring you back down to earth as well. - Tony Grant (University lecturer in Biotechnology)

David Toomey works in the same institute of technology as Margaret Thompson. Unlike her, he is familiar with its technology-related policies. Despite David’s doubts, he goes further than Tony in valuing institutional policies, in his case in the areas of Bring Your Own Device (BYOD) and professional development, though he is not involved in the development of these policies. David is also aware of BYOD policies in other institutions, saying that they effect his colleagues’ teaching practice:

I’m aware of other colleagues and other institutes where they have a very strong BYOD policy, a very strong always on policy and it has changed the way staff teach in general. - David Toomey (IoT lecturer in Biotechnology)

However, he reports that his own colleagues have concerns as to how BYOD will affect institutional IT Support. These concerns are shared by online educators interviewed by Baran et al. (2013):

Some people are a little bit afraid I suppose that it’s going to be the institute’s way of washing their hands of IT Support and so on, saying look if you bring your own devices
Brian Power, the only other participant who discussed BYOD policy in his institution, shares these concerns. He describes how BYOD is affecting his role in class, turning him into a technology manager:

I found myself becoming a technology manager in the class, because students were saying, how you connect to Citrix and how do you … and eventually I drew a line and said, look I am the educator here, I’m not trying to fob you off… but I am not a Technology Manager. - Brian Power (College lecturer in Computing)

While he seems to be resisting this threat to his professional identity, he sees the issues around BYOD as just another obstacle which he can overcome using digital fluency. Yet, anticipating a change to his professional identity, Brian goes on to say that if he were to take on this role, and he believes he may have to, he would need further professional development:

What I am, and my colleagues are, doing now is we are looking at ways of going around BYOD problems… I believe that we will have to be skilled up and become more knowledgeable, more literate, and more fluent if you like about stuff like BYOD rather than being dropped in it. - Brian Power (College lecturer in Computing)

Despite his concerns about support and his statement that BYOD is changing how his colleagues work, David does not mention any need for further professional development. He believes that his institution’s BYOD policy will encourage students to make greater use of technology and change the way staff teach:

I have an “always on” policy environment rather than an “always off” policy in class where I tell the students, take out your phones, take out your laptops, this thing of under the desk - David Toomey (IoT lecturer in Biotechnology)

However, David goes on to say that there are no specific policies on how or why to make use of technology in teaching practice:

There is no policy I suppose in terms of you have to have eLearning embedded into every module or anything like that - David Toomey (IoT lecturer in Biotechnology)

These two interviews suggest that the practicalities of BYOD have not been fully considered by policy makers and wider consultation as advocated by the National Forum might reduce these difficulties. Like BYOD, professional development is an institutional top-down policy which affects the development of digital fluency. In David and Margaret” institution, new lecturers are asked to attend the Postgraduate Diploma in Third Level Learning and Teaching. David values this diploma course, in particular its
role in developing connections with experienced educators who are often further advanced on the digital spectrum:

The policy I suppose in terms of asking staff to enrol in the PG Dip is good in terms of it opens people’s minds to different ways of teaching, plus it connects people with other educators. - David Toomey (IoT lecturer in Biotechnology)

The interviews suggest that those whose career focuses on TEL (Brian, Maria, Michelle, Kevin, William) tend to be institutional policy enthusiasts who are engaged with current TEL policies. This does not necessarily mean that they agree with these policies as can be seen in the quotations from Michelle. This may be due to her considered theoretical approach to her teaching and professional practice clashing with disciplinary expectations and institutional culture and perhaps because the use of technology is not inherent in teaching modern languages. The other three come from disciplinary backgrounds in teacher education (with a focus on TEL) and computing, where digital fluency may be expected, and TEL may fit more naturally into their role. Perhaps because of their professional background, they are more likely to have a role in developing institutional policies and to see gaps in those policies in areas such as commercialisation, openness and social media. Some policies such as BYOD can place additional obligations on the lecturer and may lead to a reduction in institutional support.

The other three interviewees (David, Margaret and Tony) were either less aware or more sceptical of current institutional policies. However, despite their scepticism, Tony was still inspired and led by colleagues in the Teaching and Learning Centre and David supported the institutional policy of professional development and could discuss the pros and cons of BYOD policies in his own and other institutions.

Before examining the interviewees’ involvement and interest in national policy initiatives in TEL, it is worthwhile examining the Digital Roadmap from the National Forum in more detail; as it aims to help higher education in Ireland to transform itself by supporting individual institutional strategies in the development of digital capacity.

4.7.2 The digital roadmap

To gain greater insights into national policy on TEL, the researcher carried out a thematic analysis of the draft digital roadmap as discussed in Chapter 3. By using descriptive coding, he derived the themes of “Pockets”, “Divide” and “Networks”, which describe the goal of the roadmap to help institutions cross the divide from pockets to networks of innovation (NFETLHE, 2014a, 2014b). The most frequent category in this
analysis was “Stakeholder”, indicating the roadmap’s view of the importance of input from stakeholders. To further investigate the latent or underlying values, the researcher examined the language of the roadmap using a form of evaluation coding, which focused on the language used (Saldaña, 2013). His aim here was to bring the document’s values and assumptions to the surface. Saldaña (2013) describes evaluation coding as a systematic way of discovering possible hidden agendas. The roadmap adopts a positive attitude to technology adoption outlining an “emerging vision” that begins with:

The Irish higher-education sector will be characterised by learning environments in which there is a culture that fully embraces digital learning and digital innovation (and where) digital technology is utilised to enhance teaching and learning, to connect teachers and students, and to increase the level and quality of learning-related communication. - (NFETLHE, 2014a, p. 5).

At times, the roadmap is quite prescriptive with verbs like “will be”, “must” and “need” appearing frequently such as:

We need to alter our approach to building digital capacity across the sector…We must take ownership and leadership of the strategic development of digital capacity in Irish higher-education institutions. - (NFETLHE, 2014b, p. 6).

Positive verbs beginning with the letter “e” such as embrace, ensure and enhance, are particularly popular throughout the roadmap. The frequency of these verbs is illustrated in the word cloud in figure 3. The larger a word appears in the word cloud the more frequently it is used in the roadmap.

Figure 3: Word cloud of verbs in the roadmap

Following this overview of the language and values of the National Forum’s Digital Roadmap, the next sub-section examines the interviewees’ involvement and
interest in national policy initiatives in TEL, such as the Roadmap, and compares it to their engagement with institutional policy.

4.7.3 Policy - Beyond the institution

When talking about TEL policy in higher education, interviewees mentioned Irish organisations such as the National Forum for the Enhancement of Teaching and Learning in Higher Education (National Forum), National Digital Learning Repository (NDLR) and the Network for Advancing the Integration of Research, Teaching and Learning (NAIRTL). The National Centre for Technology in Education (NCTE) which works in primary and secondary education was also mentioned. Of these, the National Forum is currently working on policies to increase the digital capacity of Irish higher education. Its work is the most relevant to this research project. Six of the interviewees were aware of its activities and two were actively involved. Its work is subdivided into numerous projects. The NDLR was mentioned by three interviewees who were familiar with its recent multi-institutional projects to create and share resources. None of them were actively involved in these projects and the NDLR itself is no longer operating. As well as organisations, one respondent mentioned the report on Improving the quality of teaching and learning in Europe’s higher education institutions (European Commission, 2013). JISC (UK), Higher Education Academy (UK) and the NMC Horizon reports (USA), specifically the 2015 NMC Technology Outlook for Higher Education in Ireland, were each mentioned once as international sources of information. None of the participants were involved in TEL-related policy initiatives outside of Ireland. As most of the interviewees were familiar with the National Forum and as it is the most relevant organisation to this research, this section will concentrate on the Forum before looking at broader views of what national policy towards TEL could or should be.

All six of the interviewees who were familiar with the work of the National Forum were mainly positive about its role, but some had reservations. Two of the interviewees, Michelle Delaney and Maria Gallagher, were actively involved in Forum projects. Michelle hopes that her work on the digital literacies for language learning project will have a long-term impact:

We have a big project with the National Forum on Enhancing Digital Literacies for Language Learning and Teaching… the big hope is that we will be able to influence how languages are taught at third level in Ireland. - Michelle Delaney (University lecturer in Languages)
Like Michelle, Maria is very positive about the role and direction of the Forum, though her contribution seems to be more in hosting and organising events, which facilitate collaboration in dealing with the difficult or impossible wicked problems raised by the uses of technology in education:

The National Forum I just think is fantastic, it’s the best thing to come along in Irish higher education … were all dealing with huge issues, some “wicked” problems and this is a forum for all of us to meet together as equals and collaborate - Maria Gallagher (University lecturer in Computing)

Kevin Doyle is also an enthusiast for the work of the Forum but is not directly involved. He sees the projects as providing useful information and advice:

I like these (Forum) projects because they tell you what you want to know more about or need help with. - Kevin Doyle (University lecturer in Education)

According to Kevin, National Forum projects can influence individual educators indirectly through their institutional impact, which is reflected in workshops, activities and ultimately institutional culture:

Can I say directly that the National Forum Digital Roadmap is impacting on each individual member of staff? One part of me would say, no not really, but what it is doing is it’s impacting the way that the institution is approaching technology enhanced learning and that influences the workshops and the range of things that happens and that influences how we do it. So, yes, it does influence you in a different way. - Kevin Doyle (University lecturer in Education)

Like Kevin, David Toomey follows the National Forum’s activities. However, he is more critical of the Forum than Kevin. He responded to one of their calls for assistance with their work. However, there has been no follow up from the Forum, which seems to have disappointed him. This may be because his career does not primarily focus on TEL and the Forum does not consider people like him to be key stakeholders:

I keep in touch with what’s going on through their (National Forum) website, their Twitter feed and so on and I submitted myself for if they need any help with reviewing and that wasn’t taken up, so I say, well ok, they obviously have enough people … - David Toomey (IoT lecturer in Biotechnology)

He goes on to say that he prioritises making connections with colleagues and finds that conferences are a better way of doing this than working with the Forum:

The priorities don’t lie there for me, but I’m interested in connecting with other educators in Ireland as well and conferences are probably a better way for me at the moment. - David Toomey (IoT lecturer in Biotechnology)

However, the National Forum does recommend recognising and rewarding digital champions as one of its goals while helping colleagues to network is not specifically part
of its remit (NFETLHE, 2014a, 2015). The term champion is used in the literature to describe academics who actively promote TEL (Cousins & Bissar, 2012; Mayes et al., 2009; Rolfe, 2012). David thinks the Forum could reward such digital champions by providing formal recognition for the development of their professional practice in teaching and learning:

I’d like to see it (National Forum) being more progressive ... When you look across the water to the HEA and how they have developed their practice, even in terms of the recognition, you know Senior Fellows and Fellows - David Toomey (IoT lecturer in Biotechnology)

Like David, Tony Grant emphasised the importance of recognition. Unlike David, he has little awareness of the work of the Forum. This is somewhat surprising as the Forum is explicit about acknowledging the “the voices of key stakeholders”, and as an active digitally fluent educator he could be considered as such:

So, if there was more recognition or more emphasis or more resources then maybe that would be a strategy but so far, no. I do think there should be opportunities, but I have never really had much direct access to them - Tony Grant (University lecturer in Biotechnology)

Tony is critical as to what he sees are the very limited funding that the Forum and similar organisations are offering to develop teaching and learning, compared to the much greater amounts available for research in his field:

NAIRTL, the National Forum, if they could bring in more money, they could do things at a national level… to allow people like me, without having to become a guru in the field of teaching and learning to be empowered - Tony Grant (University lecturer in Biotechnology)

He seems to see this funding as being used to recruit postgraduate students as teaching assistants who would work on TEL projects. Tony goes on to say that the Forum are not offering the type of incentives that would encourage a researcher to devote more time to developing their teaching practice:

I guess that’s the problem is that I don’t really want to turn it into my research career, I’d rather continue with my biochemistry interests as a research career, but I do want to be innovative on the teaching side as well but not in the same way - Tony Grant (University lecturer in Biotechnology)

Tony’s focus on research is the norm among university lecturers. His attitude reflects the research-oriented culture of the university (Skelton, 2012). It is interesting to compare Tony and David’s perspective as lecturers with an external point of view. As an experienced teacher educator and independent consultant, William Cleary takes a broad
view of the difficulties in TEL implementation in the context of university culture and practices:

We are dealing with people, they have a set of practices, they have a set of beliefs and really unless we start to say we have developed systems, practices over generations around books and pens which are technologies, we now have a new set of technologies that are more powerful. We are often under-utilising them. - William Cleary (Independent Consultant Teacher Education)

Although he is not directly involved with the National Forum, William has views on how policy on TEL in teaching, learning and assessment in higher education should be developed. He gives the new policy for TEL in schools as an example which higher education could follow. This policy shares David Toomey’s focus on the value of professional development for educators as well as an emphasis on institutional leadership:

The new Irish policy (for schools) leads with teaching, learning and assessment. It looks then at professional learning. It looks at leadership and, finally, it looks at infrastructure in the IT role - William Cleary (Independent Consultant Teacher Education)

This change in policy focus addresses one of his main concerns, which he admits to being guilty of himself, is the treating of technology as a separate issue, rather than integrating it into practice from the start. He sees a role for the Forum in addressing this change in higher education:

I think that when we are talking about new strategies or more active learning strategies, for example, that we should be embedding the technology right in there from the get-go… – William Cleary (Independent Consultant Teacher Education)

Moving beyond the technology, there is an expectation of change in work practices from the management of institutions of higher education, which, in turn, is influenced by public expectations. This is affecting all levels of the educational system:

However, I think a lot of the issues that are coming up in Higher Education around transforming teaching, learning and assessment are the very same issues that we have in schools and that we have in further education and training. I think people find change difficult. I think implementing change in higher education around technology is challenging. - William Cleary (Independent Consultant Teacher Education)

While the Forum can propose a new strategy, William Cleary thinks that institutional leadership would be required to drive change from the top down:

I think the educational technologists like yourself, working on your own without serious support from all of the faculties and the President and the Registrar, we are wasting our time. - William Cleary (Independent Consultant Teacher Education)

It should be noted that University A below is where current policy sceptic and future policy visionary Michelle lectures as does current policy enthusiast Kevin:
I think University A have it right. I think from a policy point of view their president has the digital as part of the experience and I think that level of leadership is needed within an institution. - William Cleary (Independent Consultant Teacher Education)

William and Michelle seem to differ on the effectiveness of current institutional policies but agree on the influence of senior management:

Maybe when all those projects are finished and made mainstream, we will see what happens. I think there’s a big push from above, that’s for sure. Whether it’s going to change the practice on the ground I don’t know... - Michelle Delaney (University lecturer in Languages)

To conclude this section, there is a brief review of why two of the interviewees were not familiar with the work of the Forum, namely Brian Power and Margaret Thompson. Unlike the universities and institutes of technology where other participants worked, the college where Brian Power lectured is not a member of the Higher Education Authority and not involved in the work of the Forum. Therefore, although actively involved in his own institution’s policy development, he has little awareness of the work of the Forum or other national groups and finds himself working in isolation, while wishing this was not the case:

I’m working more or less solo in my own place at the moment … as for policies, national forums, national groups, they are not reaching down to me at all and I am not involved in those, though I would love to be…. - Brian Power (College lecturer in Computing)

Unlike Brian, Margaret Thompson who was the least experienced of the digitally fluent educators, had little knowledge of and no involvement in policies in TEL in her own institution. She was equally unaware of national policy organisations such as the Forum. This may be because of her focus on teaching her own discipline:

I have come across it, don’t ask me any questions (laugh), one of those emails that comes along, so I am aware of it alright, but I wouldn’t have much awareness. – Margaret Thompson (IoT lecturer in Marketing)

The participants’ views and experiences of policy are summarised in the next sub-section.

4.7.4 Summary: Views on institutional and national TEL policies

The interviewees’ views on institutional and national TEL policies ranged from no knowledge, through scepticism to enthusiasm. Policy scepticism did not reduce any participants’ willingness to develop TEL in their own practice though those with a background in TEL were generally more aware of policies and more likely to participate in policy development. According to the participants, policy focused on areas such as BYOD rather than teaching practice. In Brian’s case, BYOD policies were beginning to
change the role of lecturer to that of technology manager, while David was concerned that BYOD would lead to a reduction in institutional support services. Some of the sceptics had serious visionary ideas about future policies in areas ranging from social media to BYOD, from openness to commercialisation and from the recognition of continuing professional development and to funding for TEL projects. Their views on BYOD and commercialisation would seem to fit well within present institutional culture while others such as social media and openness guidelines are breaking new ground. These views tended to reflect the educator’s own personal values and interests.

Apart from Margaret and Brian, the interviewees were familiar with the work of the National Forum in developing policies to increase the digital capacity of Irish higher education. However, they considered that it would take time before any long-term results were evident. This is to be expected as such innovations in process take a long time to emerge (Markides, 2006). Two were actively involved; Michelle as a member of the Enhancing Digital Literacies for Language Learning and Teaching project and Maria in hosting and organising events. Both were enthusiastic about the work and direction of the Forum. Kevin was also an enthusiast who shared Michelle’s interest in the long-term impact of its policies. David and Tony were more sceptical, suggesting that the Forum should do more to reward teaching practice and provide funds for large-scale projects. Based on his work on schools’ policy, William Cleary was concerned that the digitally fluent “can over promise what technology can deliver” often by focusing too much on technology rather than its role in teaching, learning and assessment. He stressed the importance of professional development for educators, institutional leadership on TEL policy and the need to focus on teaching, learning and assessment rather than technology and tools. Long-established practices, institutional culture and a lack of resources can all make such changes difficult.

4.8 Closing observations on professional identity and institutional culture

Institutional and national policies on TEL may influence institutional culture, which in turn may influence professional identity. Changes in professional identity may then influence institutional culture. Such changes tend not to happen quickly. Digital fluency enables educators to make effective use of TEL as discussed in this chapter. For the research participants digital fluency and the use of digital technologies in their practice had become part of their professional identity. For those participants who had built their career around TEL, it was an essential part of their identity while others had a stronger
disciplinary identity and had developed an interest in TEL to improve their teaching and professional practice. In terms of UTAUT (Venkatesh et al., 2003), the digitally fluent had a high performance expectancy and low effort expectancy for digital technologies while their less technologically-engaged colleagues tended to have a lower performance expectancy and higher effort expectancy. A commitment to lifelong learning and professional development as educators can enable those colleagues to become more fluent. Their digitally fluent colleagues and educational technologists can enable and encourage their development informally through demonstrations, “showcases”, “shop windows” and more formally through institutional workshops and accredited courses. Through these courses and by providing appropriate technical infrastructure and working conditions institutional culture can provide enabling or facilitating conditions for the development of TEL. Social influence can encourage educators to develop their digital fluency; though schemes for institutional awards and funding need to be carefully considered in terms of the academics’ professional identity. The concepts of enabling and encouraging can be considered as equivalent to facilitating and fostering in the anchor research question.

There is potential for conflict between policy, professional identity and institutional culture which is explored in more detail in the next chapter.
5. Implications of this research for digital capacity building

5.1 Introduction

In their study on the adoption of blended learning, Porter and Graham (2016) noted that there is a body of research which discusses the barriers to the uptake of technology enhanced learning (TEL) in higher education but little research examining the factors that facilitate its adoption. Their research underpins this thesis which aims to contribute to narrowing that gap by examining the factors that influence the development of digital fluency among academic staff in institutions of higher education in Ireland and how such fluency can be facilitated and fostered by the digitally fluent educators, by the academic institutions that employ them and by national policy initiatives. To meet its aims, this study drew on the voices of eight digitally fluent academics in Irish higher education, a wide reading of the research literature and policy documents on Irish higher education, in particular, the Roadmap for Building Digital Capacity in Irish Higher Education produced by the National Forum for the Enhancement of Teaching and Learning in Higher Education (NFETLHE), commonly known and referred to hereinafter as the Roadmap and National Forum respectively.

While the Findings Chapter addresses the anchor research question by describing in detail the factors that facilitate and foster the development of digital fluency among academic staff in institutions of higher education in Ireland, the current chapter offers a critical discussion of those findings in terms of the themes of professional identity and institutional culture and the implications of the tensions between them for individuals, institutions and national policy. This leads to some recommendations for improved policy and practice in the development of TEL in higher education in Ireland. Leveraging the findings in this way interests the researcher who is a practising educational technologist and, in this way, the insights emerging from this research are of both general and personal value.

This research starts from insights from the literature to explore in unprecedented detail how and why TEL is being used in Irish higher education and examines the factors that facilitate and foster its adoption. It is original in a number of ways (1) its use of digital fluency as a lens for examining practice in TEL in higher education; (2) its detailed investigation of the voices of a small number of digitally fluent academics in Irish higher education; (3) its selection of participants from different institutions and type of
institution; (4) its comparison of those voices with institutional and national policies, and; (5) its examination of the findings in terms of professional identity and institutional culture.

The following analysis opens by placing the research findings against the broad canvas of literature explored in Chapter Two. Following the same order as the previous chapter, it then considers the views of the research participants, moving outwards from the individual to the institution and onto national policy. It interprets the research findings in terms of their professional identity, their membership of institutions and the relationship of both professional identity and institutional culture to policy. It concludes with some recommendations for policy and practice.

5.2 Placing the research in context

Much research has focused on the barriers to wider use of TEL in higher education and why TEL has not transformed or disrupted the practice of higher education despite its potential to do so. The Literature Review began with an examination of the global, institutional and individual challenges facing higher education, how TEL can help to address those challenges and the issues this raises for educators, for the institutions where they work and for national policy. Digital fluency, innovation theory, communities of practice and learning design were the critical, theoretical perspectives informing this study. They were illustrated by the exploration of digital fluency in three case studies, moving from the perspective of an academic institution, through that of a university department, to that of individual educators. As this research focuses on individual digitally fluent educators, it builds on the work of Flavin (2012, 2016), Benson et al. (2011); Cousins and Bissar (2012), and Baran et al. (2013). However, it differs from the work of these authors in significant respects. Benson et al. (2011) and Fischer and Köhler (2011) developed a typology of educators based on their approach to the adoption of e-learning. This research expands on their typologies, by developing a typology for digitally fluent educators’ relationship with TEL, which helps us to better understand its adoption. Flavin (2012) worked with individual educators, investigating their choice of tools rather than development of fluency. Both Baran et al. (2013) and Cousins and Bissar (2012) based their research on the voice of digitally fluent educators. Cousins and Bissar (2012) told the stories of digitally fluent educators and how they developed their expertise. They focused on the “small, every-day motivating moments, cultural features and environmental factors” which contributed to their digital fluency. Their aim was to
stimulate reflection and they hoped the stories told could “both inspire actions and raise questions”. However, unlike the research reported here they did not attempt to come up with any answers or recommendations. Like this research, Baran et al. (2013) conducted a thematic analysis of interviews with a small number of digitally fluent academics, in their case, in a university in the mid-western USA. It described good practice in the participants’ online teaching and their transition from classroom to online teaching. Like this research, she and her colleagues found that the academics linked their online practice to changing roles and professional identity. However, unlike this research, her focus was on their strategies for teaching online and overcoming related concerns and challenges. Looking more broadly at teaching identities in higher education, Skelton (2012) found a range of attitudes to the relationship between teaching and research among academics in a research-led university in the UK. However, he did not examine attitudes towards technology or digital fluency. In sum, unlike the approach taken by the above authors, the research reported here focuses on the examination of the relationship between the development of digital fluency by academic staff and policies and practice in TEL in more conventional settings in higher education.

5.3 Professional identity, digital fluency and TEL

By examining how the digitally fluent educators developed and maintain their own fluency, we may gain insights as to how their less technologically-engaged colleagues might develop their own fluency, as pioneers can influence the behaviour of their colleagues (Porter & Graham, 2016; Rolfe, 2012). The Findings Chapter showed that, as in the literature, all the participants had a prior interest in and enthusiasm for technology; with the majority having or working towards a higher degree in a related area. It also seemed clear that a strong belief in the value of teaching formed an essential part of their professional identity. Combined with their technological expertise, this encouraged them to experiment with digital tools to develop active and collaborative learning activities for their students. They consider that while their less technologically-proficient colleagues share their commitment to teaching, most do not share the same level of interest in using digital technologies or the expertise necessary to do so. However, as seen in the Findings Chapter, the digitally fluent are often asked to or offer to help their less technologically-proficient colleagues to increase their digital fluency and to make effective use of TEL. Due to their enthusiasm, they are happy to do so. What is interesting to note in the research context was the degree to which the means of helping are shaped
both by their own praxis and values and by institutional opportunities and constraints, which in turn can shape and be shaped by national policy.

As discussed in the Findings Chapter, this frequently involves moving from the *transmission model* of lecturing, which remains the dominant (and often appropriate) method in most institutions of higher education (Laurillard, 2012), to a more active and collaborative approach, which can help to engage students and facilitate learning at the higher levels of cognition (Petress, 2008; Roehl et al., 2013). *Active learning* does not require; but can be facilitated by digital technologies (Blin & Munro, 2008; Garrison & Vaughan, 2008). However, teaching with digital technologies does not of itself lead to active learning, indeed their use often follows the transmission model, where they deliver content to passive learners (Blin & Munro, 2008; Garrison & Vaughan, 2008; Lane, 2009; Mayes et al., 2009). Active learning can take place in class as well as online (Laurillard, 2012; Roehl et al., 2013).

The findings show two distinct groups among the digitally fluent educators, with differing amounts of *knowledgeability* or levels of competence and engagement in the same communities of practice (Wenger-Trayner et al., 2015). This typology is based on drivers for practice as seen in Benson et al. (2011) and Fischer and Köhler (2011). The first group are active researchers or consultants in TEL. While their academic backgrounds and their approach to TEL vary, the members of this group have all developed their careers and professional identity around the use of TEL. In several cases this arose from a transformative experience early in their careers as discussed in the Findings Chapter. They make considerable use of theory in their praxis, including, depending on their individual interests, activity theory, digital identity, personal learning networks and environments, SAMR, TPACK and the 3E framework. In the words of Michelle Delaney, they take a “researcher attitude” to their practice. They are all active researchers in TEL and are likely to be aware of and engaged in policy development either in their own institution or more broadly, though they may be critical of these policies. As such, TEL can be considered as their practice. In terms of the work of Skelton (2012) on teaching identities in higher education, they can be seen as “blended professionals”, who value both research and teaching as learning processes and thus believe strongly in their own professional development in both areas. They vary in their relative commitment to research and teaching, with Michelle being the most research focused and Kevin, as a teacher educator, the most teaching focused. This group can be considered as being at the
core of the educational technology community of practice. For the purposes of this
discussion, I will call this group, TEL Career. It comprises four of the participants Kevin,
Maria, Michelle and William. Of these, Kevin, Maria and Michelle lecture in universities
while William works as a consultant.

The members of the second group have developed their digital fluency with a view
to enhancing their professional practice in their own discipline rather than as the basis of
their career; as such, they have more in common with most of their academic colleagues.
They tend to take a more applied approach than the members of the TEL Career group.
Their research largely focuses on their own disciplinary interests rather than on TEL and
they tend to have less engagement with policy initiatives. Where they had a
transformative experience regrading TEL, it came later in their career when they were
already lecturing. Of the members of this group, David Toomey, gave time saving and
efficiencies as an important reason for using TEL, while Margaret Thompson, wanted to
expand her knowledge of digital technologies to help her teach digital marketing and
Tony Grant wished to make his teaching more engaging. This suggests a pragmatic
approach to the use of TEL that is not fundamental to their professional identity. In terms
of teaching identities discussed by Skelton (2012), Tony is a “researcher who teaches”,
as, though committed his teaching practice, he values his research more than his teaching
while Margaret is a “teaching specialist”, who focuses on her teaching practice. David’s
identity is largely that of a “teaching specialist”; although, as he researches teaching in
his discipline, he could be considered a “blended professional”. Their relationship with
the educational technology community can be considered as more peripheral than the TEL
Career group as they have a lower degree of knowledgeability. It is noticeable from the
interview transcripts of this group, that they mentioned students considerably more
frequently and have a greater interest in student expectations than those in the TEL Career
group. As they have developed their digital fluency more recently, the practice of
members of this group may be more considered and with less tacit knowledge, which may
help them to relate to their less digitally-proficient colleagues. Thus, they may be in a
better position to help these colleagues and students with their journey along the digital
spectrum than their unconsciously competent colleagues in the TEL Career group
(Churches, 2008; Dreyfus, 2004). As TEL is less embedded in their identity, they may be
more willing to adapt their practice to future developments. For the purposes of this
research, I will call this group TEL Practitioners. It comprises three of the participants,
namely, David, Margaret and Tony. David and Margaret lecture in an Institute of Technology while Tony lectures in a university.

One participant, Brian, exhibits aspects of both groups. He has a doctorate in Zoology but has developed his career in the e-learning industry and is now a college lecturer in computing; who, as quoted in the Findings Chapter, “practices what he preaches”. His career can be considered that of a practitioner. He is not research active in TEL, nor does he have a strong theoretical basis for his praxis; however, he does have input into institutional policy and frequently mentioned students in his interview. He uses active learning in his teaching practice. Perhaps due to his background, he seems to prefer content creation, using tools such as his blog and YouTube, to sharing and collaboration. The difficulty in characterising his position illustrates a weakness of the typology. Even among the seven other participants, there is some blurring of the difference at the boundary between the two groups and, as Skelton (2012) noted, there is considerable variation within each group. Nevertheless, as in Skelton’s work, this division of the participants into two groups is significant. Not only does it identify their approach to TEL but, as illustrated in the findings, the fundamental value of this distinction is that it distinguishes the participants’ approach to helping colleagues on the trajectory towards the educational technology community and their approach to institutional and national policy initiatives.

While having less knowledgeability (Wenger-Trayner et al., 2015), those in the TEL Practitioner group tend to be more pro-active as brokers, helping their colleagues by discussing the benefits TEL brings to their own practice, offering informal demonstrations to colleagues over coffee as well as participating in more formal courses and workshops. Similar to the enabling approach taken by educational technologists in Hannon (2008), their approach aims to enable and encourage their colleagues to become more digitally fluent and to develop their own TEL activities. It fits with the reported preferences of both groups for learning informally and through professional networks; rather than through training courses and professional development events. Many examples of this approach have been discussed in the Findings Chapter. Such informal learning forms a major part of professional learning in academia (Flavin, 2012; Knight et al., 2006). It is consistent with a bottom-up approach to professional development.
This suggests that academics in the *TEL Practitioner* group can be more helpful to their less digitally proficient colleagues than those in the *TEL Career* group. This can be interpreted, in terms of the *Theory of Diffusion of Innovations* (Rogers, 2003), as the *TEL Practitioner* group conform to the profile of *early adopters*. They are more typical of the academic community in respect of their adoption of TEL. They are integrated and respected in that community (as seen in previous chapters) and, therefore, more influential than their *innovator* (Rogers, 2003) colleagues in the *TEL Career* group. However, if they are to influence their less digitally fluent colleagues, they will only do so in a manner consistent with both their professional identity and beliefs (Cheng, 2014; Rogers, 2003; Slowey et al., 2014). This was seen in previous chapters where all the participants were very clear that, while they were willing to help colleagues and believe in the benefits of TEL, they did not see themselves as “evangelists”, who wished to use technology to transform or disrupt education, nor did they see themselves as “technology managers” who solved BYOD and technical issues for their students. However, David saw a potential, positive role for himself as a “champion” while Brian felt, more negatively, that he and other lecturers were on the way to becoming “technology managers”.

Professional identity, institutional culture and student expectations are changing and continuing to change. The introduction of VLEs and other learning technologies have changed practice by opening up the possibilities of blended and distance learning, potentially leading to the demand for professional development and changes in praxis (Hannon, 2012). Thus, educators can be seen to be both shaping and being shaped by their tools. This in turn can lead to changes in how academic work is conceptualised and organised (Hannon, 2012). These changes along with evolving policies are influencing the digitally fluent educators’ work practices and perception of their identity and role. Educators both shape and are shaped by their working context which can either enable or constrain them in their professional roles (O'Byrne, 2014). We have seen this in the Findings Chapter where, for instance, Margaret and Michelle considered themselves both enabled and constrained by the VLE and technical infrastructure when developing collaborative learning, where Maria was enabled and constrained by her digital identities and where David found TEL enabled help to be more efficient despite reduced funding. The discussion now turns to the further exploration of the implications of change in professional identity, digital fluency and TEL for institutional culture and organisational structures.
5.4 Institutional culture, organisational structures and TEL

In earlier chapters, we have examined how the digitally fluent educators could enable and encourage their colleagues to adopt TEL and how this was influenced by their professional identity, whether as TEL Career or TEL Professional. Their approaches can be considered as bottom-up, successfully navigating the stumbling blocks created by institutional culture, such as attitudes to teaching and technology, and organisational structures, such as workload, funding and technical problems as discussed in the Findings Chapter. In the terms of Wenger-Trayner et al. (2015), their approaches can be interpreted as successful journeys across landscapes of practice to membership of an educational technology community. They see digital technologies as being both useful and easy to use or having a high performance and low effort expectancy (Venkatesh et al., 2003). This section moves from examining such bottom-up approaches to wider institutional approaches to the adoption of TEL and their potential for transformation. Such institutional approaches can provide the facilitating conditions and social influence needed to increase the adoption of TEL (Venkatesh et al., 2003). This section offers some final observations of research insights into how Teaching and Learning services and educational technologists can provide facilitating conditions for the adoption of TEL through Continuing Professional Development (CPD) programmes, while examining the benefits and risks of their association with centralised services such as the VLE. This leads to an examination of the alignment between the social influence of institutional culture and individual, professional identity in respect to TEL.

The digitally fluent approach to tinkering can turn initial exploration of digital technologies into focused activities (Resnick & Rosenbaum, 2013). As the TEL Practitioner group are more pro-active in approaching their less digitally-proficient colleagues, their activities are more likely to become the basis of a bottom-up approach to TEL development. In the terminology of Mayes et al. (2009) and of the National Forum (NFETLHE, 2014a), this approach can help to create pockets of innovation in an institution. Alongside the pockets of innovation there may also be pockets of chronic inactivity (Mayes et al., 2009). Academic departments can be a source of such pockets (Mayes et al., 2009) as can personal learning networks as detailed by David and Maria in the Findings Chapter and by both Dabbagh and Kitsantas (2012) and Rajagopal et al. (2011) in the research literature. The localised nature of such pockets of innovation and the personal nature of their connections between members in such a network may make
It difficult for their members to move beyond them to wider, institutional *networks of innovation*. The focus on pockets by the research participants may be due a conflict between their professional identity and institutional rules and regulations, leading to a lack of awareness and scepticism of institutional policies on TEL, where such exist. Such policy scepticism is particularly evident among the *TEL Practitioner* group, as discussed in the Findings Chapter.

To support the pockets of innovative practice and to help with the move towards networks, the larger institutions have created academic support units called Centres for Teaching and Learning or something similar (Quinney et al., 2017; Slowey et al., 2014). They are responsible for the professional development of academics including the design, development and delivery of CPD, the provision of advisory services in TEL and more generally supporting the development of teaching and learning practice (Quinney et al., 2017; Slowey et al., 2014). Educational technologists frequently work out of these centres (Hannon, 2008, 2012). The centres are often responsible for TEL policy implementation in the areas of managing awards for good teaching practice and minor funding for TEL development projects (Devine, 2015b). Their services are mainly used by academics with a strong teaching identity (Devine, 2015b). This facilitates a bottom-up approach to the adoption of TEL (NFETLHE, 2014a). The absence of targets for the Centres of Teaching and Learning suggests that they are more involved in bottom-up than top-down or strategic initiatives (Devine, 2015b). This bottom-up approach may be reinforced from the top by the absence of specific institutional targets for blended learning and campus-based TEL (Devine, 2015b). This seems to suggest that the Irish institutions are taking a *laissez-faire* approach to adoption, hoping it will gradually evolve upwards from bottom-up initiatives (Devine, 2015b).

In the terminology of Galvin et al. (2010) institutions of higher education in Ireland do not yet possess sufficient technological and pedagogical cultural expertise. However, according to the participants, institutions can begin to provide an environment which fosters and facilitates the evolution of digital fluency and the uptake of TEL. This includes providing appropriate working conditions (such as sufficient time), organisational structures and technical infrastructure. Such organisational factors need to be considered to bring about sustainable change or transformation (Devine, 2015b) or in the National Forum’s terms, networks of innovation (NFETLHE, 2014b). Institutions themselves need to be adaptable and flexible to both benefit from and lead any such
changes (Buchan, 2011). For any transformative vision to succeed, it needs strong institutional leadership to drive changes in culture and manage their impact on the professional identities of the academic staff (Devine, 2015b). The vision needs to be converted into actionable policies. For such policies to take effect they need not only to be disseminated by the institution but also absorbed by their individual staff (Aquino & De Castro, 2017). Absorption depends on the abilities and motivation of the staff of the institution (Aquino & De Castro, 2017) which may relate to the facilitating conditions and social influences operating in that particular institution (Venkatesh et al., 2003). To enable and encourage absorption, the literature stresses the importance of aligning academic and managerial reasons for use of digital technologies in teaching practice (Benson et al., 2011; Johnson et al., 2011; Mayes et al., 2009; Porter & Graham, 2016; Slowey et al., 2014). Or, as Knight et al. (2006) noted, trying to change individuals without changing the “rules, tools and division of labour” can hinder and discourage professional development. However, this was not mentioned by the participants, perhaps because they were digitally fluent enthusiasts who were prepared to go around institutional stumbling blocks in their desire to make use of TEL in their professional practice, even when being asked “to do more with less”.

As discussed in the previous chapter, none of the interview participants suggested that their own digital fluency or their use of TEL had a transformative impact on the institution where they worked. They were largely working on their own initiative beyond institutional structures and technologies. Defining transformation as doing “completely different things in a completely different way” (Devine, 2015b), such uncoordinated bottom-up changes in practice are unlikely to have a transformational impact on the institution as a whole, as they cannot readily be scaled-up (S. Brown, 2013; Devine, 2015b). However, in her research in the Charles Sturt University, a multi-campus institution, which is the largest provider of distance education in Australia, Buchan (2011) considered that practice in the university as a whole was transformed by cumulative transformational changes among its educators. Among these changes, the educators, including both academics and educational technologists, had adapted to new structures, become constructively critical of learning technologies and had developed expertise in the design of teaching and learning activities (Buchan, 2011). A strong, existing culture of teaching and learning, supported by internal conferences and networking events, helped the transformation; as did disciplinary, professional and institutional communities.
of practice (Buchan, 2011, 2014). Seemingly, this is evidence of multiple communities in a landscape of practice. The process of transformation could, thus, be described as trajectories across landscapes of practice towards multiple teaching and learning and educational technology communities, which were themselves evolving in response to the changes. Some of the educators considered they had developed personal learning environments through their involvement in communities of practice (Buchan, 2014). Participants in both groups in this study discussed similar processes for the wider adoption of TEL. The educators in Charles Sturt University could, therefore, be considered as developing TEL Practitioners. It should be noted that these transformational changes took place during an institutional restructuring, including the introduction of a new VLE (Buchan, 2011). Clearly, this is evidence of a top-down impetus for this bottom-up transformation.

Many writers have discussed the difficulties of integrating such bottom-up approaches with top-down institutional strategies (S. Brown, 2013; Devine, 2015b; Hannon, 2012; Price & Oliver, 2007). As William Cleary claimed in his interview, while everyone finds change difficult, academics find changes around technology particularly difficult. Such changes do not fit with their own professional identity or with institutional culture and are, therefore, unlikely to be successful in the absence of institutional leadership, according to both Maria and William. While bottom-up changes are difficult to scale up, top-down institutional changes can be met with resistance (S. Brown, 2013). Such resistance is discussed by David Toomey, Michelle Delaney and Tony Grant in the Findings Chapter. However, institutions can promote the adoption of TEL in a positive manner in ways that are consistent with academics’ professional identity. The provision of Continuing Professional Development (CPD) programmes is one such, gradual approach.

In the absence of major restructuring as in Charles Sturt University, the research participants suggested that their institutions could play a valuable role in promoting the adoption of TEL through designing, developing and delivering CPD programmes for academics. While it is difficult to measure the impact of such CPD (A. Jones, Lygo-Baker, Markless, Rienties, & Di Napoli, 2017), it can enable and encourage academic staff to develop their expertise in pedagogy and digital technologies. This top-down approach to widening the adoption of TEL was considered important by seventy percent (70%) of the leaders of institutes of higher education in Ireland in Strategic and
Leadership Perspectives on Digital Capacity in Irish Higher Education (Devine, 2015b). Forty percent (40%) of these institutions had set targets for such continuing professional development (Devine, 2015b). The participants in this research also consider CPD to be important. All the members of the TEL Career group received institutional support for their doctoral studies in TEL-related topics, which could be considered an aspect of CPD. This clearly goes beyond what most academics would require from CPD. However, two members of the TEL Practitioner group, working in the same Institute of Technology as each other, undertook a part-time master’s degree in Applied eLearning, with the encouragement and support of their employer. This might appeal to a wider academic audience. As noted in the Findings Chapter, the research participants placed a greater value on such accredited CPD than on the short courses and workshops frequently offered by the institutions. However, these may be of greater value to their less digitally-proficient colleagues (J. C. Moore, 2011) and seemed to have helped in the transformation of practice in Charles Sturt University (Buchan, 2014).

In a survey of the views of academics in Irish higher education, estimated to have been completed by between twenty-five (25) and thirty (30) percent of Irish academic staff in the Dublin region, the most popular subject for CPD was “Innovative delivery methods”, chosen by eighty-four percent (84%) of the participants, while “Use of new technology” was chosen by seventy-seven (77%) of the participants (Slowey et al., 2014). Innovative delivery may also involve new technologies. It is worth noting that twenty-four (24%) of respondents had not taken part in any formal CPD in teaching in the previous three years and that some were antagonistic to the whole idea (Slowey et al., 2014). The design and delivery of such CPD can be considered a top-down programme from the institution, which can encourage the development of digital fluency and the wider adoption of TEL, particularly where it is aligned with bottom-up initiatives, communities of practice and personalised learning networks. Its reported popularity by Slowey et al. (2014) supports the findings of this research, confirming that such CPD could play a significant role in increasing digital fluency and the use of TEL in higher education in Ireland.

As seen in the previous chapter, digitally fluent educators are frequently invited as presenters on CPD programmes and to workshops and events which focus on digital fluency and the adoption of TEL. Educational technologists often work closely with their academic colleagues in such programmes and events (Devine, 2015b; Fox & Sumner,
2014; Hannon, 2012; Ooms et al., 2008). According to William Cleary, some top-down programmes have failed in the past due to a focus on technology rather than teaching practice. He expands on his point, claiming that the language used by the digitally fluent and by educational technology experts can alienate academics. It is often deterministic focusing on the use of technology to deliver content (Mayes et al., 2009, p. 41). William further states that the experts themselves can be the cause of failure by over-promising on what technology can deliver and by underestimating the importance of the pedagogical and practical benefits for using learning technologies in the first place. Similar views have been noted by Tondeur, Van Braak, Ertmer, and Ottenbreit-Leftwich (2017) in their research on the link between teachers’ pedagogical beliefs and their educational uses of technology while Johnson et al. (2011) expanded on his point claiming that the technological experts understanding of the expectations and teaching role of academics may differ from the academics’ own professional identity. As can be seen in this chapter and in the Findings, teaching practice in academia is highly individualised and emergent and thus cannot readily be standardised (Johnson et al., 2011). To allow for and benefit from this diversity, academic staff can be given opportunities for reflection on their own practice, as suggested by Michelle in the Findings chapter, and thus engaged in the design of their own CPD (Baran et al., 2013; S. Brown, 2013; Cochrane & Narayan, 2011; Mayes et al., 2009; Slowey et al., 2014). To increase transfer to practice and to provide ongoing development, CPD programmes can foster the development of leaning clusters and personal learning networks as described by Kevin and David in the Findings Chapter. According to David, these may feed into wider communities of practice. This view is supported by Rajagopal et al. (2011) who claim that communities can develop where there are strong ties within a personal learning network. This research confirms that to facilitate this diversity of approach, institutions would need to allow flexibility in the design and implementation of TEL policies.

As well as CPD, Centres for Teaching and Learning are frequently responsible for supporting VLEs, institutional Teaching and Learning technologies and providing advisory services in TEL (Hannon, 2008). Educational technologists working in these centres can play an important role of bridging the gap between academics and information technologies (Ellaway et al., 2006; Hannon, 2008, 2012; Ooms et al., 2008; Peacock, Robertson, Williams, & Clausen, 2009). In this context, as evidenced in the Findings Chapter, most of the participants claimed that the role of those educational technologists
working in centralised services was too limited, being narrowly focused on guiding academics in the use of institutional systems, particularly the VLE. Similar views are noted from Australian (Hannon, 2008, 2012), English (Fox & Sumner, 2014) and Scottish (Ellaway et al., 2006) universities. As noted by Hannon (2008), Ellaway et al. (2006) and detailed in the Findings Chapter, the participants preferred educational technologists to take a bottom-up approach, helping individual academics with their developmental needs; both with institutional and non-institutional technologies. This enables the academics to go “off piste” in David Toomey’s words, going around stumbling blocks to meet their own teaching needs. This approach builds on their existing level of fluency, helping them to develop it further as they travel on their trajectory towards the educational technology community. While this approach is laudable from a development perspective, it does run the risk of neglecting technical problems and difficulties in using the VLE and institutional systems. Such difficulties are widespread (Benson et al., 2011; Blin & Munro, 2008; Lane, 2009) and as discussed in the Findings Chapter. For example, William Cleary claims that this risk can be heightened by the over-selling of technology by experts. In the same chapter, Margaret Thompson describes her early struggles with the VLE. Margaret, who is the most recent of the digitally fluent educators to learn about and adopt digital technologies, particularly regrets the departure from the Centre for Teaching and Learning of what she describes as “one of the key people, the technology person”, an educational technologist who “knew the software”, leaving only people who “knew the theory”. From her words, she clearly valued practical software knowledge over pedagogical theory, suggesting that in the adoption process, there is a danger in neglecting ease of use or effort expectancy (Venkatesh et al., 2003). Some of the respondents in their report on the professional development of academics expressed similar views (Slowey et al., 2014). This suggests to the researcher that a form of guiding may be a prerequisite for the more enabling approach. Technological knowledge and understanding are a necessary part of the process (Koehler & Mishra, 2009; Mishra & Koehler, 2006; Siemens & Tittenberger, 2009). Guiding should at least reduce the number and severity of stumbling blocks, so that an enabling approach can begin.

Such difficulties with institutional systems can lead to academics using simple and convenient web-based services, which, though they have not been designed for education, provide some of the features and benefits of institutional systems (Flavin, 2012, 2016). These web-based services may free the academic from a rigid view of teaching
practice imposed by the VLE and facilitate the introduction of personal learning networks (Johnson et al., 2011). This may have long-term implications for the institution and the services it provides. By associating with a centralised service, tasked with implementing institutional policy and services, educational technologists risk becoming identified with university management as described by Tony in the Findings Chapter. This may also have long-term consequences for them particularly in an environment characterised by “doing more with less”.

As evidenced in the Findings Chapter, an absence of alignment between institutional culture and the professional identity of some of the participants was noticeable in their attitude, not only, towards institutional systems but also towards policy and initiatives such as awards and modest funding for innovations in teaching practice. This lack of alignment is particularly noticeable in the low level of awareness and largely negative attitude towards institutional policies on digital technologies among the TEL Practitioner group, who are largely policy sceptics, as previously discussed. However, their scepticism did not in any way reduce their personal enthusiasm for TEL. Such policy scepticism about TEL initiatives seems widespread and has been reported from institutions of higher education in other countries by Hannon (2012); Kubler and Sayers (2010); Mayes et al. (2009). Those in the TEL Career group and Brian Power were interested in institutional policies on the adoption of TEL. Apart from CPD, institutional policies reported by the interview participants focused on technology management issues such as Bring Your Own Device (BYOD) rather than teaching and learning. More broadly, the TEL Career group felt that technology was often treated as a separate issue rather an integral element of professional practice and that this was a factor in the relatively low uptake of TEL. This viewpoint can also be considered as focusing on “how” rather than “why” or on digital literacy rather than digital fluency. Despite their fluency and interest in policy, none of the TEL Career group played a significant role in developing institutional policies on TEL. Such lack of input into TEL policies seems to be widespread as it is reported from other institutions of higher education (S. Brown, 2013; Buchan, 2011; Newland & Handley, 2016). Due to their views on issues such as digital identity, digital literacy, open education and commercialisation of resources as described in the Findings Chapter, members of the TEL Career group could be described as policy visionaries, as their views go far beyond current institutional policies and could transform
institutional culture. Potentially, these issues could be considered as matters of national policy by organisations such as the National Forum.

In addition to the TEL Career or policy visionary and TEL Practitioner or policy sceptic dichotomy, participants from the university and Institute of Technology sectors display different attitudes to institutional initiatives such as awards and funding for innovations in teaching practice. Both Institutes of Technology and universities had similar awards for teaching excellence and offered modest funding for teaching initiatives involving TEL. The Institute of Technology participants were largely enthusiastic about these schemes while the university participants were mostly negative due to their focus on research as discussed in the Findings Chapter. This suggests that there are conflicting priorities between teaching and research identities in the universities as discussed by Skelton (2012) in his research on teaching identities among lecturers in a British research-intensive university. He found that awards for teaching excellence had not changed professional, departmental or institutional values and that the pursuit of excellence in teaching was considered a risky career strategy (Skelton, 2012). Such a conflict can be illustrated by examining the mission statements of the relevant universities and Institutes of Technology. Both universities describe their vision as becoming a leading global institution, renowned for their research. This is followed by a recognition of the value of teaching, scholarship, a wider engagement with society, and the conversion of expertise into societal and economic benefit. This seems to suggest that research is prioritised and as such there are conflicting goals in institutional culture between policies to develop TEL and the prioritisation of research. As the research-focused academics stated in the Findings, there is a mismatch between institutional culture in practice and the promotion of these initiatives or, in terms of UTAUT (Venkatesh et al., 2003), between the stated and perceived social influence in the institutions. The professional identity of the academics prioritises research over teaching. Unlike the university, the Institute of Technology in question describes its mission in terms of an innovative learning environment for a diverse range of students. This suggests that its institutional culture prioritises teaching. These findings correspond with those of Mayes et al. (2009, p. 118) and who, in their review of the impact of technology on teaching and learning in UK higher education, found considerable diversity in institutional culture both within and between institutions of higher education. Similarly, Devine (2015b) found differences between universities and institutes of technology in his report on Strategic and
Leadership Perspectives on Digital Capacity in Irish Higher Education. This further division between the institutional and professional values of those working in the universities and the Institutes of Technology is particularly significant as national bodies such as the National Forum (NFETLHE) and policy documents such as The National Strategy for Higher Education to 2030 (Hunt Report) (DES, 2010) tend to act as if all institutions have a similar culture and operate under similar conditions. Clearly, this is not the case.

Both institutional culture and professional identity vary widely within higher education. Programmes to encourage the adoption of TEL need to take this into account and should seek to align the expectations and interests of academics with those of the institution. Bottom-up projects and CPD can help academics to develop their digital fluency, thus enabling them to adopt TEL to suit their own teaching practice. These projects can be supported by educational technologists though, where centrally located, they may focus on institutional services rather than on the academics’ requirements. While enabling and encouraging academics to take their own route to adopting TEL in the context of their own practice is desirable, some guidance in institutional systems may still be required beforehand. This can provide the pre-requisite “knowing how” to use the tools and technologies and help to build confidence.

Based on the analysis offered above, the present research suggests that, in practice, both institutional culture and professional identity largely support bottom-up approaches to the development and adoption of TEL. Strong internal leadership may introduce top-down approaches which can be encouraged and facilitated by outside influences such as national and international policy. As an external and institutionally non-aligned though professionally engaged body, the National Forum may have a role in producing policies and strategies which strike a balance between bottom-up and top-down initiatives, research and teaching and operational and transformative policies in setting tangible goals for the use of TEL in higher education in Ireland (Devine, 2015a). The next section examines the views of the digitally fluent educators on national policy and their views on its development, focusing particularly on the work of the National Forum.

5.5 Digitally fluent educators and national TEL policy post Hunt Report

Before examining the role and views of the digitally fluent on policy development, it is useful to briefly review the background and context to the adoption of digital
technologies in Irish higher education. This helps to contextualise the analysis of the results that follows. Historically, funding for institutions of higher education in Ireland has mostly come from public sources - eighty-five percent (85%) according to the Department of Education and Science (DES, 2010), which had decreased to seventy-five percent (75%) by 2014 (OECD, 2018). In 2010, the Department of Education and Science (DES) set out its plans in *The National Strategy for Higher Education to 2030* (DES, 2010). To better understand its agenda and priorities, it is useful to know the membership of any group determining policy (Devine, 2015a; Selwyn, 2014). The membership of the Hunt Report strategy group, was drawn from the worlds of business, public service and higher education (DES, 2010). Business representatives included two senior executives of major US-owned IT business in Ireland and the chair, a consultant in corporate finance (DES, 2010). Higher education was represented by one Irish and one US university president, one principal of an Institute of Technology, a professor of higher education research from Finland and the president of the *Union of Students in Ireland* (DES, 2010). The other members were senior public servants with one trade union representative, the six public servants forming the largest single group (DES, 2010). Though the Hunt report stresses the importance of stakeholder consultation, this seems mainly to refer to external stakeholders such as government and enterprise. While the Hunt Report had a much broader remit than TEL, practising academics, digitally fluent or otherwise, and educational technologists had no direct representation on the strategy group, though they may have participated in focus groups or made submissions. None of the research participants reported any such involvement. Thus, it can be argued that, despite its interest in TEL, the strategy group has not sufficiently engaged with the values or expectations of digitally fluent academics and has not considered their professional identity. This could lead to a lack of alignment between those tasked with implementing the recommendations of the report and academic staff, which, in turn, reduces the likelihood of its recommendations of being implemented.

Senior managers in institutions of higher education and those tasked with implementing educational strategy are the principal intended readership of the Hunt Report. The report takes a national perspective, expressing a desire to transform Irish higher education to provide greater value to its students and society at large (DES, 2010). It recommends that teaching and research should be given “parity of esteem” and that this should be reflected in the allocation of institutional resources and promotion criteria (DES,
Where this was tried in UK research-led universities, such an approach met considerable resistance and was subsequently abandoned (Skelton, 2012). This was mainly due to the researchers’ belief that the pursuit of teaching excellence would damage their careers and their reputations (Skelton, 2012). Doubts were also expressed as to what extent the CPD programmes actually helped academics with their teaching practice (Skelton, 2012). In its view of teaching, the Hunt Report also recommends that best practice in pedagogy and technology-enhanced learning become standard, though without stating what it considers these to be (DES, 2010, p. 42). Moving from teaching and technology, it also aims to reduce costs to public expenditure and provide increased revenues for higher education. Here, it recommends that Irish higher education connect with enterprise in new ways and position itself to play a pivotal role in developing Ireland’s culture of innovation (DES, 2010, p. 55). If accepted, which is by no means a foregone conclusion, both these proposals would lead to a major transformation of the role of Irish higher education. In response, the Irish Universities Association seems to accept the innovation agenda though not parity of esteem for teaching, as it describes Irish universities as “research intensive” where research informs teaching activity and creates outputs for the “innovation economy” (IUA, 2014). In the event of the IUA approach being accepted, this could lead to a transformation where there is less institutional interest in teaching and, therefore, in TEL, than at present. Overall, the Hunt Report recommendations on TEL are problematic as they propose a changed status for teaching which has failed in the UK, an increased role for enterprise and innovation which may reduce the importance of teaching practice and a standardised best practice in pedagogy and technology, which is not defined.

To help determine the nature of “best” practice in pedagogy and technology as described in the Hunt Report, the Department of Education and Skills (DES) established the National Forum for the Enhancement of Teaching and Learning in Higher Education (National Forum) in 2012. Its board members are largely drawn from higher education as are its professional staff. Noticeably, as William Cleary commented, its name includes teaching and learning and does not include technology, which he considered a positive sign as it focuses on educational practice rather than technological tools. This is borne out by the aim of the National Forum to enhance teaching and learning for all students in higher education in Ireland. The National Forum has published, among a wide range of reports, the Roadmap for Building Digital Capacity in Irish Higher Education.
It defines digital capacity as, “the skills, competences and attitudes that enable people to work, live and learn in a complex world that is increasingly digital”. Digital capacity can be considered at the individual, organisational and national levels (NFETLHE, 2014b). It and its relationship to digital fluency are discussed in detail in the Literature Review.

“Leaders within the higher education sector” form the intended readership of the Roadmap (NFETLHE, 2014a). It aims to guide Irish higher education in leading its own transformation by enhancing and supporting institutional efforts to develop their own digital capacity and therefore wishes to engage with academics, professional staff and students in higher education (NFETLHE, 2014a). As such, it shares some of the interests of this research. It also shares the vision of the European Commission’s High Level Group (HLG) report on New Modes of Teaching and Learning in Higher Education (NFETLHE, 2014a). Like the Hunt Report before it, the extent to which the National Forum engaged with stakeholders, even who it thinks those stakeholders are, is somewhat unclear.

From its inception, the National Forum has been keen to involve stakeholders in its plans for developing the digital capacity of Irish higher education. Specifically, the Roadmap claims to reflect the views of those key stakeholders (NFETLHE, 2014a). However, this raises the questions as to whom they see as key stakeholders and what they consider to be an adequate level of consultation. In developing the Roadmap, the National Forum consulted over one thousand (1,000) stakeholders. This figure seems to be based on the approximately eight hundred (800) respondents to an online survey of twenty questions who were teaching staff in higher education. In addition, it seems to include participants in student focus groups and interviews with academic support staff and senior management. In addition, as in the Hunt Report, the Roadmap also refers to “employers, external communities, schools and further education providers” as key stakeholders (NFETLHE, 2014a). The selection of stakeholders is particularly important as the National Forum ambitiously claims that those stakeholders will lead the transformation of Irish higher education (NFETLHE, 2014b). As discussed in the Findings Chapter and further analysed here, this research has found that the views of digitally fluent educators have not received much consideration from the National Forum, suggesting that it is does not see them as key stakeholders. For transformation to succeed, it would require an alignment between the vision of the National Forum, and that of the educator/stakeholders and institutional culture, which is unlikely to be achieved when their views of educators
are neglected. Considering the research participants to be key stakeholders, it is interesting to examine their perspectives.

In the interviews, the TEL Career group included policy enthusiasts and policy visionaries who valued the work of the National Forum. Michelle Delaney was actively involved in a project on digital literacies for language learning and teaching, and Maria Gallagher had received some funding for her work on digital identities. Kevin Doyle thought that the National Forum was having an indirect effect on individual academics by influencing the centralised educational technology services which then affected participants at institutional events. William Cleary was supportive but felt that in its name and terminology it was failing to recognise the importance of assessment and thus reducing its potential impact. Overall, members of the TEL Career group were optimistic that the National Forum could raise awareness of the importance of TEL to senior managers in higher education. Potentially, this could lead to top-down institutional change.

Two of the TEL Practitioner group were also aware of the work National Forum but more sceptical than their colleagues in the TEL Career group. One of them had offered to participate in response to a call from the Forum but there was no follow up by the Forum, which seemed to disappoint him. In the Findings Chapter, we saw that David Toomey felt that the National Forum should develop teaching fellowships like those of the Higher Education Academy in the UK and that Tony Grant felt it should provide large scale funding for TEL development projects (though other participants appreciated its more modest levels of funding). These are the views of individuals, highly committed to TEL, with opinions and ideas they wished to share with their colleagues through the National Forum and elsewhere. For a successful implementation of the Roadmap recommendations, such views need to be taken into consideration as much as those of stakeholders from the wider community and the TEL Career group.

Based on its engagement with stakeholders and its own research, the Roadmap has developed a vision which foresees Irish higher education as developing a culture that embraces digital learning and innovation, by using digital technologies to enhance teaching and learning and by developing and supporting digital literacies for staff and students (NFETLHE, 2014a). Perhaps due to the difficulties discussed by Skelton (2012), the Roadmap does not mention the “parity of esteem” between research and teaching as
proposed in the Hunt Report (DES, 2010); instead, it discusses research in the context of providing an evidence base for the development of digital capacity (NFETLHE, 2014a, 2014b). The Forum would like institutions to convert its vision from the Roadmap into action (NFETLHE, 2014a). The Roadmap aims to provide a framework to make this happen by connecting bottom-up and top-down initiatives within institutions and by facilitating collaboration between institutions (NFETLHE, 2014a, 2014b). It recognises several “tensions and paradoxes” in its vision including potential conflicts between professional autonomy and an agreed enhancement of teaching practice, between professional development and a scarcity of resources and between the educational potential of digital technologies and technological determinism (NFETLHE, 2014a). These can be considered as tensions between professional identity and institutional culture or between bottom-up and top-down initiatives. All the participants shared the Forum’s vision and its recognition of these tensions and paradoxes as discussed in the Findings Chapter. Reflective CPD can help participants to resolve some of these tensions and paradoxes (Baran et al., 2013; Cousins & Bissar, 2012); thus increasing their digital fluency and alignment between institutional policy and professionally identity. To further facilitate the adoption of this vision, both the Roadmap and the interviewees recognised the importance of language and the disciplinary context. To enable mutual understanding between the “experts” and academics, the roadmap identifies the need for an agreed common language as did William Cleary in his interview. Such a shared language is a feature of communities of practice and knowledgeability (Wenger-Trayner et al., 2015; Wenger, 1998). The roadmap also identified the importance of working within disciplines, a view shared by Michelle Delaney and Kevin Doyle in their interviews and by Siemens and Tittenberger (2009), though both Michelle and David Toomey also discuss the commonality of approaches to TEL across disciplines. Having examined its vision and the associated paradoxes and tensions, the Roadmap has made four recommendations for the development of digital capacity in higher education. These are to build institutional and national policies from a strong evidence base by increasing collaboration within and between institutions. This would lead to a “consistent, seamless and coherent digital experience for students’ which would require both students and teachers to “develop their digital skills and knowledge” (NFETLHE, 2014a). As discussed, such policies and such an experience risk a top-down, “one size fits all” approach to teaching and professional practice. This is unlikely to engage policy sceptic lecturers as it is contrary to their professional identity.
The research participants, particularly those in the TEL Career group, were largely supportive of collaboration with other institutions, as were some of the TEL Practitioners. Devine (2015b) suggests that greater shared academic planning between institutions is a prerequisite for inter-institutional collaboration at a higher level. In his interview, William Cleary claimed that academics did not like such high-level collaboration and that this would be a challenge for the National Forum while David Toomey discussed collaboration in terms of individuals and small teams; therefore, at “pockets” rather than at “network” level. Kevin Doyle saw a “trickle down” benefit from inter-institutional collaboration to academics through the Centres for Teaching and Learning. These views suggest that while inter-institutional collaboration may be taking place, its benefits are often not reaching the policy sceptics.

The TEL Career group also favoured, in Michelle Delaney’s words, taking a “researcher’s attitude” to educational technology or, taking a digitally fluent rather than just a digitally literate approach (Briggs & Makice, 2012; Hsi, 2007; Resnick, 2001; R. L. Wang et al., 2012), or, in Kevin Doyle’s more prosaic terms, looking at the “why” and not just the “how” of digital technologies in their practice. Kevin’s view was largely shared by the TEL Practitioner group. This can be considered as taking a broad approach to the Forum’s recommendation of evidence-based pedagogy.

Learning design as discussed in the Literature Review can provide an evidence-based approach to the development of TEL (Agostinho et al., 2011; Dalziel et al., 2013). It provides a framework for describing learning activities using a standardised notation. Its aim is to share these designs with colleagues who can use them to develop their professional practice (Conole, 2014; Laurillard, 2012). This could lead to a consistent and seamless experience of TEL for students as recommended by the Forum (NFETLHE, 2014a). As such, learning design would seem to offer the digitally fluent educators interviewed a valuable tool for sharing their practice with their less technologically-proficient colleagues. This is particularly true for members of the TEL Career group, who with their greater knowledgeability of the educational technology community of practice, are familiar with a wide range of methodologies used in TEL development. Learning design fits well with a belief in open education and with co-creating and sharing resources with colleagues and the wider community; beliefs that are shared by many of the research participants. However, the only participant to mention designing learning activities was David, one of the TEL Practitioner group, and it seems from the context that he was
referring to design in its broader sense rather than learning design. While theories, such as activity theory, and frameworks, such as SAMR and 3Es, were mentioned as a foundation for their practice by Michelle and Kevin respectively, none of the participants mentioned learning design when discussing their approach to teaching either in theory or in practice. While this finding was initially unexpected, it would seem to be consistent with the professional identity of the participants who while aiming to “practice what they preached” did not wish to be seen as “cheerleaders” for TEL. This is particularly true of members of the TEL Career group, such as Maria, who was reluctant to share her professional practice, which she considered to be personal, unless specifically asked. This may be because TEL is more deeply ingrained in the professional identity of this group.

The formalised, structure of learning design does not seem to fit well with a professional identity which prefers an informal approach to helping less digitally-proficient colleagues. All participants were willing to respond to informal requests for help and advice from colleagues and more formally to share their practice at institutional courses and workshops. TEL Practitioners, David and Tony took a more pro-active approach with their “showcase” and “shop window” where they used informal gatherings to demonstrate their TEL practice to colleagues. As TEL Practitioners, they were closer to the boundary of the educational technology community of practice and, therefore, had a more common with their colleagues than members of the TEL Career group did. These showcases and shop windows could, perhaps, be formalised using learning design patterns to provide a consistent and seamless experience of TEL for students as recommended by the Forum (NFETLHE, 2014b). However, the TEL Practitioners did not see this as part of their role or professional identity as lecturers. Such a learning design project would have to be driven from the top by institutional policy and practice through organisational structures such as centres for teaching and learning.

This consistent and seamless experience of TEL can be considered as the Roadmap’s interpretation of “best practice” in teaching and learning with “state-of-the-art learning resources” in the Hunt Report (DES, 2010, p. 42), as these terms need to be defined and interpreted. These two recommendations may be considered as forming the basis for an institutional strategy and implementation plan. The nature of such an experience was discussed by all participants in the Findings Chapter. A consistent and seamless approach might facilitate the spread of efficiencies in assessment and feedback as David Toomey found with increasing class sizes. However, as several participants
claimed in the Findings Chapter, there is a risk of trying to impose a “one size fits all” solution which would not account for differences in students’ abilities and experiences nor in differences between disciplines or institutions.

As both the Roadmap and the participants suggest, courses could help students to develop their own digital literacy and digital identities; thus, increasing their digitally fluency. This could help all students to start their higher education with a similar ability to learn from technology. It would also require considerable institutional support. Similarly, CPD could help staff. Such courses might help lecturers who believe in students co-creating resources or other active learning approaches, though professional identity would seem to prevent co-creation, active learning or any other preferred approach from being consistently and seamlessly used throughout an institution and, even more, across institutions. The introduction of Bring Your Own Device (BYOD) policies would also make it more challenging to introduce a consistent and seamless experience as would the growing practice of using non-institutional tools discussed by Flavin (2012, 2016). This introduces another tension between the desire for staff and student freedom in the selection of tools and technologies and the desire for institutional technological and pedagogical standards.

It should be noted that the Roadmap set a target date of 2017, for the development of institutional strategies and plans for the widespread adoption of TEL (NFETLHE, 2014a, 2014b). When the participants were interviewed in 2016, none of them mentioned such plans. Perhaps, these plans did not exist at the time, the participants were unaware of them or did not think of them as worth mentioning. As the interviews were conducted two years after the publication of the roadmap, this would suggest the Forum is having difficulty in having this recommendation implemented in a timely manner. This may be due to difficulties in organising inter-institutional collaboration, determining the nature of the consistent and seamless experience, insufficient involvement by digitally fluent academics or other reasons. It may simply be that the pace of change is not matching the Forum’s ambitious schedule and that its recommendations will be implemented in the longer term.

Such attitudes, impediments and general policy scepticism may help to explain the absence of institutional strategies and implementation plans to date. Nevertheless, based on these challenges, a very broad consistent and seamless approach might still be
successfully disseminated by the National Forum to individuals and institutions. A broad approach could focus on the most widely accepted ideas in the Roadmap which have been reflected in the interviews, particularly those in the TEL Practitioner or policy sceptic groups, and in the research literature. Such an approach is more likely to be absorbed into practice, as it could facilitate alignment between the originating organisation, the National Forum, the institutions of higher education and individual academics (Aquino & De Castro, 2017; Benson et al., 2011; S. Brown, 2013; Knight et al., 2006; Porter & Graham, 2016). This approach would do best where it was supported by institutional leadership (S. Brown, 2013; Devine, 2015b; Knight et al., 2006), which could enable and encourage the development of technological and pedagogical cultural expertise (Galvin et al., 2010). The principal ideas in this approach are CPD for staff, digital literacies (or fluency) for staff and students and an evidence-based approach to practice. There seems to be widespread support for CPD, though a minority of academics seem to resist it (Devine, 2015b; Slowey et al., 2014). The need for increased digital literacy for an increasingly diverse student population also seems to be uncontested in the interviews and in the research literature (Beetham et al., 2009; Olsson & Edman-Stålbrant, 2008; Turner, 2012). As discussed in the Findings Chapter, CPD and digital literacies could draw on some common themes such as digital identities (Goode, 2010; Hsi, 2007) and, in the case of the academics, a desire for efficiency and engagement (Fischer & Köhler, 2011; Kirkwood & Price, 2013). Taking a more evidence-based approach also seems uncontested by the research participants. Its importance is discussed in the academic literature (Kirkwood & Price, 2013; Mayes et al., 2009; Peacock et al., 2009). It would require significant support from educational technologists and Centres for Teaching and Learning to increase awareness of relevant educational research and appropriate pedagogies (Benson et al., 2011; Hannon, 2008; Ooms et al., 2008; Peacock et al., 2009). Colleagues could also have an advisory role as seen in the Findings Chapter and in Cousins and Bissar (2012). More broadly, this approach would require practitioners to increase their knowledgeability of some of the many educational research communities of practice in that landscape. As there are many of these communities, with differing perspectives, this could prove problematic. A potential solution would be to integrate the evidence-based approach with CPD, allowing participants to develop their own praxis by selecting the approaches best suited to their own needs.
The approach analysed here could provide a route to the implementation of the four recommendations in the National Forum’s Roadmap. It could provide the basis for an institutional or national policy where colleagues collaborate draw on research evidence to develop a consistent and seamless approach to learning through and about digital technologies. The recommendations that follow draw on the Forum’s recommendations and the researcher’s own analysis as discussed in this chapter.

5.6 Recommendations

This section draws on the findings and analysis in this study to develop recommendations for a policy to increase digital fluency and the development of TEL in higher education in Ireland. These recommendations follow the findings of Devine (2015b) who found that policies and plans to increase institutional digital capacity must address both the professional development of academic staff in their teaching role and the organisational factors required to facilitate and foster such changes. This section focuses on how less technologically-proficient educators can be enabled and encouraged to develop their digital fluency so that they can make greater use of TEL in their teaching practice. Digitally fluent lecturers and educational technologists, both have a role in this process, which can only progress in a manner consistent with the professional identity of all educators, in terms of being digitally fluent and otherwise. Policies and strategies, both institutional and national, play an equal role. Their implementation in practice is affected by institutional culture in addition to professional identity. For a policy to enable change it must be implementable, situated in practice and reflect institutional priorities (NFETLHE, 2018).

The recommendations in this study serve an additional purpose in that they address the third recommendation of the Roadmap. That is, “to actively engage with … teachers to develop their digital skills and knowledge” (NFETLHE, 2014a). This further relates to another National Forum publication, The National Professional Development Framework for all Staff who teach in Higher Education (NFETLHE, 2016) which, in turn, draws on the National Forum report, Towards a National Digital Skills Framework for Irish Higher Education (NFETLHE, 2015) and on the Hunt Report (DES, 2010). Globally, the New Media Consortium in their Horizon Report see the development of digital fluency as a solvable challenge for higher education though they acknowledge it is difficult to get institution-wide support for this development (NMC Horizon, 2018). As
the National Forum has suggested, the development of both individual digital fluency and institutional digital capacity challenges many of the beliefs and attitudes, basic structures, policies and procedures in higher education in Ireland (NFETLHE, 2014a). This implies a challenge to both individual, professional identity and institutional culture in facilitating and fostering the development of digital fluency in higher education in Ireland. The four recommendations that follow attempt to outline a broad policy that could address the challenges at both individual and institutional levels by drawing on a bottom-up approach to develop a top-down policy.

5.6.1 Recommendation 1: Increase informal learning opportunities for educators

As presented in the Findings Chapter, the interviewees encouraged their colleagues through ad-hoc interventions, such as helping them to solve specific problems and giving informal demonstrations over coffee. As teaching practice is highly individualised, such interventions can facilitate and foster the development of digital fluency in a manner consistent with the colleagues own professional identity (Johnson et al., 2011). Following these informal interventions, some of these colleagues have started to adopt the practices of the TEL Practitioners due to their expertise and enthusiasm for demonstrating, discussing and sharing their praxis through “small every-day motivating moments” in the words of Cousins and Bissar (2012). As noted by Flavin (2012); Knight et al. (2006) and the research participants, such informal, unstructured activities can have greater impact than more structured, institutional events. This is the preferred approach to learning for many academics (Reid, 2014). Engagement in these informal activities is consistent with the TEL Practitioners’ professional identity. They take a pragmatic approach to TEL, emphasising the teaching and learning benefits without becoming evangelists for digital technologies. It is also consistent with the professional identity of those of their less technologically-proficient colleagues, who share an interest in teaching practice. Informal learning can lead to the development of personal learning networks or pockets of innovation within and between academic departments and institutions. Educational technologists can also participate in this process through enabling (rather than guiding as discussed in Chapter Four) their academic colleagues in their use of TEL.

This recommendation is clearly situated in practice and can be implemented even in the absence of institutional support. However, the institution can embed informal learning in its professional development policies to increase the influence of informal learning on practice.
5.6.2 Recommendation 2: Develop accredited CPD based on reflection for educators

At an institutional level, both the Roadmap and the findings previously evidenced support the development of digital fluency through Continuing Professional Development (CPD). As noted in the Findings Chapter and by Dabbagh and Kitsantas (2012); Rajagopal et al. (2011), formal institutional courses can be enriched by informal and unstructured learning from pockets of innovation. Thus, CPD can draw on the informal learning as discussed in the first recommendation. Institutional leaders in Irish higher education favour such CPD as it would professionalise the teaching role of academic staff (Devine, 2015b). Academics in these institutions favour “Innovative delivery methods” and “Use of new technology” as subjects for CPD (Slowey et al., 2014) which suggest that digital fluency and TEL are appropriate subjects for CPD. Such an approach could help to resolve the some of the tensions and paradoxes between identity and culture, between professional autonomy and institutional control and between the educational potential of digital technologies and technological determinism (Baran et al., 2013; Cousins & Bissar, 2012).

As discussed in the Findings Chapter, participants from both the TEL Career and TEL Practitioner groups considered reflection on their own practice to be an important element in their professional development. This is particularly true of the TEL Career group who can be considered policy visionaries with a keen interest in policy development. Such reflection can usefully draw on informal learning and their own praxis and can both raise questions and inspire actions (Cousins & Bissar, 2012). As discussed in the literature, CPD programmes can be designed to enable and encourage individual educators to engage in the design of their own development plans around reflection on their own professional practice (Baran et al., 2013; S. Brown, 2013). Such an approach reflects their professional identity. Drawing on the educator’s own experiences and identity should reduce their resistance to change and a mistrust of top-down approaches. This would enable the institution to benefit from a diversity of approaches, backgrounds and professional identities (Baran et al., 2013; S. Brown, 2013; Cochrane & Narayan, 2011; Mayes et al., 2009; Slowey et al., 2014). Reflection on their own praxis could help to engage all educators, making them genuine stakeholders in the development process and giving them a greater role than as stakeholders in the development of the National Forum’s Roadmap. This approach would switch from the National Forum’s focus on institutions; redressing the balance in favour of individual educators, thus reducing the
effects of policy scepticism on the introduction of CPD. It is through reflection on their own practice and the realisation that they could not continue teaching as they were taught, that brought most of the TEL Practitioner group on the journey along the digital spectrum towards digital fluency. Similar reflection could facilitate and foster the development of digital fluency among the less digitally-proficient. It could enable and encourage those with less knowledgeability to travel on the same journey, investigating the potential of digital technologies for their practice.

To help with this journey, the CPD programmes could draw on the TEL Practitioners’ approach of focusing on the benefits and drawbacks of specific tools and technologies for their practice. To enable the less digitally proficient to realise these benefits, the CPD should also include “knowing how” to use the tools and technologies (Koehler & Mishra, 2009; Lane, 2009). Such “learning by doing” can help them to develop their own digital fluency through reflecting on their own learning processes and discovering new ways of achieving their pedagogical goals (Laurillard, 2012; Meyer, 2010). They may need guidance from experienced practitioners in this process (Meyer, 2010). This approach can help them to improve their perception of the affordances of digital technologies and to understand the limitations of those technologies (Baran et al., 2013). As Flavin (2012, 2016) and Johnson et al. (2011) have noted, the TEL Practitioners’ tools and technologies may be free services on the web such as Google Scholar or YouTube rather than official, institutional systems. This approach should lead to a pedagogically appropriate choice of tools (Benson et al., 2011; Blin & Munro, 2008). According to Kevin Doyle in the interviews and Briggs and Makice (2012), this combination of “knowing how” and “knowing why” can facilitate and foster the development of digital fluency. This is demonstrated comprehensively in the Findings Chapter.

Several of the interviewees in the TEL Career group, as evidenced in previous chapters, considered that professional development should take a researcher’s approach, drawing on the academic literature to develop teaching practice, while those in the TEL Practitioner group tended to favour informal learning and drawing on the evidence from the practice of digitally fluent practitioners. Both approaches correspond to the fourth recommendation in the Roadmap, which suggests that pedagogical practice should draw on the evidence from research into teaching and learning practice (NFETLHE, 2014a).
Combining these approaches could lead to the development of personalised CPD which draws on reflection on praxis, research, informal learning and pedagogical and technological knowledge in ways not previously attempted. As it takes an approach suggested by digitally fluent policy visionaries and the research literature, while drawing on practitioners’ own experiences; such an approach would help to minimise policy scepticism and reduce the problems involved in scaling-up noted by S. Brown (2013) and Devine (2015b). To facilitate and foster the development of digital fluency, the lessons learnt in this CPD need to be implemented in actual teaching practice. To increase the value of such CPD, it could be accredited either by the home institution, or through inter-institutional collaboration, another institution or a national body. Accreditation is valuable as it facilitates setting goals and signifies institutional commitment. Both of which increase the likelihood of adoption (Devine, 2015b; Reid, 2014). Such accreditation could draw on the core ideas of the Higher Education Academy (UK) which offers accreditation both for individuals, through its teaching fellowship programmes as mentioned by David Toomey in the interviews, and for institutional programmes of continuing professional development (Higher Education Academy, 2018). The accredited nature of this CPD suggests, if not a priority, at least, institutional support. An implementable plan to do so could be in the form of an atlas.

5.6.3 Recommendation 3: Produce an atlas of routes for educators

Rather than providing a roadmap, as the Forum did, a consistent approach based on reflection would produce an atlas of many maps, taking different journeys across the landscape of practice towards appropriate outcomes (Devine, 2015b, p. 12). This approach corresponds to the variety of professional identities and disciplinary and institutional cultures found in higher education rather than the “one size fits all” approach of a roadmap. This atlas would empower individual educators, as its outcomes and plans would be derived from reflective CPD (Baran et al., 2013; S. Brown, 2013; Cochrane & Narayan, 2011; Mayes et al., 2009; Slowey et al., 2014). While the approach to developing the atlas could be described as, in the words of the National Forum, “consistent and seamless”, the resulting teaching practice could and probably would vary considerably. This atlas approach can be described, in the words of Wenger-Trayner et al. (2015), as taking many trajectories across landscapes of practice where the participants develop varying degrees of knowledgeability in the educational technology community of practice, or, in the words of Lenhart and Horrigan (2003), facilitating and fostering a
move along the *digital spectrum* towards digital fluency, taking a digitally fluent rather than a digitally literate approach to inform praxis (Briggs & Makice, 2012; Hsi, 2007; Resnick, 2001; Q. E. Wang et al., 2013; R. L. Wang et al., 2012).

As S. Brown (2013) claimed, such an approach requires an acceptance from the institution that some of these atlases may lead to outcomes different from its pre-conceived ideas. It fits well with the *laissez-faire* approach that Irish institutions are taking as noted by Devine (2015b, p. 7) but also fits a more goal-oriented, structured approach. However, outcomes designed by educators and are more likely to be implemented by those same educators than those imposed from above (S. Brown, 2013). This approach makes educators the stakeholders in their own development and in institutional practices, allowing them to guide development rather than have it imposed from above by institutional management, industry or government. With supportive institutional leadership, it could lead to greater alignment between the goals of the educators and the institution. To have an impact beyond the *pockets of innovation* and to increase digital capacity, institutions should consider enabling and encouraging more academic staff to develop their own atlases by participating in such CPD programmes. Such a change in practice may lead to iterative changes in both institutional culture and professional identity as suggested by O’Byrne (2014).

**5.6.4 Recommendation 4: Implement plans from the atlas in practice**

As Hannon (2012) has noted, implementation does not necessarily follow from plans and intentions. Visions and strategies, whether derived from CPD or elsewhere, are of little benefit without an implementation policies, plans and procedures to put them into practice (NFETLHE, 2018). To increase institutional digital capacity, institutions need to reach a wider audience beyond specialists in Centres for Teaching and Learning and already committed academic staff. Therefore, these policies, plans and procedures not only have to be disseminated by the institution but also absorbed by individual members of staff (Aquino & De Castro, 2017). Institutional leadership would be required both to develop the CPD programme and to implement the many maps in the atlas. Both digitally fluent educators and educational technologists could play a supporting role in this process (Hannon, 2008, 2012). Indeed, it is likely to require additional resources from Centres of Teaching and Learning and from educational technologists. Appropriate technological infrastructure and support would also make it easier to use and experiment with digital technologies as evident from the Findings Chapter. All of this requires a *social influence*
from institutional leadership, which, by raising the importance of TEL, should help to reduce some of the barriers to the implementation of the journeys in these atlases. This could facilitate changes in institutional culture to support ongoing professional development. These changes are likely to be evidenced in institutional policies and procedures or “the rules, tools and division of labour” (Knight et al., 2006). In turn, this could lead to a transformational change in institutional culture and values as suggested by Buchan (2011). Such a change can happen where there is an institutional culture of teaching and learning supported by internal networking and communities of practice (Buchan, 2011, 2014). This culture could be considered as one of lifelong learning. Over time these changes could be reflected in a changing professional identity, which could, in turn, be shaped by the changing nature of CPD (O'Byrne, 2014). On a cautionary note, while CPD based on reflection may help lecturers with a strong teaching identity to develop their digital fluency it is less likely to appeal to those with a strong research focus.

Rogers (2003) noted that time is always a factor when considering the adoption of an innovation. The National Forum seems to have set over-ambitious timelines for the implementation of its Roadmap by 2017. The changes suggested in these recommendations would take a considerable amount of time to become embedded in institutional practice. In the interviews, the participants considered time pressure and heavy workloads to be major stumbling blocks to developing digital fluency and implementing TEL. Reducing these burdens would help to convert a policy vision into results. To facilitate the implementation of the many journeys in the atlas in practice, institutions could consider decreasing workload and thus relieve time pressures. As evidenced in the Findings Chapter, they could also consider means of rewarding rather than awarding the development of digital fluency and the implementation of TEL. Paid development time for all lecturers including those on short-term and part-time employment contracts would also give an incentive to develop digital fluency and to improve teaching practice.

In conclusion, these four policy recommendations to facilitate and foster digital fluency in practice would help to provide educators with both the knowledge and confidence to develop an effective and sustainable practice in TEL. They could be considered as meeting the Hunt Report’s broad goals of providing “state-of-the-art” learning resources and “best practice in pedagogy” and technology-enhanced learning. The recommendations attempt to address the “tensions and paradoxes” between
professional autonomy and identity and institutional culture and structures, and between bottom-up and top-down initiatives, raised in the National Forum’s Roadmap (NFETLHE, 2014a). They could be promoted by the National Forum to help to meet the Roadmap’s recommendations for increasing digital capacity. Digital fluency enables and encourages academics to evaluate teaching and learning technologies, create engaging and effective learning activities and to overcome stumbling blocks. It helps them to avoid being driven by tools and technologies and encourages them to make their own decisions about learning technologies. This may ultimately lead to changes in their professional identity. With institutional support and alignment between the educators and institutional policies and strategy, cumulative increases in digital fluency can lead to increasing institutional digital capacity and, potentially, transformation (Buchan, 2011).

While taking the opportunity to make recommendations for policy and practice, the researcher recognises that doctoral work is fundamentally about enhancing knowledge, contributing to academic debate and gaining insights through interpreting and synthesising information and ideas. The work underpinning this thesis makes an original contribution to our understanding of the development of digital fluency in higher education. The researcher has derived practical recommendations from a synthesis of his contribution with the work of many experts in the field. This thesis concludes with a summary of what the researcher learned through discussion and analysis of the findings.
6. Reflections and future directions for this research

6.1 Introduction

This research set out to address the researcher’s academic and professional interests in the development of digital fluency and how it affects teaching practice in higher education. As reviewed in Chapter Two, institutional digital technologies have made little change to the teaching practice of most academics (Benson et al., 2011; Blin & Munro, 2008). While there is a considerable body of research discussing the barriers to the effective use of technology enhanced learning (TEL) in higher education there is much less research on the factors that enable and encourage such use (Porter & Graham, 2016). This research aimed to contribute to reducing that gap, by investigating the role of digital fluency as an enabler for the use of TEL in higher education. Specifically, the research would investigate how academics can develop their digital fluency. Following an extensive, critical review of the academic literature and official reports, the anchor research question for this thesis was formulated as:

“How can the development of digital fluency among academic staff in institutions of higher education in Ireland be understood, facilitated and fostered?”

To thoroughly investigate the anchor question, it was divided into sub-questions, exploring digitally fluent academics own development and practice, how both they and academic institutions could help their less technologically-proficient colleagues to become more digitally fluent and the role of national and institutional policy in supporting this. This research study follows the interpretive tradition as does much research in this field. It explores actual practice in depth, by means of semi-structured interviews with eight digitally fluent educators in higher education in Ireland. The interviews were coded, categorised and analysed using thematic analysis, as this draws on the participants’ own experiences and motivations (Braun & Clarke, 2006; Saldaña, 2013; R. L. Wang et al., 2012). This analysis led to the identification of professional identity and institutional culture as themes which could help us to understand the findings as discussed in Chapters 4 and 5 (Trede et al., 2012). Professional identity includes elements of technical and interpersonal skills, good reasoning and judgement, critical self-evaluation and a commitment to self-development (Trede et al., 2012). It also includes the embodiment of the attitudes, beliefs and standards of the profession (Trede et al., 2012).
This chapter draws on the discussion and analysis in Chapters 4 and 5 to reflect on the answers to these sub-questions before finally addressing the anchor question and research purpose. These reflections may provide valuable insights for future research.

6.2 Developing their own digital fluency

The study starts by examining how the digitally fluent educators develop and maintain their own fluency and how their fluency and teaching practice inter-relate. This addresses the first two sub-questions:

1a: What factors influence digitally fluent educators in the development of their own digital fluency?

1b: How do their digital fluency and their teaching and professional practice inter-relate?

All the digitally fluent educators interviewed had a prior interest in and enthusiasm for technology. They enjoyed “tinkering” with new digital tools and technologies (Resnick & Rosenbaum, 2013). Five of the eight participants had a master’s and four had or were working towards a doctorate in an area related to TEL. All the participants were committed to their own continuing professional development. Apart from accredited courses, the participants did not greatly value institutional training preferring to teach themselves or learn through conferences and professional networks. As they are digitally fluent, they have the knowledge, experience and confidence to do so and to overcome stumbling blocks or pedagogical and technical challenges to their practice. Such informal learning forms a major part of professional learning in academia (Flavin, 2012; Knight et al., 2006). Informal and formal learning tend not to be integrated (Flavin, 2012; Siemens & Tittenberger, 2009; Turner, 2012).

All the research participants wanted to teach well and were all committed to their own professional development. They were motivated to use their digital fluency to develop TEL with the aim of providing engaging learning activities for their students. These activities ranged from providing formative feedback, collaboration with students in other institutions, making classes more engaging, allowing students to participate remotely, creating and evaluating multimedia artefacts, flipping the classroom and developing digital identity. Despite their proficiency with TEL, the research participants were very clear that they did not consider themselves better teachers than their less
technologically-proficient colleagues. However, there are differences in attitude towards and experience of TEL between the participants. This can be considered in terms of their professional identity and the relative importance of teaching and research (Cheng, 2014; Skelton, 2012; Trede et al., 2012). The centrality of TEL to their career and values can equally be considered in terms of the degree or depth of their membership of an educational technology community of practice (Wenger-Trayner et al., 2015; Wenger, 1998). While there is some blurring of the boundaries, the participants can be divided into TEL Career and TEL Practitioner groups as analysed in Chapter 5. TEL is fundamental to the careers and professional practice of those in the TEL Career group while those in the TEL Practitioner group have developed an interest in TEL to improve their practice in their own discipline. It is not their principal teaching or research interest. They are less engaged in policy initiatives and tend to have a less theoretical basis to their praxis. For these reasons they have more in common with most of their academic colleagues, whom they are more pro-active in encouraging. Developing effective learning activities, increased the TEL Practitioner’s self-confidence, encouraging them both to tinker with more technologies and to re-evaluate the choice of tools in their current practice; thus, further developing their digital fluency. Therefore, understanding the development of fluency by the digitally fluent TEL Practitioners may help us to understand how their less technologically-proficient colleagues could also develop their fluency, as pioneers can influence the behaviour of their colleagues (Porter & Graham, 2016; Rolfe, 2012).

6.3 Facilitating and fostering digital fluency

The next three sub-questions are concerned with how less technologically-engaged educators can be enabled and encouraged to develop their digital fluency and thus make greater use of TEL. They examine the role of the digitally fluent educators, educational technologists and institutional structures in supporting such development:

2a: How can the digitally fluent educators help their less technologically-engaged colleagues in the development of those colleague’s digital fluency?

2b: How can educational technologists help their less technologically-engaged academic colleagues in the development of their digital fluency?

2c: How can academic institutions support educators in the development of their digital fluency and its application in professional practice?
The digitally fluent believed that most of their colleagues wanted to teach well and were committed to helping them to do so. This is inherent in being a professional (Trede et al., 2012). In keeping with their professional identity, they saw their role as advising and supporting their colleagues rather than evangelism or acting as, in Maria’s words, “cheerleaders” for technology. Due to their lack of technological proficiency, many of those colleagues have a high effort expectancy a low performance expectancy (Venkatesh et al., 2003) for TEL, as they do not see it as helping their practice or they find TEL too difficult or time-consuming (Vaughan, 2007).

None of the interviewees had a formal role in helping their colleagues with TEL. However, they were all willing to help their colleagues with advice and support. This ranged from responding to specific problems through giving practical demonstrations to lecturing on institutional courses and workshops. The demonstrations focused on the reasons for using a tool or technology rather than its features or in Michelle Delaney words, literacies rather than skills or taking a researcher’s approach to teaching. Such an approach is more sustainable and transferable; and, thus, can help their colleagues to move along the digital spectrum (Briggs & Makice, 2012; Hsi, 2007; Lenhart & Horrigan, 2003; Q. E. Wang et al., 2013; R. L. Wang et al., 2012). In terms of perceived affordances (Norman, 1999), this approach can help lecturers to gain a greater understanding of the conceptual model underlying a digital tool (Baran et al., 2013). Like Hannon (2008), some of the participants felt timely coaching and 1:1 training were more useful than formal courses for their colleagues. Coaching and small group training could help their colleagues to develop informal or personal learning networks (Knight et al., 2006; Rajagopal et al., 2011). Interventions such as these can lead to the development of “pockets of innovation”, a bottom-up approach to institutional digital capacity.

According to the interviewees, in the absence of appropriate guidelines and support, their colleagues tended to emulate classroom practices online or use the VLE as a document repository (Baran et al., 2013). They did not using TEL for active and collaborative education which is one of its main benefits (Blin & Munro, 2008; Vaughan, 2007). However, it may not be entirely due to inexperience but rather to the perceived affordance of the VLE and to inappropriate advice from technical experts, who may not understand the educational context. The professional identity of the experts may not match that of the academics as they have differing expectations and speak a different
language. It is often the role of educational technologists to bridge the gap between the academics and the experts by providing advice and support.

While the digitally fluent had the expertise to overcome stumbling blocks and thus did not require the services of educational technologists, they valued the services provided by educational technologists and the institutional Teaching and Learning Centres. Their less technologically-proficient colleagues who belong to the early or late majority of adopters (Rogers, 2003) have a much greater need for such services (Porter & Graham, 2016). The participants, particularly those in the TEL Practitioner group considered the educational technologists, who worked for central services, to be too closely aligned with the VLE and institutional structures; as such they risked being associated with the new managerialism and “doing more with less” (Deem & Brehony, 2005). However, a report on leadership in digital capacity in Irish higher education Devine (2015b, p. 10) found that educational technologists were mostly involved in bottom-up projects. These of course could involve the VLE. As found by Hannon (2008), this focus on the VLE often led the educational technologists to guide academics in the use of institutional tools rather than encourage their professional development, though this was not necessarily their choice or fit well with the educational technologists’ own professional identity. This latter approach could enable the academics to go, in David Toomey’s words, “off-piste” and help to sustain and embed new practices, often involving tools that are not provided by the institution. This can both develop the academics’ professional identity and challenge institutional culture. However, as seen in Chapters 4 and 5, it is important not to neglect guidance in the use of institutional systems as this can provide the pre-requisite skills and knowledge to enable academics to go “off-piste” and “tinker” with a wider range of digital technologies.

Institutions can provide an environment that facilitates the development of digital fluency and the adoption of TEL (Porter & Graham, 2016). Conditions include providing adequate funds and time for development, providing technical and pedagogical support, ensuring the necessary infrastructure is available and support for professional development. This support could be through formalised learning design (Dalziel et al., 2013) though none of the interviewees were involved in developing or applying learning design patterns. While David Toomey found using TEL saved him time and made him more efficient his views are the exception, the other participants and the literature report it as time-consuming (Baran et al., 2013; Ooms et al., 2008). In a climate of “doing more
with less” (Deem & Brehony, 2005), time and workload pressures make it less likely that lectures will have the time to develop their digital fluency or explore the potential of TEL, as do more specific infrastructural problems such as unsuitable rooms for video-conferencing or the absence of software licences. However, institutional policies can help to overcome these constraints and encourage academics to increase their digital fluency and make greater use of TEL in their professional practice.

6.4 Institutional and national policy

Having examined how the digitally fluent educators and the institutions of higher education can support their less technologically-engaged colleagues in developing their digital fluency, the study continues with an investigation of the influence of institutional and national policy on the development of TEL and the role of digitally fluent role in the development of any such policies. This addresses the following sub-question:

3. What are the views of digitally fluent educators on institutional and national TEL policies? What role (if any) do they have in their development?

Based on the interviews, there is little or no policy on the development of TEL in teaching practice as such. However, there are policies on related areas such as professional development, BYOD, awards and funding. In the Findings and Analysis chapters, participants from the TEL Career group were considered Policy Visionaries, who were enthusiastic about policies and more likely to participate in their development, while members of the TEL Practitioner group tended to be Policy Sceptics, who were less aware of policies and had a more dismissive attitude towards them. Most of the participants in both groups were somewhat sceptical about the influence of policies on practice.

Professional development was the main institutional policy for promoting TEL mentioned by the research participants. An institution that supports professional development suggests an institutional culture that facilitates and fosters the development of digital fluency and the enhancement of teaching practice. In this study, academic employers supported six of the participants in obtaining higher degrees in TEL related subjects. Michelle, Maria, Kevin and William were supported by their institution in their doctoral studies, while David and Margaret both completed a master’s level course accredited and run by their own employer (an Institute of Technology). Such institutional...
support implies that there is a policy to promote professional development that is consistent with academics’ professional identity.

Institutional awards and funding were available for the development of innovative teaching practice. However, the participants’ attitude to these varied. Those working in the institute of technology sector valued the awards and funding while those in the university sector tended to be dismissive. This may be due to a strong research identity in the universities and a greater focus on teaching in the institute of technology sector as discussed earlier. Institutional culture varies across higher education.

Some participants reported institutional policies on BYOD which were inconsistent with their professional identity but consistent with “doing more with less”, as they required lectures to take on additional duties and become “technology managers”. Reflecting their own interests and identity, participants were concerned about a lack of policy in areas such as the commercialisation of resources, openness and digital identity. Institutions may not have addressed these issues as they raise concerns for both institutional culture and professional identity. These concerns could perhaps be best addressed by national policy.

The role of technology in education became a matter of national policy when the National Strategy for Higher Education to 2030 (Hunt Report) recommended that teaching and research should be given “parity of esteem” and that this should be reflected in the allocation of resources and promotion criteria (DES, 2010, p. 44). It also recommended that Irish higher education connect with enterprise in new ways and position itself to play a pivotal role in developing Ireland’s culture of innovation (DES, 2010, p. 55). This contrasts with a more market-oriented future, “Higher Education Inc.” described by Kubler and Sayers (2010, p. 56) in a report for the Association of Commonwealth Universities, where higher education is characterised by competition, a commercial outlook and a disconnect between teaching and research. The National Forum (for the Enhancement of Teaching and Learning in Higher Education) was set up to put the recommendations of the Hunt Report into practice. Among many reports it has produced the Roadmap for Building Digital Capacity in Irish Higher Education (the Roadmap) which is discussed and analysed extensively in this research. While recognising “tensions and paradoxes” in its vision, the roadmap outlined a policy to connect bottom-up and top-down initiatives. This policy recommended drawing on a strong evidence base to design a “consistent, seamless and coherent digital experience for
students” (NFETLHE, 2014a). This would require both students and teachers to increase their digital fluency.

The *TEL Visionaries* were largely positive about the work of the National Forum and the Roadmap. While they considered it is too early to judge the impact of the National Forum’s projects, they were optimistic that they could increase the importance of TEL to senior managers in higher education. However, despite their expertise and interest, none of them were involved in the design and development of the Roadmap. This is particularly surprising as the Forum made much of the involvement of stakeholders in the development of TEL in higher education. However, the Forum itself seems to take a very broad view as to the identity of stakeholders as it includes industry, schools and government. Educator involvement seems to have been limited to an online questionnaire. The danger of minimising educator input is that inaccurate or incomplete assumptions are made about educational processes and possibilities. One such assumption made in the Roadmap is that all institutions have a similar culture and all lecturers a similar professional identity. This is not the case as illustrated by the participants’ attitude towards awards and funding and the differing mission statements of the institutions. Despite this assumption, this research has identified a potential way to implement the recommendations of the Roadmap.

An institution that supports professional development suggests a culture that could facilitate and foster the development of digital fluency and the enhancement of teaching practice. This policy could be expanded into the development of accredited continuing professional development programmes. To align these programmes with academics’ professional identity, they could draw on the academics’ reflection on their own practice. This would help to integrate a diversity of professional identities with a range of institutional cultures.

### 6.5 Closing commentary

This research contributes to our understanding of how higher education could make greater use of digital technologies to enhance teaching and learning practice by examining the factors that influence the development of digital fluency among academic staff in institutions of higher education in Ireland and how such fluency can be facilitated and fostered both by the digitally fluent educators and by the academic institutions that employ them. Digitally fluent educators can make effective use technology to create
learning activities and to evaluate tools and technologies (Briggs & Makice, 2012; Hsi, 2007; Resnick, 2001; Q. E. Wang et al., 2013) or in other words to use TEL at the highest cognitive levels. The closer educators are to fluency on the digital spectrum (Lenhart & Horrigan, 2003), the better prepared they are to make effective use of TEL in their professional practice.

The study presented here is based on the voices of eight digitally fluent academics in Irish higher education, a wide and exhaustive selection of the research literature and a major policy document on TEL in Irish higher education. Interviews with the academics were coded and categorised and the themes of professional identity and institutional culture were identified as helpful in addressing the research question. Based on their own descriptions of their interest and experience in digital technologies, all research participants are digitally fluent. The study started by examining how the research participants developed their own fluency and how this affects their teaching practice. It then examined how these digitally fluent academics could, in their own words, enable and encourage their less technologically-proficient academic colleagues to increase their fluency and how educational technologists, in particular, and institutional structures, in general, can facilitate this process. Finally, it examined the views of digitally fluent educators on institutional and national TEL policies and their role in the development of these policies. This examination of policy and practice led to some recommendations for improved policy and practice in the development of TEL in higher education in Ireland.

Digital fluency in higher education can be facilitated and fostered by accredited courses and informal learning. Institutions can support it by providing appropriate conditions and support services including educational technologists. Ideally these should enable and encourage educators to develop their own fluency as this will help to provide sustainability. Digitally fluent educators can help to support this process by solving problems and giving demonstrations and lectures to their colleagues.
6.6 Further research and limitations of this study

This study is a preliminary investigation into the factors affecting the development of digital fluency among academics in institutions of higher education in Ireland and raises some questions worthy of further investigation. The themes of professional identity and institutional culture emerged from the analysis. It would be interesting to re-interview the participants to explore their views on these themes. This could form part of a presentation where the participants commented on the findings. In the spirit of informal networks and learning clusters, a joint presentation would allow for discussion among the participants. This could deepen the findings and the analysis, perhaps leading to the development of a grounded theory. Ethical guidelines would have to be agreed to cover anonymity. It would also be interesting to interview colleagues who have been helped by the digitally fluent educators and gain their perspective, how they have been helped and how (if) their practice has changed. Drawing on the recommendations it would be an interesting study to investigate ways of integrating learning from personal learning networks into accredited CPD programmes and its impact on the development of digital fluency and professional identity.

The researcher intends to present the results of his research at the annual EdTech conference in Ireland and other appropriate conferences and events.

It is conceivable that research involving other participants in different institutions of higher education might yield different results. Continuing changes in technology, professional identity and institutional culture and student expectations are also likely to lead to changes in the adoption and practice of TEL. This in turn will affect the nature of digital fluency. However, the development of digital fluency should help educators to manage these changes; with this research providing a useful insight into the factors facilitating and fostering the development of digital fluency among academic staff in institutions of higher education in Ireland.
References


Cuban, L. (2012). As Teacher Use of New Technologies Has Spread, Have Most Teachers Changed How They Teach? In *Larry Cuban on School Reform and Classroom Practice*.


ITU. (2019). *New ITU statistics show more than half the world is now using the Internet*. Geneva.


O'Rourke, K. (2014). *The VLE 10 years on: Has anything changed? (Show me the evidence)*. Paper presented at the EdTech 2014, Dublin. [https://media.heanet.ie/page/4912331fd65c4740a85c151b7e8d3736](https://media.heanet.ie/page/4912331fd65c4740a85c151b7e8d3736)


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Turner, J. (2012). The difference between Digital Learning and Digital Literacy – a practical perspective. In *Light Offerings - Just another educator trying to find his way*.


Appendices

Appendix 1 – Pilot Interview Guide & Questions

Thanks for agreeing to participate in my pilot interview. I am a PhD student in the UCD School of Education where my supervisor is Dr Conor Galvin. I am conducting a research project on “Developing Digital Fluency in Higher Education”. To gather data for my research I intend to conduct about 8-10 semi-structured interviews with digitally fluent educators in higher education in Ireland. I have obtained exemption from full ethical review for this research from the UCD College of Social Sciences and Law. All research subjects will be external to UCD.

However, I would like to contact a pilot interview with you as a digitally fluent educator in UCD. This will enable to test out my methods and approach. The interview will be recorded for a pilot analysis of the transcript. This analysis will not be included in the research findings.

For the purposes of this research, I am using the National Forum for the Enhancement of Teaching & Learning in Higher Education definition of technology-enhanced learning as “the use of any technology to support teaching and learning in all contexts”.

Question 1: Factors influencing your use of Technology-Enhanced Learning (TEL)

I understand that you are using technology-enhanced learning as part of your professional practice. Can you tell me how and why you use TEL?

Sub-questions

- What benefits do you perceive for yourself/colleagues/students/institution in your approach?
- What problems do you perceive for yourself/colleagues/students/institution in your approach?
- What skills and knowledge do you need to make use of TEL as you do?
- How did you obtain these skills? What encouraged/discouraged you? How are you continuing to develop your skills in this area? Any impediments?
• How did your institution support you (or not) in acquiring these skills?

• Do you have the support of an educational technologist? Is this useful?

Question 2: Effect of Digital Fluency on their Practice

How has your use of TEL affected your professional role (new roles & responsibilities – time spent - skills)? How has it changed? Will it change?

• What are your own beliefs about teaching and learning in your discipline? How do these beliefs affect your use of TEL? Does your school/institution share these beliefs?

• What if anything is preventing you from making greater use of TEL in your practice

• How do you see future use of TEL in your practice? Ideally how would you like to use technology?

• How do you see the role of TEL in higher education more broadly? Will it change the nature of higher education?

•

Question 3a: Skills Transfer

To what extent do your colleagues use TEL in their teaching practice?

• Have you a methodology for exchanging expertise among colleagues?

• How could your less digitally fluent colleagues be helped to develop their skills, where desired? Can educational technologists help?

• How specific is your practice to your discipline?

• How can we get from “pockets of innovation” to “networks of excellence”?

•
Question 3b: Policy

- What influence do you have on the choice of tools and technologies and how they are used? If not you, who decides?

- As far as you know, does your institution have a policy on TEL? How does that affect you? Have you any input into that (or other relevant) policy?

- How do you think digital fluency should be recognised or rewarded by your institution (If at all)?

- To what extent is your use of TEL influenced by national/EU policies?

- Do you have any input into these policies and procedures? If so, how is it influenced by your own experience of TEL?

Question 4: Other Issues and Matters

Are there any other relevant matters that you would like to raise?

Niall Watts

11 January 2016
Appendix 2 – Relationship between interview prompts and research sub-questions

Research sub-question one focused on the development of interviewee’s own professional practice:

What factors influence digitally fluent educators in the development of their own digital fluency?

How do their digital fluency and their teaching and professional practice inter-relate?

The following prompts were to be used for this research sub-question:

1. "What benefits do you perceive for yourself/colleagues/students/institution in your approach to TEL?"

2. "What problems do you perceive for yourself/colleagues/students/institution in your approach to TEL?"

3. "How has your use of TEL affected your professional role (new roles & responsibilities – time spent - skills)? How has it changed? Will it change? "

4. “What are your own beliefs about teaching and learning in your discipline?”

5. “How do these beliefs affect your use of TEL?”

6. “Does your school/institution share these beliefs?”

7. "What skills and knowledge do you need to make use of TEL as you do?"

8. "How did you obtain these skills? What encouraged or discouraged you? "

9. "How are you continuing to develop your skills in this area? Any impediments?"

10. "How did your institution support you (or not) in acquiring these skills?"

11. "Do you have the support of an educational technologist? Is this useful?"

12. “What if anything is preventing you from making greater use of TEL in your practice? Any technical constraints?”

13. "How do you see future use of TEL in your practice?"

14. "Ideally how would you like to use technology?"

15. “How do you see the role of TEL in higher education more broadly? Will it change the nature of higher education?”
The second research sub-question focused on their colleagues’ use of TEL in their professional practice and how that can be supported institutionally:

How can the digitally fluent educators help their less technologically-engaged colleagues in the development of those colleagues’ digital fluency?

How can educational technologists help their less technologically-engaged academic colleagues in the development of their digital fluency?

How can academic institutions support educators in the development of their digital fluency and its application in professional practice?

The follow-up interview questions or prompts were:

1. “Have you a methodology for exchanging expertise among colleagues?”

2. “How could your less digitally fluent colleagues be helped to develop their skills, where desired? Can educational technologists help?”

3. “How specific is your practice to your discipline?”

4. “How can we get from “pockets of innovation” to “networks of excellence”?”

The third research sub-question focused on the role of policy, its influence on the educators and their influence on it.

What are the views of digitally fluent educators on institutional and national TEL policies? What role (if any) do they have in their development?

The follow-up interview questions or prompts were:

1. “What influence do you have on the choice of tools and technologies and how they are used? If not you, who decides?”

2. “As far as you know, does your institution have a policy on TEL? Copyright/IPR? How does that affect you? Have you any input into that (or other relevant) policy?”

3. “How do you think digital fluency should be recognised or rewarded by your institution (If at all)?”

4. “To what extent is your use of TEL influenced by national/EU policies such as the digital roadmap or by standards (e.g. accessibility)”

5. “Do you have any input into these policies and procedures? If so, how is it influenced by your own experience of TEL?”
Appendix 3 – Interview guide and questions

Thanks for agreeing to participate in my interview. I am a PhD student in the UCD School of Education where my supervisor is Dr Conor Galvin. I am conducting a research project on “Developing Digital Fluency in Higher Education”. To gather data for my research I intend to conduct about 8 -10 semi-structured interviews with digitally fluent educators in higher education in Ireland. I have obtained exemption from full ethical review for this research from the UCD College of Social Sciences and Law. All research subjects are external to UCD. The interview will be audio recorded and then transcribed to enable an analysis of the interview.

For the purposes of this research, I am using the National Forum for the Enhancement of Teaching & Learning in Higher Education definition of technology-enhanced learning as “the use of any technology to support teaching and learning in all contexts”.

There are a number of definitions of digital fluency, for example, “the knowledge, skills and mindset to achieve desired outcomes using technology” (Briggs & Makice, 2012) “Strategic expertise that a learner gains or demonstrates by using digital tools to gather, design, evaluate, critique, synthesise, and develop digital media artefacts, communication messages, or other electronic expressions” (Hsi, 2007). Digital fluency can be compared to the Five-Stage Model of Adult Skill Acquisition (Dreyfus, 2004), Conscious Competence and higher order thinking skills in Bloom’s Taxonomy (Churches, 2008) and language learning (Resnick, 2001).

Question 1: Factors influencing your use of Technology-Enhanced Learning (TEL)

I understand that you are using technology-enhanced learning as part of your professional practice. Can you tell me how and why you use TEL?

Sub-questions to prompt further discussion

- What benefits do you perceive for yourself/colleagues/students/institution in your approach?
- What problems do you perceive for yourself/colleagues/students/institution in your approach?
• What skills and knowledge do you need to make use of TEL as you do?
• How did you obtain these skills? What encouraged/discouraged you? How are you continuing to develop your skills in this area? Any impediments?
• How did your institution support you (or not) in acquiring these skills?
• Do you have the support of an educational technologist? Is this useful?

Question 2: Effect of Digital Fluency on their Practice

How has your use of TEL affected your professional role (new roles & responsibilities – time spent - skills)? How has it changed? Will it change?

• What are your own beliefs about teaching and learning in your discipline? How do these beliefs affect your use of TEL? Does your school/institution share these beliefs?
• What if anything is preventing you from making greater use of TEL in your practice? Technical constraints?
• How do you see future use of TEL in your practice? Ideally how would you like to use technology?
• How do you see the role of TEL in higher education more broadly? Will it change the nature of higher education?

Question 3a: Skills Transfer

To what extent do your colleagues use TEL in their teaching practice?

• Have you a methodology for exchanging expertise among colleagues?
• How could your less digitally fluent colleagues be helped to develop their skills, where desired? Can educational technologists help?
• How specific is your practice to your discipline?
• How can we get from “pockets of innovation” to “networks of excellence”?
Question 3b: Policy

• What influence do you have on the choice of tools and technologies and how they are used? If not you, who decides?

• As far as you know, does your institution have a policy on TEL? Copyright/IPR? How does that affect you? Have you any input into that (or other relevant) policy?

• How do you think digital fluency should be recognised or rewarded by your institution (If at all)?

• To what extent is your use of TEL influenced by national/EU policies or by standards (e.g. accessibility)?

• Do you have any input into these policies and procedures? If so, how is it influenced by your own experience of TEL?

Question 4: Other Issues and Matters

Are there any other relevant matters that you would like to raise?

Close

Thank you. Please confirm (or otherwise) that the contents of this interview can be used in my research. Would you like a copy of the transcript? You may withdraw consent at this stage or on receipt of the transcript.
Appendix 4 – Word clouds from document analysis

Second Cycle codes – size proportional to frequency

A word cloud of verbs in the roadmap.
### Appendix 5 - Roadmap Categories by coding frequency

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## Appendix 6 - Case profiles

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ET Res. = Research active in Educational Technology
### Appendix 7 – Codes and their frequency in the first attempt

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**Total Sources:** 139  **Total References:** 889

Sources refers to the number of transcripts where the code is applied.
Appendix 8 – Codes and their frequency in the second attempt

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Note that sub-codes are not included by name but included in totals.
**Appendix 9 – Codebook for second attempt**

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<td>Compare to why used &amp; TEL</td>
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<td>Preference for free or very inexpensive tools</td>
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<td>Good Enough Quality</td>
<td>Good enough - not perfectionist - quick to create - minimal editing</td>
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<td>Encourage use of mobile technology in class</td>
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<td>Description</td>
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<td>Digital Literacies</td>
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<td>Digital Native</td>
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<td>How things might change? Their expectation and predictions for future TEL practice</td>
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<td>Due to way institution is run</td>
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<td>Money</td>
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<td>Own Technical Skills</td>
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<td>Pedagogy Transfer</td>
<td>Inappropriate teaching practices (transferred from F2F)</td>
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<tr>
<td>Solutions (Getting around Stumbling Blocks)</td>
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<td>Specialised language</td>
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<td>Support from EdTechs or IT</td>
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<td>Technical Change</td>
<td>Caused by frequent change in tools or technology</td>
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<td>Name</td>
<td>Description</td>
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<tr>
<td>Technical issues</td>
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<td>Time (workload)</td>
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<td>Summer School</td>
<td>Participated in DIT Summer school</td>
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<td>Technology enhanced learning and similar terms</td>
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<td>TPACK</td>
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<td>Training Course</td>
<td>Training in TEL (received at work)</td>
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<td>Transformation</td>
<td>Transformation of education by new technologies</td>
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<td>Virtual Worlds</td>
<td>Second Life, VR</td>
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<td>Why TEL used</td>
<td>Reasons for using technology enhanced learning in their professional practice</td>
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<tr>
<td>Wicked problem</td>
<td>Use of word wicked</td>
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<td>Wi-Fi</td>
<td>Issues around wi-fi, connectivity</td>
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## Appendix 10 – Categories from Second Cycle Coding

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<td>Future Views</td>
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Appendix 11 – Sample Interview Transcript
Anonymised transcript from Brian Power interview

NW: Can I ask you a very broad question on your own experience of using technology enhanced learning in your professional practice. Then I will drill down in some more detail depending on your answers. So first of all, I want to ask you how and why you use technology enhanced learning as part of your work?

BP: Well first of all just to add a little bit of back ground here, I am a lecturer in computing and so that means that I am involved in talking on these subjects. Initially when I started I was involved in several e-learning programmes, higher diploma and master’s level. The college no longer runs those programmes; so, I basically graduated from that, if you like, to take what I learned there and use in my everyday classes at the moment. Even though I am a computer lecturer I tend to be on the business and data analytics and statistics side of technology, rather than say programming and web development. I am a strong advocate of technology enhanced learning. In a previous life I worked for an e-learning company and saw the value and saw the use of people using technology and I also saw the evolution of it from the late 1980s up to today so the difference between taking a lesson on a 512 (kilo)byte floppy disk and now having it streamed onto you mobile phone. I have lived through all of that and I think that learning has been enhanced through all that as well as from my point of view the teaching aspect of it all. So I decided when I was working as a lecturer on the e-learning diploma and masters in e-learning programmes at our college that I would practice what I preached that that I would use online tools, even simple stuff like Moodle was not being used or any type of content management system was not being used at the college and so we started to use it in our classes and then though it would be a great idea if we could extend this to the rest of the college, that’s around 2005/2006 so it was not that long ago the college wasn’t using a content management system. We did have material available online but you needed to be a HTML developer in order to do something like add a file to a web page. So that was one of the first things that I did so I was a keen advocate and one of the early adopters of Moodle in the college. We did look at other systems as well but we based our final decision on a report that had been done the previous summer by
DCU comparing different content management systems and they choose Moodle and we went along very much with that. We did a trial and it worked very well and now ten years later very few people in the college can function without it, as I am sure it is the same experience in all other colleges, so not much difference there but just to make a point that I was one of the instigators and dragging many, many people kicking and screaming into using this very, very basic tool for enhancing learning at the moment. Maybe we can come back to it later, what do I do, how do I use that compared to my colleagues and so on. How different all of that is. I then started to do other things. I have always used the basics like email to communicate with people, I have my own website for a long time where in the past I have made material available to my learners, to my students – I don’t do that anymore because we have Moodle and so I also started blogging at an early age as well. I have had a YouTube channel for over ten years now. For a while I used the likes of Twitter in education, I didn’t find it terribly - it didn’t really add much value to what I was doing. It kind of got to the point where I was saturated with different types of technology and I wanted to cut back on Twitter, I wasn’t one of those. I dabbled with Facebook at one stage as well but I don’t use that in any formal way at the moment and I am a typical kind of social medial person, I have a LinkedIn profile, a Facebook page which is personal and not professional, a YouTube channel, I use both Goole Mail and College Email for communicating with students. I use stuff like Google docs and Google Sheets for exercises in class where I can get the entire class to add material to say a Google spreadsheet and then we would look at the results and would those in the rest of the class. So, if I can try to give an example of a typical class that I ran recently, it was a statistics class. In the class we were using PowerPoint for notes, we were using Moodle to manage and provide that content to the students along with case studies and links to other things as well. We used SPSS as our statistical package, we used the R programming language for writing some statistical tests. We also used Excel for some of that, mostly for cleaning and managing data. In that was an exercise on probability so I used Google Sheets for the probability and I got students to do basic things like toss coins and roll dices and record the incidences and compare that to expected and observed and what the probability of rolling a six on a dice was and so on. So it was kind of a practical element to it with a dice that had been around for thousands of years and coins that had been around for thousands of years and the students are recording the results on Google sheets and they can see the results. I have the formula for adding up the standard deviation, the variance and all of that at the end once they are all done. Later on in the class I would be using
Moodle for an assignment so that they could submit an assignment online and then provide feedback online to them through that medium as well. So we are using an awful lot of software tools in the class. Some time it can be a little bit overwhelming in trying to make sure everything is right so if I am using SPSS I have to have an SPSS file ready, if I am using R I have my code tested and run before hand and CSV files and the like ready for students to use. I occasionally will record material myself if I need to stop or what might sometime happen is that I run out of time so I might just record something separately so that students are not missing out on it. So it’s a great mix of tools and technology that I use that I believe and it is my sincere hope that it enhances the learning for my students. One never knows for sure right whether the effort I put into all this and it is a significant effort. Would my students be just as knowledgeable if I did a stand up presentation with no notes, with them writing down as you and I did in our day back in Trinity when we brought pen and paper to class and nowadays I ask the class to take out pen and paper and half the class won’t have it and, of course, I have seen the change in the actual computing technology getting more powerful and so on as well. It’s been quite an experience, whether it is enhanced or not is the big question and it is my firm belief and hope that it has done so.

NW: Your colleagues, do they share the same degree of enthusiasm or do they see you as a workaholic?

BP: Enthusiasm, No. I wouldn’t think so. There are some of the younger lecturers who tend to be keener and hungrier. Many of them are on contracts which they would like to be extended to full-time positions, many of our younger lecturers are part-time as well, so you know anything that they can add in to help them become more efficient because you know if you are working part-time you might be teaching a lot more hours than say a full-time person is going to be doing, so there is the practical thing of having files and everything ready for all the different classes. So that is one thing. So my younger colleagues tend to be much more knowledgeable. You will find them using YouTube channels, you will find them using virtual classrooms like Adobe Connect and so on. In fact, in my college it’s really only some of the younger lecturers that are using Connect regularly, some of our older lecturers are using it for distance learning classes,
primarily for business courses, very few technology courses are delivered online at the moment. They are primarily using it (the older people)... They are primarily using it for – they are basically using PowerPoint and using voice overs through Adobe Connect. Whereas our student support people and some lecturers will do tutorials online and so they are giving and taking student feedback. They would be doing something like using Connect, they would share screens and would be writing code – this primarily would be done using Java programming classes, so they would be writing code and they would ask the student to change this code, share a screen and change it, so it tends to be the younger people who do that. They are still colleagues who can barely manage Moodle and thankfully they are in the minority, but there are still colleagues who are kind of barely literate as we were talking earlier on about using technology. We have in our college, I don’t want to give too much away, but we have three schools – two primary schools, computing school and there’s a business school and I would say that my colleagues in the computing school, where I am, are very digital literate and fluent, if we can want to define it that way, whereas colleagues in the business schools tend to be less reliant on the technology. Their Moodle pages for example would tend to be maybe copies of PowerPoint presentations and little else when they are not using the full range of tools and techniques that are available in the likes of Moodle, such as assignments, such as quizzes, such as discussion groups, notifications, mixed web pages and so on.

NW: There’ll be a third school

BP: We are forming a third school which will include psychology in education which is an interesting school.

NW: So that’s to come really

BP: Yes, it’s in progress
NW: Just on the institution, I mean your institution is a bit different from the other places I have been talking to, who are publicly funded …

BP: Partially publicly funded. Actually at the moment I would say that the vast majority of our students are publicly funded. Almost all are fulltime students, about 1200 of them are – they qualify for free fees and so on. They are paying the registration fee like everybody else and about half of those students would also be on grants so they wouldn’t be paying that fee themselves. So we have about 1000 to 1200 of those. Many of the remainder we have had great success in the last two to three years on ICT Skills and Springboard programmes, so they have dominated. An awful lot of my own teaching has been to people on those programmes. So, for example, myself – every student I have at the moment is funded in some way by either through Department of Education grants or through Springboard or through ICT Skills and also we are hoping to – new apprenticeship schemes are coming out that we will have hopefully funded students on those programmes as well. So I would think a big number, well over half the college’s students are publicly funded on these various schemes but we would have maybe a third to a quarter of our students overall are fulltime students the rest are all part time. So that’s a different model to a lot of than a lot of other colleges.

NW: Does your institution use technology teaching methods as a way of selling itself or promoting itself…

BP: Not that I am aware. We would in proposing new programmes and in marketing materials, say when we do deliver courses online, we don’t have the success with online courses that other colleges have had, nevertheless, we do stuff like digital marketing online and these tend to be certificate level courses – 15, 20, 30 credits. So the vast majority of the college’s delivery of classes and content is done in the classroom, the vast majority. Like everywhere else we are looking at – there’s no pot of gold out there - where we produce a course and make it available online, that we will suddenly strike it rich. We’re not in that league. 98/99% of our stuff is classroom based. We like to think that we are cutting edge. In that 98/99% we are using Moodle, we are using Connect, the
support people use that quite a lot but in a classroom this morning I moved an old overhead projector out of the way and there are still some people using those.

NW: Are there any kind of problems or difficulties you have, stumbling blocks in using technology through yourself or more widely as an institution.

BP: The blocks that are there I overcome by going around them so, for example, I am sure we will get to a conversation about video which is a big thing that I do in my classes. I don’t use any college system or tool or recording studio or anything like that, I just don’t use it. I use YouTube, right. I want students to do...

NW: You don’t use them. Are they available or you just don’t use them? Or they don’t exist?

BP: There is a camera somewhere and there are microphones somewhere, I just use an ordinary headset when I am making my own videos in my own office with the sound and background noise and so on. So we don’t have – we are not in a recording studio – obviously we investigated and talked about it. We don’t have the equipment and the facilities to professionally record material – much of that would be done by the marketing department for marketing purposes would be done outside the college. There isn’t expertise within the college, there are some people like L01 for example who would have a lot of expertise in making video and making film and stuff but we are not a media rich college in that kind of a way so if I want to say for example to produce a professional looking video for, or even a semi-professional video or what Elliott Masie calls a good enough video I do it myself. So I make the recording and I use YouTube to deliver it, to host it, to render it, to tag it, to label it and then I link to it from Moodle and say here guys here’s a video, a five minute video, revising what we did last night, here’s a five minute video showing you how to do a T-test in Excel, this kind of thing, that’s what I am using them for.
NW: Do you use your own camera, or do you just use a phone?

BP: Well most of my videos now, the last few, I use a mixture of things. I use a programme called Snag-It right now for screen capture with a headset and I do the voice over as I am working through recording videos, usually five to seven or eight minutes long. Recently I used an overhead projector type of device which was a camera recording what I was able to do on paper and it was connected to a USB and I was able to do the voiceover on that as well. I forget what’s it’s called, it looks like an overhead projector but it’s not one of the ...

NW: Wolf…?

BP: I can’t remember now. So it was a light shining down and I had my paper and pen on me because I was doing some statistical tests by hand and so I was showing students how to do all this. So I recorded it using this device which I got from our support office and that just creates a movie on USB and I just uploaded it straight away to YouTube so it’s there instantly. So because YouTube and Moodle is there we don’t need an internal server, I don’t need to put the videos on Moodle. The fact to me is that 99.9% of the people who view my videos are outside the college, so I would be cutting down my audience big time using that. So what other people is something similar. There’s about two or three other people in the college who have YouTube channels, who have videos online for their own students as well as students outside the college to look at as well. So that is there. The number that I am aware of is extremely low, that’s not to say people don’t use YouTube. Many lecturers will find it useful, YouTube lectures online, say here people, watch this video this might be useful to you as well. It’s replacing the old, Oh, here’s a paper, read that, you know. Students are much more inclined to go to YouTube to learn something rather than to say find a journal article or webpage or something. So mostly I use video a lot in class, not in class but as support for students and I usually make my own.

17:55

NW: And all the skills and knowledge that you have to do these things, did you acquire them…
BP: Self-taught, completely self-taught

NW: In CBT Systems and onwards?

BP: I learned many lessons there in CBT and then Smartforce such as being clear and concise with content, so it made me – I don’t want to be slapping myself on the back here, too much here – but it made me good at explaining things in the shortest and most concise possible time because in online learning you don’t have the facility to spend half an hour explaining something to a student who can’t understand it, you’ve got to do it in five minutes or ten minutes max. So it made me learn and it also taught me the value of small chunk learning object size pieces of learning. So I said to myself, there’s a value – and I want to show somebody how to do something in Excel or how to do something in statistics. I don’t create an entire course to show them everything. I say, ok, well you need to learn how to conduct an Anova to compare these three samples, now here’s how you do it in Excel and here’s how you do it on paper. So I would have two versions of it and I happen to be good at explaining things, at least I think I am and the feedback on the channel is very, very good on these things. So the learning and development experience taught me all of that, taught me the value of learning outcome, or a learning object as I prefer to call it. What training and what learning is needed to meet that learning object and if I can produce that in five or six minutes in the video then I am very happy to be able to do that. If my video doesn’t teach you what you want to learn then that’s possibly another learning object so I would have a suite of learning objects, but is, if you like, it’s like a training course that is made itself from disparate learning objects rather than from the usual top down design that people would have where let’s design a curriculum and lets design the learning outcomes for the curriculum and then the learning objects within each of those learning outcomes – the old lesson, topic, individual screen or learning outcome that, you know, whatever the hierarchy is, sort of say that again, you would have say curriculum broken down into lessons, each lesson broken down into topics and each topic broken down in four or five kind of subject areas – we used to call them screens – so a screen full of information at a time. So what I am doing is I am essentially creating a topic and I am making that topic available online and it’s the topics that I am doing is the topics that
usually involve some kind of practical skill that you need to do using a computer, mostly
the likes of Excel and PowerPoint and statistical tests – that’s my area at the moment,
about 120 odd videos or so on YouTube explaining all of those things and every single
one of them are all stuff that I use in my own classes and that many people outside my
own classes find useful as well because it’s on YouTube and they can find it.

NW: Any sort of plans for or have you taken on new things or things that you see might
be useful to develop in the future in terms of your skills

BP: Yeah, it’s funny you should ask that because I was reading recently about virtual
reality. Now I don’t see myself going down the road of virtual reality, I think that the
learning curve there might be very, very high, but I do see that the manufacturers like
Samsung and Google Cardboard are starting to make this type of technology a lot easier
and Google Cardboard makes it cheap, ok. Their headsets are made out of cardboard,
and now the latest Samsung Edge phone, S7 or S8, or whatever it is can be put into one
of these headsets and, I’m thinking, well, I don’t see myself – my subjects don’t
particularly lend themselves to – like if I was teaching geography I could have a film or
an experience about how to navigate around UCD via this headset or something, give the
learning experience that way, but I was looking at that and I was thinking, you know, in
40 years time, people will be looking back and saying, gosh, do you remember when
students used to use virtual reality and wasn’t that ancient and so on and so I am kind of
interested from that point of view and seeing what else is out there. I think we have very
good tools for doing what I need to do. We have good content management systems, we
have good screen capturing systems and we’ve very, very good basic recording device in
my headset and so on. I’ve a very good one. I can do this stuff at home or can do it at
work, I use Google Drive a lot as well and so all my work video, lecture notes, personal
stuff, it’s all on Google Drive so that has changed enormously in the last three or four
years compared to when we used to carry around USBs. When you think about it we
carried around USBs for a very short period of time, for about two years we gave every
incoming student an USB and now we don’t do it any more, because they all have
Dropbox and student themselves are using Dropbox for approved projects and so on as
well, so that can be something that is very, very useful too. Other innovations that have
come in the the last year or so which we will continue to use is using the likes of Turnitin to check for originality reports so we have been using Turnitin and it has been very good in reducing incidents of cheating or plagiarism and so but it’s also added extra workload for people when it detects stuff that might not otherwise have been detected. We have a process/system like every other college has, a processing system for what you do next if you suspect or it is alleged there is a case of plagiarism and that can increase the workload for a lot of people and, for example, part-time people, they don’t get paid – they get paid for the hours in class, that’s it, so dealing with five or six cases of plagiarism in a class of 50 or 60 students is adding on an unwanted extra burden of workload that this piece of fantastic technology has brought upon them. So at the moment my next piece of technology is on its way to me as we speak. I’m switching from an iPhone to a Windows Phone. That is going to pose some challenges for me to both create and manage my own content from that device which I can do with my iPhone quite well. My first iPhone was given to me by O2 because I wrote to them, I emailed them – this was back in 2005/6, not long after it came out first, it was the original iPhone – and I wrote to them and said I’m teaching e-learning and stuff in class, I have a video online, here’s a copy, about how to create a movie that can be played on an iPod, I’d love to have an iPhone to see what can we do in education to get video content on to the iPhone and would like to sponsor me and give me a free iPhone, which amazingly, despite my cheek, they did, so my first iPhone was a freebee from O2 and I took from there and so I use for my own content and I’ve got students in class, I’m one of these lecturers I do not tell students to put down their screens in class, I do not tell students to put away their mobile phones, although I do tell them to put them on silent, I’m constantly – particularly with the younger students – saying to them look this up, look that up. There’s a website this morning that they were looking at, we were briefly discussing sentiment in the likes of Facebook, LinkedIn and Twitter and so on and how would you measure it, so I said check out on your phones happygrumpy.com or topsy was another one but Apple had bought that and closed it down. So enter a term CocaCola or Donald Trump or Brussels or something like that and they can see the number of tweets and they can see the changes over time and I am telling them to do this on their mobile phone because they are used to doing it. Sometimes I’ll say use your screen or use your desktop computer to do it. Which brings me to the biggest recent challenge that I have had in technology and it was an unexpected challenge and it is in relation to BYOD. Before we even started this conversation we were chatting about programmes in the college in data analytics and we
are running an extremely successful Level 8 Higher Diploma in data analytics. We have four classes of 60 plus students at the moment who are studying this programme. Two started last September and we started off two in January. When we were starting the two in January we didn’t have labs for them and so management in the school, in the college, decided we will use ordinary lecture theatres and they can bring their own laptops so a spec was decided, I wasn’t involved in deciding the spec, but it’s a reasonable spec, most modern laptops will meet this spec and the students were bringing along their laptops to class and this has unwittingly influenced the way I do things in class, so, for example, in a statistics module I will have two in-class tests for continuous assessment and that would normally be held in a computer lab, so the students would come in and sit at the computer and log on and all the software that they need is available to them there and they would be able to do the test if it’s an open book test and so on. So I’ve been doing that for several years and that would be typical CA worth 20-25% or something, which they would do online and submit their report, submit their files through Moodle to me. I was assured by the college management, as assuring as they could be, you will be fine Brian, you can manage technology and BYOD. I was assured by the IT Department that their wireless connection would be perfect for everybody and they did bring in high speed wireless connection for the lecture theatres where this is being held, which they probably needed to anyway because more and more students are bringing devices to the college, but every single class, about 60 in the class, 60 some days 65 other days, but it averages around 60 in a class, I would say at least 4, 5 to 6, that number, that’s almost 10% of the class cannot connect for a myriad of reasons, there’s the usual, they have forgotten their username or password, or something like that, so I tell them to go down to the Student IT Helpdesk and get that back. That problem can occur whether it is a BYOD or a desktop computer but most of the time they are able to log on but they can’t connect to Eduroam. They can connect today but they can’t connect tomorrow. We use a virtual desktop environment called Citrix in the college as well, they can’t long on to Citrix where the software that I need them to use such as SPSS that’s where it’s located. I didn’t know this, the staff, because we don’t use Citrix ourselves, this is purely for students, so this was a learning curve for me. Oh, we have to use Citrix, what is that, I’d never seen it and practical things like, I didn’t know that if you are using your own desktop - you can switch your own desktop to the virtual desktop - that if you copy something on to the clipboard on your own desktop that’s not on the clipboard on the virtual desktop, so I was doing things like telling students copy this data from Excel and load it into SPSS, so Excel they
would have on their own desktop and SPSS they would have on the virtual desktop but they can’t copy it over and so every now and again some smart student in the class would come along and figure out a way of doing it and he or she would explain that to the rest of the class and so we would learn as a group how to do this. In the meantime, I’m on a typical lectern at the top of the class which does not use Citrix, so that’s a fierce problem. One of the students approached me and said – I held a test, it did not require Citrix, it was a written test so there wasn’t any problem there, it was open book so students could access Moodle and webpages and content online, whatever they wanted to do and some students were disadvantaged because they could not log on during class and how they overcame it was at the suggestion of another student in the class and that was they tethered their laptops to their own mobile phones and got to the web through their own mobile phones. Now this wasn’t anybody’s fault, this wasn’t the fault of the IT Department, this wasn’t their own fault. Some students that brought laptops in did not meet the specifications, so, for example, we specified PCs, some students brought in Macs. It shouldn’t be a problem and a problem arose when somebody asked me how to do something in Excel one day and I said what you do is do it the short way, ctrl, it doesn’t work on a Mac so I was a bit flummoxed there. Many students are using work laptops which may have some restrictions on them, which prevent them from installing some of the software, client software for example, that they need to load Citrix, so that can be a problem outside our control. We don’t know that whether the fact that somebody cannot connect is their own fault, their laptops fault or the college’s fault and so I made a decision last week, my second CA for one particular class, we require them to use SPSS which is on the virtual desktop and in that particular class we were using SPSS, about 60 students in the class, I asked for a show of hands, who cannot access SPSS right now, and about 6 hands went up and I made a decision, ok, we are not going to do an in-class test, I’ll give you an assignment instead that you can do outside the class and do at home because I could not rely on the fact that everybody in the class would be able to access needed materials and needed software online because of connectivity issues in a room which has high speed wireless connections in it. Our system is designed, its scalable, IT people come along, saying we’ve got the best material here, we’ve got fantastic broadband speed from HEAnet, it can manage far more students than we have in the college, so they don’t understand what the problem is and it’s generally issues in the students’ problems, password issues, software authentication issues, the laptop not being of the right spec or some restrictions due to work related or they don’t have administrator rights on their own.
laptop or are using a borrowed laptop or whatever or it’s a Mac or whatever. So I decided in this case here to abandon my plan to run an in-class test that required using laptops in favour of an assignment and to be quite frank I would probably do the same next year so my faith in doing something like that running in a computer lab for the last while has been shaken a little bit in a BYOD environment, because I have a class of 60 students and not all 60 are doing the same thing. In a lab with 60 desktops they are doing all the same thing and so the variety and the connectivity issues are preventing me from doing things. In class I have to ask, if you can’t access SPSS, I asked a student beside him if they would mind if they looked over their shoulder. Its 40 years since I shared a desk with another student and we had to share the same pen, the same inkwell, so we don’t like going back to there, so that has been a big challenge and again, like the YouTube and Moodle use to go around problems what I am and my colleagues are doing now is we are looking at ways of going around BYOD problems, so I would like to find a way not to have to use the virtual desktop because that would eliminate a huge problem for me. Literally seeing people going I’m able to log on now, go out for a break, they can’t log on when they come back. We don’t know why. Whether it’s that particular moment, the Wi-Fi is gone or whatever for the particular moment our connectivity is gone or their desktop or laptop was on a timer or its power save or whatever, we put in extra connections for everybody, there’s plugs – old fashioned lecture theatre – there’s plugs everywhere and a big challenge in a BYOD environment in a tiered lecture theatre is during tutorials. What I do is I tell them, could you sit in every second row please so that I and my TAs can walk around and help somebody in the middle of the room. So some unexpected challenges with BYOD which I was not ready for and not prepared for, that’s not unique to this institution or any other college not preparing their staff for these things and so it has been a very, very interesting experience, shaken my belief in the technology a little bit but the students rally round, they are very good, they are using their own technology, they are bringing their own stuff. Something funny – we had a fire drill during my BYOD class last Monday night. There were signs all over the place that there was going to be a fire drill so I reminded them at the beginning of class. Class started at 6 and the fire drill was quarter to 7 and at twenty to 7 I said to the students, the alarm is going to go off in a few minutes, it’s up to you – technically we are supposed to do it, just get up straight away and walk out of the building and leave everything behind, do you want to leave 60 laptops behind in this room, some of them connected to mobile phones physically, some of them plugged in and many of them took those two or three minutes before the fire alarm went
off to close up their laptops so they could bring them with them under their arms when they were leaving. Now, many students bring their laptops to other classes as well and they would have the same issues but this was a classroom full of people. Interestingly, not everyone brought their laptops, left them behind, and thankfully none of them were stolen or pinched or anything like that. Hadn’t intended to talk about that, but that was a real, real difficulty for me that I would have done without and I am taking an extra module this semester which is beside the point but it is one of the busiest semester I’ve ever had and I could have done without all of this. I’ll be more prepared for it next time.

NW: An interesting example. Unexpected drawbacks…

BP: What it’s done and I’ve read a little bit about this as well – actually read quite a bit about it, blogged about it and the difficulties and the challenges facing it, I found myself becoming a technology manager in the class and because students were saying, how do you connect to Citrix and what do you do and how do you download to Citrix client and all this kind of stuff and eventually after about two or three weeks in the semester I drew a line and I said, look I am the educator here, I’m not trying to fob you off but I am not a Technology Manager, people are using – I bet if I did up an audit I would three or four different versions of Windows and IOS and Mac OS and so on in the room and some people were using Office for the Mac, some people were using – and still using – Office 2003, so I believe lecturers will eventually become technology managers in the classroom as well and many already are. I’m not there yet but you know, and it is unfortunate as well as – well unfortunate is the word, I cannot help a student in my class who cannot connect. Most of the time I can’t help them, I don’t know what their problem is. Quite often they’re locked out because they entered their password three times and got it wrong. Every time the stock answer is, go downstairs to the Student IT Helpdesk, they’re the people who can help you out, and I don’t want to take the time out to be sorting somebody out, so technology management is becoming part of all of this as well and I believe that we will have to be skilled up and become more knowledgeable, more literate, more fluent if you like about stuff like BYOD rather than being dropped in it. It’s a great learning experience being dropped in it, there’s no doubt about that but whether students in their feedback at the end of the semester say well the beginning of the semester was a
disaster because we couldn’t access anything and all this kind of stuff then and they might say the lecturer was no help to us, I’m not a technology manager and can I afford to draw that line, that’s a question I am asking myself at the moment. I’ll see now, next semester, when we go to BYOD again with these groups, certainly I have seen it all now at this stage, I think, and maybe I will be a little bit better in helping students out, I’ll be, oh, I know what to do there, you go to Citrix with this and you go to your desktop for that. We have many students coming not knowing what a virtual desktop was and here we are on day one telling them to please use a virtual desktop.

NW: Do you have any educational technologists or anyone like that in your institution?

BP: Not formally. There’s a few people who – there were a couple of Post Graduate Students in the past who were kind of for staff training, employed as a technologist but, no, we don’t have any formal learning technology people like that you and I know here (in UCD) and in DIT and so on, we don’t have that and crucially we have no support for faculty who want to engage with things. If a part-time person who might be only teaching one module accepts that module in an online course, it could be a certificate in First Line Management which is delivered online, they will have somebody from the IT Department who will come down and show them what to do, so the actual room that they do it in is outside my own office so I see this quite a lot and it’s just an ordinary desktop in an ordinary meeting room, like this one here, with an ordinary computer, they’ve got a headset and somebody will set them up with Adobe Connect, its usually L03 in the computing support office who sets them up, there’s nobody with the formal role for that. I think we can do an awful lot more, use an awful more technology TL for our existing class stuff, never mind moving online but we haven’t crossed that particular bridge yet, which is a pity that we don’t have somebody in there with expertise on that, that could, for example, do something basic like show a lecturer who has never created a video before on YouTube how to do it. How to record a lecture, how to make their PowerPoint presentation into a PDF. There’s loads of people don’t know how to do that. Many people would not regard that as technology enhanced learning but in fact it is.
NW: At a basic level…

BP: I’m in the college now 14 years this summer. I do see, particularly with the newer lecturers coming a much, much higher level of literacy, so basics like Office and Mail and using Moodle and so on, you’re not explaining it to these people any longer, but I do find myself with many of our middle aged and older lecturers, particularly they come to me because I was on the plagiarism committee in the college for a long time, we don’t have a committee anymore. We’ve a different system and I’m the plagiarism person in the school and a lot of them come to me and a lot of it is basic stuff. How do I turn off quotations and how do I turn off bibliography and not count it in the index. Oh, it’s matching with a paper in this institution and how do I check that out and so a lot of it is kind of usable, not usability, but kind of productivity stuff, rather than the piece of technology itself. It’s how do they use it, how can we use it better. We do have staff development programmes and so on. I know you’re going to anonymise this but they tend not to be very well attended. I am guilty here as well, sometimes one of my classes are on and I can’t go. So if we held a session tomorrow on how to optimise Moodle, a fraction of the staff would go.

NW: So how would you suggest – somebody like yourself with a lot of expertise – that their knowledge is more broadly disseminated?

BP: Well first of all, make myself available to people, I have a certain reputation for all of this and I know there is resentment of that as well, I don’t make any secret of the fact that I monetise my videos on YouTube and make money out of it and so that could cause some resentment. Others just couldn’t be bothered, they are fine the way they are so they are not involved in changing. But the first I will say is, if somebody comes up to me and says, Brian, I saw your video, how do you do that and is that easy to do, I would absolutely trip over myself to try and help them set this up and I did this, particularly with younger colleagues. Many may not want to do all of these things, they might not see any added value to it, they mightn’t see the need for it, particularly say part-time people who might like to do it but they are not going to get paid extra to do it and if you are a part-
time person coming to the college and you’re teach a module say on Project Management
the first thing you ask is where are the notes, are there any notes on this. I teach this
module so I share my notes with them, notes which I developed and that’s all they use.
They might say, Oh Brian has a channel, there are some videos there, go to that and that’s
it, so they are not encouraged to do anything extra themselves because they are only paid
for the hours they spend in the classroom, so if they spend 10 hours preparing the lecture
or 10 minutes preparing the lecture they get paid the same. So there isn’t the monetary
encouragement there for people to – unless somebody is young and hungry and they are
doing a PhD or something and see potentially a full-time position in a couple of years to
come or a one or two year contract position perhaps they might be encouraged to do that
but your general run of the mill part-time lecturer doing one or two modules – sometimes
they don’t even like using Moodle because it’s an extra hassle, so that’s the first step that
I would do.

NW: There’s only one of you?

BP: I do, I have – the one thing I have done is that I do guest lectures. I’m doing one
next week as it happens on video and education, video and the classroom and some
analytics as well, so guest lectures – I did one recently and I have got one more this
semester next Tuesday evening at 6.

NW: Guest lecture within the college?

BP: Yeah, within the college, so I have made myself available to other lecturers and
the last one was for Dr. L02, who has a class in her International Marketing MSC and so
I went in and talked about them using video and video for marketing and the analytics
and showed them analytics such as demographics, you can see whose watching and what
age they are, male or female, what country they’re from, they’re always fascinated by
that. Their level of engagement, how long they watch the video for. If you own the
channel you can see all of this stuff, and that was of interest to her and her students. She
sent me an email afterwards, she said I had no idea anybody was doing anything like that
in the college, she said the students were gobbling it up, they couldn’t stop chattering, it was the most interesting thing that was happening in the entire module this semester, and that’s saying something in a digital marketing module. I don’t know what the reaction will be next week. It’s a first year module just called in general Computer Industry so I do a little bit of history of YouTube as well as the practicalities of it and there’s only 17 in that class and I don’t know how many of them are going to be there, so I make myself available like that. Beyond that I am not so sure what you can do. I am not in a position of authority in the college so I can’t say do this, do that. I’ve done seminars, I’ve done workshops in the college as well, people have attended them and ironically at the last workshop there was a technical problem and I couldn’t actually do the video. I was going to make a video in front of a group of people, how to calculate a net present value in Excel, I was actually going to do that, I chose that particular topic because it’s a financial topic and that attracted a number of business school lecturers.

NW: OK

BP: Can we make it part of professional development? I would certainly like to see some basics like optimising Moodle introduced as a requirement. We don’t like it, we don’t have a training programme when a lecturer joins. Quite often lecturers join a couple of weeks before the semester starts and their task is a survival task, survive those first few weeks.

NW: Anything like the centre of teaching and learning that we have here…

BP: So we don’t have a programme of events. Yes there is an introduction but that tends to be here’s how you get paid, here’s the rules over when you finish, here’s your timetable, here is how you use the IT systems and so on, you must use the college’s email system, this is where Quercus, our student management system, is, here’s where you enter results. So it tends to be on a practical level like that, the bare minimum I would call it for people to do their jobs, and they are told about Moodle as well, they are introduced to Moodle but they are told – here’s how you upload your lecture notes, PowerPoint
presentation full stop. Some will go on and do other things, there are many part-time people who do loads of super things with Moodle such as quizzes, discussion groups and add in loads of material and video and do all sorts of things, but there is a lot more that you can do than just upload your PowerPoint presentation, there is a lot more, and I can see myself that that is starting to expand beyond just 12 copies of 12 weeks of lectures. Now people are adding links to interesting articles online, links to I can see particularly our business school lectures and there is awful of video available online, so they would like to say for example, John Cleese videos on how not to manage a complex situation and stuff like that. So they are starting to make more and more use of that and I have got people coming to me and saying, Brian, I’ve heard that you can embed a video in a PowerPoint presentation. Could you show me how to do that? I refer them to the video where I do show people how to do that but I am also quite happy to go to their office and show them how to do it as well. So, can we make it part of professional development, at the moment I don’t know. Can we make it part of induction, I don’t know. Can we pay people to do it, I don’t know. I think what it’s going to be is that it’s going to be the tried and trusted generational thing that new people coming in much more digitally literate than we were, or that we are, will by default use all things and apparently that will be student driven. The students are now, they don’t print up their timetable any more, every time a student asks me a question about their timetable, they swipe the phone out of their pockets and say look, it says here we are in Room 105 and they’ve got the PDF file open on their mobile phone, very simple technology, a very simple and easy thing to do but they don’t want printouts anymore, they don’t bring pen and paper to class most of the time. They are bringing laptops, they are bringing iPads and android devices, they are doing all of these things now so they are driving if you like.

NW: Do they record lectures or is that not encouraged or discouraged...

BP: It’s not discouraged because we do have a disability officer and students with disabilities at the moment that are permitted to record lectures. There has to be confidentiality and things signed and so on. I haven’t had a situation yet in my own class where lectures are recorded, I do have one student in one of my classes who has a scribe, she has cerebral palsy and is in a wheelchair and is not able to use a computer and is not
able to use her hands at all barely and she has a scribe who is not taking the course. He,
on his laptop – I presume it is her laptop – but he takes all the notes and basically he is
typing out everything I say in the class for her benefit which is fantastic and that’s paid
for, not by the college but paid for by the Department of Education, and I am sure there
any many, many students in UCD who are in a similar situation.

NW: An ordinary, say able bodied student, do they try to record lectures to listen to at
home.

BP: I would be in the camp where I would prefer to sit in my office or sit in a studio
or something like that and record a lecture, not the lecture that I gave because, for example,
last night, we were – teaching statistics – the effect size, so if you got statistics with your
PhD you will definitely need to investigate effect size and there is a simple form for
measuring effect size is called Cohen’s D and the formula for calculating Cohen’s D is
very, very simple and we had rule of thumb table then, if you got a value of 0.2 it is a
small effect, 0.5 is a medium effect and 0.8 and values in between, it’s a large effect. So
this – we give an example and the students were coming along we got the answer is 1.35.
Oh great so I wrote it up on the board 1.35 and then I actually did it myself on Excel on
the screen, look 1.35. Is that right, because I thought 0.8 was the highest value? I just
didn’t check it out. 1.35 turned out to be correct, I investigated it this morning, it was the
correct calculation and this value is over 0.8 are considered to be a large effect and I was
going values around 0.8 were large effect. So I was saying to the class, OK people, look,
I’m not sure what the effect is here. I think it’s a large effect but I need to confirm and I
will do that and I will have word for you via Moodle discussion board tomorrow morning
which I did do. So that would be recorded, me apologising and me not understanding.
Basically it was a lack of understanding, I just basically didn’t check out what happens if
you get a value over .8 and 1.3 is a legitimate value, values above 2 would be rare. So I
was caught there and it wasn’t the only thing I was caught for last night as well. One of
the students said, is the CA breakdown 60/40 or 50/50 and I said its 50/50 and she said to
me, no, according to the module descriptor its 60/40 so I said I will investigate that and
to my embarrassment this morning its 60/40, so I had to write another message in Moodle
discussion board about that and the third thing that happened last night was I said to
people, here’s a link – I had a link in Moodle – there was a census file, we are going to some non-parametric tests on this data, survey data for the 2011 census, survey data about mode of transport to work, how long it takes you to get to work and what time you leave home to get to work at and its non-parametric data, so we wanted them to do some Kruskal Wallis and Mann Whitney U tests on that. I’m sounding very knowledgeable here but that is what we were doing and so I put the link into Moodle – what I thought was the link – and in class I said let’s click on this and take a look at the file and it gave us a different file and I’m going, I don’t understand, I wrote this assignment this morning, looking at this file. I clicked on the link myself, got the wrong file, which of course was the right file for that link and of course it turned out to be a completely different link which was on my home computer and so I was able to go into Moodle and change that this morning and again for the third time in the same day send out an apology to students, apology I put up the wrong link, here’s the correct link, it shouldn’t be any disadvantage to you at all. Now had last night’s lecture been recorded, the last 15/20 minutes of the class where all this happened could well have been a problem and somebody did poorly in an exam and decided to use it in whatever way they would choose. Maybe not in a malicious way, I don’t generally think that students are malicious but you never know, somebody comes around – they might be very, very happy until they get a bad result in an exam – and then they go, the reason we did that is because your man doesn’t know what he’s talking about, here’s the evidence. I doubt there is a lecturer in the world who doesn’t have on a set of slides more than 20 or 30 pages – it would be an interesting statistical test -which doesn’t have a typo or a formatting error or something on it somewhere, I doubt. So the recording of the lectures – in principal I don’t have a problem, certainly no problem with a disabled person, who can’t write notes, recording and they commit to keeping it for their own purposes. But I am not there yet. If I was able to say take my lecture notes aside and go into a studio and do a voice over on it, do a talk about it, then I would. I have seen lectures online. Sometimes the quality is very, very poor. I have seen fantastic online lectures by people like Prof. Michael Sandel of Harvard, course on justice, I’m sure you know it, it’s fantastic. It’s the only online course – well not the only, but the only video YouTube online course that I have taken in full and I have joked to my own students, because I refer my own students to this, I say when I grow up I want to be Michael Sandel. He’s got – that’s edited - that’s Harvard, they’ve got money to do this. He’s got TAs in that huge big auditorium and cameras
NW: It includes advertising…

BP: Yes. And so what you see in the end is an edited version, so that could take a bit where the student is stuttering with an answer or comes up with “what you talking about, this is b******t” and they can take that out. And I’m a quick and dirty type of person. I don’t want to edit – none of the videos that I have on YouTube, none of them are edited, absolutely none of them. If I make a mistake they are so short I stop and go back and start again, and so I haven’t made any long videos, partly for that reason because of the difficulties with editing. I don’t have editing. I actually do have editing software on my computer but I don’t use it. So I know a guy in Trinity, I don’t know his name, said that he records his lectures and then when the exams and everything are over he takes those lectures down and then he goes into class the following year, he records those lectures for that class of students, leaves that online until all those students are through and then delivers his lecture again. And the main reason for doing that is one is if there is a mistake it doesn’t get carried over and over and over, but secondly so that there is a consistency in message, so if the content is updated then the old one is now no use and if you make a mistake well you don’t want that mistake to be perpetuated for two or three years. And, also you might cover something different as well, so the value of recording lectures, I don’t think their life time is very, very long unless you are doing something like maths or algebra or geometry, those ones can last a long time. But if you were doing say economics or if you were doing web development, if you were doing android or mobile phone development, the minute the lecture is over you are nearly out of date.

NW: Can I just ask you about policies. We are coming to an end now. Such things as the National Forum for the Enhancement of Teaching, Higher Education and similar organisations do they have any effect on your practice?

BP: Well the short answer is No because I don’t know what they are. I do keep up to date with some online groups for the latest in technology. I am a big fan say for example of the Horizon Report which comes out every year just to see what’s coming down the
line and brings me back to the virtual reality, I was looking at it earlier this year. Probably at the very least, subconsciously, influences me in some way, I don’t know. But national forums and so on, they don’t reach down to me, they don’t. Whether they reach into the college or not I don’t know.

NW: Maybe because it’s a private (or not fully public) institution…

BP: I think there are a lot of public institutions but perhaps because were are not fully publicly funded that doesn’t extend to us. We are in that group of colleges – we are in, if you like, the third tier of colleges in Ireland where the Universities are at the top and then you’ve got the ITs and then you’ve got the other colleges, some of them private like DBS, others like ourselves, Griffith College, we’re the main colleges in that third sector there and we’re a little bit more independent as a consequence. Of course we are still quality assured by QQI and we still have to go through formerly HETAC, we still have to go through all of that so there is an element of quality control there but we’re a little bit different than some of the other colleges. So at the moment things don’t reach down to me. I’ve been out of the loop for a while. I’m going to be at the ILTA conference this year, I hope. I’ve to submit an abstract yet for that, so I will do that soon, and I’ll maybe catch up a little bit there. But what’s going on in other colleges, for example, I have no idea of what you guys are doing here, whatsoever. I’m working more or less solo in my own place at the moment and I suspect I am not doing a huge amount different than what other people are doing but as for policies, national forums, national groups, no, they are not reaching down to me at all and I am not involved in those, though I would love to be, I would absolutely love to be. We have, of course, internal policies. We’re drawing up some internal policies on private data and so on and those type of things, we have a lot of access to student data. A student queried me yesterday about a continuous assessment mark that he had, it was a student who had deferred a module, and so he had a query about it and he had been pesterling me for the last few weeks about this, so eventually anyway I was waiting for lecturers to send me their marks, so I said feck it, I’m going to look up Quercus, our student management system, and I took a screenshot of his page. I can look him up – he’s in my class, so I can look him up. If he wasn’t in my class I couldn’t look him up in the system, and I printed it out – or sorry, he printed it out and brought it to me
in class, during a break in class, and said explain this and explain this to me. He was fine, everything was ok. But as I was looking at it, what was on that page that he had printed out that I had sent him a screenshot of, from our system was his photograph, his mobile phone number, his home number, his personal email address, they were all on that page. Now he printed out his own page and he didn’t have a problem with that and that was another tab on that screenshot where I could have clicked on and got his address. So we are now taking attendances of classes, we can look at logs and reports from the likes of Moodle and so on and we need some policies around the privacy and how that data is going to be used, not particularly interested in using them myself. I have been asked to go on the committee for that which hasn’t formally met yet, but certainly from a pedagogical point of view, I’m more of an instructional design person myself, but certainly from a pedagogical point of view these data could add value to people who are looking particularly at say first year students who say their level of engagement drops and we can have some early interventions and so on and this data can certainly help there and I would advocate that that could be used, but at the same time, if a student is not engaging in the college by being absent from class and so on, the reaction seems to be, well an alert will come in, they haven’t swiped for three weeks, ring them up and say to them, excuse me you haven’t been in college for three weeks – well they already know that so where’s the value in the data and where’s the privacy in it and how can that data be used – it would be a nice rich seam of data for researchers in years to come, I know it will be. I am certain it could be anonymised and so on like that. Every college in the world has these type of data so that can be a challenge for us. We don’t have policies and rules around on how technology is used so there is rule, for example, preventing me earning money from YouTube, none whatsoever. There is no rule preventing me from putting content on YouTube. And that content that I am paid to develop for the college to deliver in my class, so I think of it that way, there’s an ethical and moral question to be answered in there as well. So for many years I did not monetise my videos for the particular reason, I was using college equipment to create it, laptop and headset, that’s all it was, but I said no, I don’t want to earn – I do want to earn money, but this would be unethical and it was a DIT summer school, I decided to turn it on just for a few days, just to show people how little you earn on this and I earned something like $100 in a couple of days so I was amazed at that and though, let’s leave this on and see what happens. There’s no rules governing all of that, and I feel myself it falls under academic freedom so I have the freedom to research this, to research new methods, I have the freedom to try out new
technologies. I don’t have very much of a budget for all of these things but usually when I go to Head of School and say I need something like Snag-It and he’ll approve it and this kind of thing. We hopefully will be getting new computers this summer, our computers now we have for four years and hopefully we’ll get an update on all of those and that I put in some requests for particular types of technology, software for those as well, but sometimes I feel it’s a solo run, sometimes I do.

NW: I think that brings us to an end unless there is anything more you want to add...

BP: One of the things and I am sure you often feel this yourself is that I wish I was 30 years younger, not because I want to be younger, which is partly true, but I also wish – I mentioned earlier on - 20 years ago we were delivering lessons on 5 ¼ inch floppy disks – what will we be saying in 20 years from now. Twenty years from now I will be retired and well retired and what will they be saying 20 years from that. What type of technologies are going to be there. We’re hearing a lot now about the Internet of Things and wearable technologies and all of that and I am certain that will filter its way down into classes. I see now what school children are doing, not just in secondary school but in primary school with technologies. That will change, if students are learning about programming in secondary schools what they going to learn when they come to college, so we will have to step up a level there. So I’m really, really looking forward to seeing – who will have thought 20 years ago – did you see that picture with Mark Zuckerberg walking past those people in Barcelona wearing headsets, who would have thought that would happen. Why are they all in a room, in the same room, it was a Samsung event so they were demonstrating products. If we have a classroom in the future do they need to be physically in the same room. Right now they don’t because we can deliver stuff online.

NW: But people like to meet and socialise…

BP: I do find that there is great value in people coming in and being able to ask questions and so on, but you know I can eventually see – already several of my colleagues have double screens in front of them at their desks – I don’t - and one colleague has three
screens at his desk and he has different things going on so I could potentially have a screen full of head shots of all the student in my class at their own computers and the next one could have resources like Moodle and videos and stuff like that and then the third one could be the one with slides and presentation and stuff – maybe enough work to want to share a screen. I can see myself being like a stockbroker in years to come with a bank of screens in front of me. Wouldn’t that be nice! I don’t think it will happen in my life time.

NW: ... 

BP: But young people coming through. I have a very tech savvy daughter, she is only 24 years of age, and she uses double screens all the time. She uses double screens at work and she uses double screens at home and she has tablets and those kind of devices as well, so they are multi-tasking and many of my colleagues are the complete opposite of multi-tasking. They can just about log on – I had to push the overhead projector out of the way.

NW: Mono tasking…