The Diffusion of Digital Learning Resources in Irish Universities

An exploratory study of users’ attitudes and behaviours

by

Aisling Dundon Arthur

Thesis submitted for the degree of Master of Arts (Research)

Thesis Supervisors: Dr. Yvonne Cleary and Professor Eamonn McQuade

Submitted to the University of Limerick,
October 2014
Abstract

The purpose of this study is to provide an insight into the behaviours and attitudes of academics regarding the diffusion of digital learning resources within Irish Universities. Rogers’ Innovation Diffusion Theory (1995) is used to frame the study providing context around the process of innovation diffusion. The work evolved from research gaps related to the key influencing factors that inhibit or encourage the diffusion of digital resources in the practice of teaching and learning in Ireland.

The study focuses on four key research questions: The extent to which the use of digital learning resources has diffused amongst the teaching community; the types of digital resources being used; the main incentives and barriers for using, reusing and developing digital resources; and the support or changes needed to encourage more engagement with digital resources.

In addressing the research questions, a web-based survey was used to gather the quantitative data for the study in conjunction with five face-to-face interviews to help substantiate the findings. The study is exploratory in nature and uncovers the common behaviours and attitudes shared amongst the teaching community providing a basis for further more extensive research.

The findings of this study indicate that there is a high level of engagement with digital resources, throughout all academic positions and across disciplines, in the practice of teaching and learning. The study indicates that most teachers are motivated to use digital resources as they perceive them to enhance the overall learning experience. The greatest deterrents to use centre around issues of self-efficacy, lack of training and lack of institutional recognition. The key supports requested by participants of this study, which would encourage more use and engagement with digital resources, include the availability of training and on-going support, evidence of pedagogic value and the time to trial and implement digital resources within their teaching practice.
Table of Contents

Abstract .................................................................................................................................................. i

Table of Contents .................................................................................................................................. ii

List of Figures ........................................................................................................................................ iii

List of Tables ......................................................................................................................................... iv

Glossary of Terms .................................................................................................................................. v

Acknowledgements ............................................................................................................................. vii

Declaration ............................................................................................................................................. viii

Chapter 1 Introduction ......................................................................................................................... 1

Chapter 2 Literature Review ............................................................................................................... 10

Chapter 3 Methodology ....................................................................................................................... 68

Chapter 4 Findings ............................................................................................................................... 85

Chapter 5 Discussion ............................................................................................................................ 124

Chapter 6 Recommendations and Conclusions ................................................................................. 160

Reference List ..................................................................................................................................... 166

Appendices .......................................................................................................................................... 187

Appendix A Summary of Key Findings ............................................................................................... 187

Appendix B Ethic Checklist ............................................................................................................... 194

Appendix C Ethics Application Form ................................................................................................. 196

Appendix D Consent Form .................................................................................................................. 200

Appendix E Sample Interview Questions .......................................................................................... 201

Appendix F Contact Email .................................................................................................................. 203

Appendix G Information Sheet ........................................................................................................... 204

Appendix H Web-based Questionnaire ............................................................................................... 205

Appendix I Interview Transcriptions ................................................................................................. 210
### List of Figures

| Figure 4.1 | Types of digital learning resources used | 89  |
| Figure 4.2 | Disciplinary preferences for resource types | 90  |
| Figure 4.3 | Most effective types of digital resources | 90  |
| Figure 4.4 | Sources of resources | 91  |
| Figure 4.5 | Incentives for contributing to a repository | 93  |
| Figure 4.6 | Incentives to use digital resources in teaching practice | 97  |
| Figure 4.7 | Main incentives for using digital resources | 100 |
| Figure 4.8 | Key factors influencing development of digital resources | 101 |
| Figure 4.9 | Barriers to using digital resources | 102 |
List of Tables

<p>| Table 4.1 | University representation | 86 |
| Table 4.2 | Academic positions of survey respondents | 87 |
| Table 4.3 | Age demographic of survey respondents | 87 |
| Table 4.4 | Faculty representation of survey respondents | 88 |
| Table 4.5 | Digital repositories used | 92 |
| Table 4.6 | Development of resources by academic position | 94 |
| Table 4.7 | Development of resources by age group | 95 |
| Table 4.8 | Do students react positively to the use of digital resources | 96 |
| Table 4.9 | Top two combined incentives to use digital resources | 98 |
| Table 4.10 | Key factors in choosing to use a particular resource | 99 |
| Table 4.11 | Barriers to using digital resources | 102 |
| Table 4.12 | Institutional support preferences | 104 |
| Table 4.13 | People would use more digital resources if there was more institutional support | 105 |
| Table 4.14 | Profile of interviewees | 109 |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLOGS</td>
<td>A personal website or web page on which an individual records opinions, links to other sites, etc. on a regular basis.</td>
</tr>
<tr>
<td>CERI</td>
<td>OECD’s Centre for Educational Research and Innovation</td>
</tr>
<tr>
<td>CONNEXIONS</td>
<td>Connexions is a dynamic digital educational content repository and content management system optimized for the delivery of educational content.</td>
</tr>
<tr>
<td>COURSERA</td>
<td>Coursera is an education platform that partners with top universities and organizations worldwide, to offer courses online for anyone to take, for free.</td>
</tr>
<tr>
<td>DLR</td>
<td>Digital Learning Resource</td>
</tr>
<tr>
<td>EdX</td>
<td>EdX is a massive open online course provider and online learning platform. It hosts online university-level courses in a wide range of disciplines to a worldwide audience at no charge.</td>
</tr>
<tr>
<td>HEA</td>
<td>Higher Education Authority</td>
</tr>
<tr>
<td>iTunes U</td>
<td>iTunes U is a free service hosted by Apple that allows instructors, administrators, and affiliates to manage, distribute, and control access to educational audio and video content.</td>
</tr>
<tr>
<td>JISC</td>
<td>Joint Information Systems Committee</td>
</tr>
<tr>
<td>JORUM</td>
<td>Jorum is the UK’s largest OER repository (<a href="http://www.jorum.ac.uk/">http://www.jorum.ac.uk/</a>)</td>
</tr>
<tr>
<td>LIPS</td>
<td>NDLR funded Learning Innovation Projects</td>
</tr>
<tr>
<td>LINC</td>
<td>NDLR funded Learning Innovation Community Supported Projects</td>
</tr>
<tr>
<td>MERLOT</td>
<td>Free and open peer reviewed collection of online teaching and learning materials and faculty-developed services contributed and used by an international education community (<a href="http://www.merlot.org/merlot/index.htm">www.merlot.org/merlot/index.htm</a>)</td>
</tr>
<tr>
<td>MOODLE</td>
<td>A free, open-source PHP web application for producing modular internet-based courses that support a modern social constructionist pedagogy (<a href="https://moodle.org/">https://moodle.org/</a>)</td>
</tr>
<tr>
<td>MOOCS</td>
<td>Massive Open Online Courses</td>
</tr>
<tr>
<td>NDLR</td>
<td>National Digital Learning Repository</td>
</tr>
<tr>
<td>OBHE</td>
<td>The observatory on Borderless Education (<a href="http://www.obhe.ac.uk/">http://www.obhe.ac.uk/</a>)</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>OCW</td>
<td>Open Course Ware</td>
</tr>
<tr>
<td>OECD</td>
<td>The Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>OER</td>
<td>Open Educational Resources</td>
</tr>
<tr>
<td>OPAL</td>
<td>Observatory of Parliaments after the Lisbon Treaty a joint endeavour of the Fondation Nationale des Sciences Politiques (Paris), University of Cologne, Cambridge University and Maastricht University</td>
</tr>
<tr>
<td>OPENAIRE</td>
<td>OpenAIRE is a project supporting the implementation of Open Access in Europe.</td>
</tr>
<tr>
<td>PODCAST</td>
<td>A multimedia file, such as a radio programme or video, that can be downloaded or streamed from the Internet onto a computer or mobile device.</td>
</tr>
<tr>
<td>SECOND LIFE</td>
<td>Second Life is an online virtual world, developed by Linden Lab, launched on June 23, 2003.</td>
</tr>
<tr>
<td>STEM</td>
<td>Science Technology Engineering and Mathematics</td>
</tr>
<tr>
<td>TWEET</td>
<td>A Tweet is a 140-character message posted via Twitter.</td>
</tr>
<tr>
<td>TWITTER</td>
<td>Twitter is an online social networking and microblogging service that enables users to send and read short 140-character text messages, called &quot;tweets&quot;.</td>
</tr>
<tr>
<td>UDACITY</td>
<td>UDACITY is a for-profit educational organization offering massive open online courses</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational and Cultural organisation</td>
</tr>
<tr>
<td>WEB2.0</td>
<td>The second stage of development of the Internet, characterized especially by the change from static web pages to dynamic or user-generated content and the growth of social media.</td>
</tr>
<tr>
<td>VLE</td>
<td>Virtual Learning Environment</td>
</tr>
</tbody>
</table>
Acknowledgements

The NDLR was a community of digital learning resource users and developers supporting and encouraging the diffusion of this grassroots movement in Ireland. I feel privileged to have had the opportunity to work with such an enthusiastic and dedicated community of people dedicated to enhancing the experience of teaching and learning. I would like to thank the NDLR core and extended team for igniting my interest in the area of digital learning resources.

I would like to sincerely thank my supervisors Professor Eamonn McQuade and Dr. Yvonne Cleary for their direction and guidance throughout this study.

I would also like to thank the University of Limerick for sponsoring this thesis.

Finally, I would like to acknowledge and thank my family. Thank you to my sister-in-law Denise for keeping Evan entertained and busy every Tuesday for months on end. A special thanks to my Mum for her support and for looking after my boys while I worked. Thank you to my husband Mike who listened patiently to me throughout this whole process and to my three darling boys Conor, Cian and Evan who had to put up with endless hours of me hiding away in my room reading and writing. You’ll be happy to know boys I’m finally done ‘typing’!!
Declaration

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or institute of learning.

I declare that the thesis embodies the findings of my own work. Following normal academic conventions I have made due acknowledgement of the work of others. The work has been completed within the specified word limit with 59,705 words excluding appendices and reference list.

Signed:

Date:
Chapter 1 Introduction

The National Forum for the Enhancement of Teaching and Learning (2014, pp. 3-5) in their recently published Digital Roadmap emphasise the importance of building digital capacity within Irish higher education. The roadmap articulates an emerging national vision and suggests that ‘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; where digital literacy and digital skills for teaching and learning are developed and supported; and 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’. Although my study pre-dated the initiation of the National Forum, the values and principles expressed by the key sectoral stakeholders are directly aligned with my key findings. The timeliness of the Digital Roadmap reflects the growing sense of importance amongst the education community with respect to improving and supporting digital literacy within higher education in Ireland.

This study contributes to the field of educational technology diffusion within the context of Irish universities. It seeks to explore the behaviours and attitudes of the Irish university teaching community with regards to digital learning resources and provides an insight into their motivations and barriers to adoption of. The study uses a framework that has guided similar studies in the field of educational innovation for the past four decades, E. M. Rogers’ (1995) work on the diffusion of innovations (Perkins 2011).

The relative importance and originality of the research emanates from the fact that it is focussed primarily on the perceptions and attitudes of the Irish higher education teaching community and not on technology. Firstly, the study seeks to contribute to current research on the behaviours and attitudes of academics with respect to the use of digital learning resources. Secondly, the study identifies the key factors inhibiting or contributing to the diffusion of digital learning resources within Irish universities. Finally, the study proposes a list of recommendations, aimed at university governing authorities, which could assist with further digital learning resource diffusion amongst the teaching community.
1.1 The Changing Landscape of Education

Education is founded on the process of communication and since the onset of the digital revolution in the latter half of the 20th century, society’s forms of communication have changed significantly. Digital technology has changed the way the world accesses, creates and interacts with information. Tuomi and Miller (2011, p. 1) state that ‘each historical era creates a system of education that addresses its needs’, and that the knowledge society, which is also referred to as the information age or digital age, is again changing the system of education. They go on to say that unlike the transformation of education from the pre-Industrial Age to the Industrial Age which saw a change from predominantly work-based learning to formal school based learning, this present transformation is not only changing the educational system but changing learning itself.

Higher education institutions are now faced with the daunting task of re-shaping themselves in order to keep relevant in today’s knowledge society. Brown and Adler (2008) stress that university environments and methods of teaching and learning need to change in order to prepare students for life in the twenty-first century. This topic has been the interest of many authors (Hanna 1998; Oblinger and Oblinger 2005; EC 2006 COM 208; Wiley 2006a; Brown and Adler 2008; Bradwell 2009; Tapscott and Williams 2010; Baranuiik 2012; Papanno 2012) with general consensus that formal education systems must change, and are changing, in response to economic and societal pressures. In a report prepared for UNESCO, Altbach et al. (2009, p.15) emphasise that ‘there is no doubt that higher education is entering a period of crisis, unprecedented since World War II, and the full impact is as yet unclear.’

While the visionaries of the educational world are professing the need for change, the processes of changing embedded formal education systems and traditions are proving arduous. Tapscott and Williams (2010) believe that leaders of old paradigms are often the last to embrace the new as vested interests fight change, yet changing the model of pedagogy and the model of knowledge production is crucial for the survival of the university. Professor Donald Hanna (1998, p. 66), in his study of Higher Education in an Era of Digital Competition: Emerging Organizational Models, wrote about the need for higher education to evolve in order to survive in an era of digital competition. ‘Growing demand among learners for improved accessibility and convenience, lower costs, and direct application of content to work settings is radically changing the environment for higher education in the United States and globally’.
Sixteen years later, traditional universities are still being challenged by the availability of content and a new culture of sharing. Hanna goes on to state that the combination of demand, costs, application of content and new technologies is opening the door to emerging competitors and new organizations that will compete directly with traditional universities and with each other for students and learners. This has since been realised with the availability of Massive Open Online Courses (MOOCs) where learners can access course material and participate on online courses, in some cases free of charge, from some of the world’s most prestigious universities. The New York Times, recognising the significance of this change in opening up access to educational content, declared 2012 the year of the MOOCs (Papanno 2012). While the pedagogic value of MOOCs is yet to be affirmed it is important to acknowledge their potential for impacting traditional forms of education.

While technology is the primary impetus for the changing landscape in higher education the impact that technology has had on society in general has changed basic industry requirements (EC Digital Agenda 2010, Department of Communications, Energy and Natural Resources 2013) and even learner’s ways of learning (Prensky 2001; Oblinger 2008). Tapscott and Williams (2010) purport that students will play a significant role in changing universities and that a huge generational clash is emerging in our institutions.

‘Today’s students are no longer the people our educational system was designed to teach’, according to Marc Prensky (2001, p.1). Prensky believes that technology has changed, in a fundamental way, how today’s students process information. The students of today have grown up with technology, while many educators are of a pre-digital age who he classifies as Digital Immigrants. In Prensky’s view, the single biggest problem facing education now is that educators are ‘struggling to teach a population that speaks an entirely new language’ (2001, p.2).

These Digital Natives are also sometimes referred to as Millenials, (Howe and Strauss 2007) or the Net Generation (Tapscott 1998), and are terms used to define a population born between 1982 and 1991. Oblinger and Oblinger (2005) ‘Educating the NET Generation’, describe the characteristics of this generation. They advise higher education institutions to take note of the new cohort of students for whom communication technology forms part of their daily lives. According to Tammy Savage, General Manager Microsoft, ‘for the Net generation the Internet is like oxygen; they can’t imagine being able to live without it’.
Student preferences for how they receive information and learn are most likely to be different to previous generations as studies show (Prensky 2001; Dede 2005; Brown and Adler 2008; Oblinger 2008; Sharples et al. 2013) that they favour more graphics, rapid pace, and immediate responses. Higher education institutions need to consider how they could adapt their pedagogy and teaching materials in order to stay relevant. Technology has changed the Net Generation, just as it is now changing higher education (Oblinger and Oblinger 2005).

Tapscott and Williams (2010) go as far as saying that the current model of pedagogy in most universities is becoming obsolete. They maintain that traditional forms of learning are not meeting the needs of the new generation who need to prepare themselves for employment in a knowledge economy. They believe that the technology available today needs to be harnessed to support new forms of pedagogy. However, they emphasise that this pedagogical change is not about the technology but about the change in relationship between students and teachers in the learning process.

Dede (2005) believes that leaders in higher education institutions need to recognise that by using emerging technologies to deliver instruction which is tailored to the “neomillennial” learning styles of their students they can prosper by remaining relevant. This point of view is echoed in a recent report commissioned by the Open University entitled Innovating Pedagogy (Sharples et al. 2013) which states that educators and policy makers must look at ways of infusing the technology to complement, enhance and improve our existing formal education practice. Technology itself is not innovative. It is how it is integrated into pedagogy that can make a change.

Some contrasting views exist as to the needs and expectations of the Net Generation. While many argue that traditional teaching methods do not match the learning styles of the new generation (Prensky 2001; Dede 2005; Brown and Adler 2008; Oblinger 2008) others claim that students prefer and expect traditional face-to-face learning in higher education and only like a moderate amount of technology integrated in their learning. Research has also found that using technology, which typically they would use for social purposes, in a study context presents conceptual difficulties. They find it counter intuitive and need demonstration, persuasion and room to experiment in this context (Joint Information Systems Committee 2009a; Jones and Shao 2011).
Cowan (2011) concluded, in his study of Digital Natives and their preferences and abilities to use technology for educational purposes, that using technologies familiar to Digital Natives, did not necessarily make them digital learners.

Jones and Shao (2011, p. 1) even question the existence of a new type of learner and conclude in their literature review for the Higher Education Academy in the UK, that there ‘is no evidence that there is a single new generation of young students entering higher education and the terms Net Generation and Digital Native do not capture the processes of change that are taking place.’ Nor did they find any evidence of a growing demand amongst students for changes in pedagogy and their overall conclusion was that young students do not form a generational cohort and they do not express consistent or generationally organised demands, and the authors thus caution policy makers about responding to such theories.

Regardless of the debate around the pedagogical requirements of the students of the future, the quality of education, even in the developed world, is not keeping pace with the demands of what is now and what will be an increasingly knowledge-based economy (Desjardins et al. 2006; Brown et al. 2008; Obama 2011). Speaking at the National Digital Learning Resources Fest in May 2012, Professor Martin Curley, Vice President of Intel Labs, spoke about the forces shaping learning, and, referencing Alison King (1993), said that learning today “is less about the sage on the stage and more about the guide on the side”. He also went on to say that the rate of advancement in technological innovation is outpacing education and he was concerned that higher education is currently lagging behind the curve of technology.

The disparity between the skills and attributes being developed in our education systems and those required by the workforce of the knowledge society is the topic of many programmes of reform and innovation, reports and initiatives (National Forum 2014; Department of Communications, Energy and Natural Resources 2013; Andrade et al. 2011; EC COM(2010) 245). The European Commission’s Europe 2020 initiative (2010) has prioritised the learning of digital literacy by all citizens to overcome the skills mismatches in the ICT sector. One of the key drivers of the strategy identified is ‘smart growth’, fostering knowledge, innovation, education and digital society.
A recent communication from the European Commission, titled *Rethinking Education: Investing in skills for better socio-economic* (EC COM (2012) 669 final p. 2), states that European education and training systems continue to fall short in providing the right skills for employability, and are not working adequately with business or employers to bring the learning experience closer to the reality of the working environment. These skills mismatches are a growing concern for European industry's competitiveness. Institutions at all levels of education and training still need to adapt in order to increase the relevance and quality of their educational input to students and the labour market. Higher education institutions need to ensure that the skills and attributes of their students are relevant to help them become successful in today's knowledge economy. Oblinger (2008, p. 20) states that ‘learners need skills that go far beyond reading, memorisation and communication’. The internet provides access to vast amounts of content which students need to be able to select from, assimilate, validate and synthesise and educational institutions have an obligation to help students cultivate these skills in preparation for the workplace.

*Are tomorrow’s best learners those who can use the tools and technologies to sift, search and synthesise information or those who can memorise places, numbers, and formulas? Is knowing something or knowing how to make a decision more valuable? ‘Will the ability to synthesise information become the primary goal of education? In a world full of images, audio, and spatial relationships, do schools put less emphasis on reading and print and more on other skills? Is individual effort most important, or has thinking become a distributed activity – among people, devices, and digital resources?*

*(Oblinger 2008, p. 28)*

A collaborative report conducted by the Higher Education Academy and the Joint Information Systems Committee (JISC) in the UK (2009a) found that students who engage with Web 2.01 technologies develop a skill-set that matches both to views on 21st-century learning skills and to those on 21st-century employability skills – communication, collaboration, creativity, leadership and technology proficiency.

However, there is little convincing evidence that directly correlates the use of technology with improved academic performance as there are too many variables to consider, such as the teacher, the subject matter, the type of technology and the pedagogy in which the technology is integrated.

---

1 Web 2.0 is a term first coined by Darcy DiNucci (1999) which refers to the second iteration of the internet where users interact and collaborate online in a social medium to produce content.
This is affirmed in an OECD report (OECD 2007b, p. 7) that states categorically that ‘there is no conclusive evidence about the effects of technology upon academic achievement. This is partly for obvious reasons – they are teaching means that can be used with a wide range of methodologies and strategies – and also because insufficient effort has been made to evaluate relationships as complex as those among technology access, frequency of use at school and out of school, and academic achievement.’

Despite the lack of evidence available, there is little denying the change that technology has had on how we communicate and create information. Many higher education institutions are acknowledging the impact technology is having on education and recognizing the new ways in which content is being accessed and delivered. The OECD’s Centre for Educational Research and Innovation (CERI), which does extensive research on learning at all ages, conducted a study with an aim of gathering qualitative and quantitative data on e-learning in tertiary education. The report (OECD 2005b) shows that almost all institutions involved in the study had some form of central strategy for e-learning or were in the process of developing one. In 2004, only 9% of 122 Commonwealth institutions responding to the OBHE survey lacked an institution-wide online learning strategy or plans to develop one, down from 18% in 2002. The report also mentions that there was a general acceptance that e-learning has broadly a positive effect on the quality of teaching and learning. However, the report also notes the lack of detailed evidence and skepticism around the pedagogic value of online learning due to its current immaturity which is a significant barrier to the mainstream adoption and support of digital learning in general. Some leading universities however, such as Harvard, Stanford, Oxford, Trinity College Dublin, MIT, Yale and many more are exploring the value of using new technologies to their advantage and are making their lectures freely available online through iTunes U, Edx, Coursera and other media channels which according to D’Antoni (2009) can realize many benefits to institutions in terms of prestige, marketing and cost efficiencies. As our educators and institutions attempt to navigate the demands of the knowledge society it is important to understand the opportunities and challenges associated with adopting educational innovations.
1.2 Overarching Considerations
My personal experience working as Open Educational Resources Communities Advocate with the National Digital Learning Resources (NDLR) service between 2007 and 2012 gave me the impetus for this study. The responsibilities of OER Advocate centred on the diffusion of digital learning resources within Irish higher education institutions and provided opportunities to experience the many challenges associated with the diffusion of new educational technology. The role required direct engagement with the academic community across many disciplines to discover the particular pedagogic challenges and opportunities associated with technology-enhanced learning.

In 2007, the use of digital learning resources was still in its infancy. Pockets of innovators were experimenting and pioneering the use of digital learning resources to enhance their teaching and learning, however it was far from common practice. The concept of sharing teaching material in an open repository was even less accepted, with many academics reluctant to share their intellectual property or reveal their course notes or resources. Encouraging novice digital resource users to engage with, develop or share resources was a challenging task. The NDLR service supported, promoted and encouraged the adoption of digital learning resources in Ireland. The successes it realised during its operation demonstrated the importance of what Rogers (1995) terms as ‘near-peer communication’, through its communities of practice; and Rogers’ perceived attribute of ‘observability’, through the NDLR Local Innovation Projects and Learning Innovation Community Supported projects (NDLR 2011b and 2011c, NDLR 2012b and 2012c). This study builds on the empirical knowledge of diffusion acquired through my personal involvement with the NDLR and summarises the issues surrounding the adoption of digital learning resources in our universities today.

1.3 Structure of the Thesis
Chapter two synthesises the literature and offers a theoretical framework around which the process of diffusion is examined. This chapter examines the emergence of digital learning resources within education and the rise of open educational resources. It includes a review of the different classification of users, the types of resources used and the impact of disciplinary differences on the practice of digital resource use. Chapter two also reviews current research in the areas of academic motivations and barriers with particular reference to the adoption of educational technology.
Chapter three discusses the methodology of the study in detail. It includes a methodological review, examines the research aims and objectives and the instruments used to capture data, namely; web-based surveys and unstructured interviews. The design, validity and ethical considerations are presented and the limitations of the study are also discussed.

Chapter four presents the research findings of the study. It commences with highlighting the profile of the survey respondents and interviewees. It examines the types of resources they use, how they source them and whether they develop or share resources. The findings in relation to the participants’ perceived motivations and barriers to digital resource use are then presented, looking at the key influencing factors that would encourage use and development. The chapter also presents the desired support measures which the participants believe would encourage the use of digital resources. A summary of the five interviews are also included with the key findings from the unstructured interview sessions. The common themes which emerged from the interviews are discussed with particular reference to their perceived barriers and incentives to use and the support measures they would like to see implemented.

Chapter five discusses the research findings with reference to the research framework. The chapter outlines opportunities for further research in this field and highlights the need for a larger nationally representative study of innovative educational diffusion in higher education institutions. It presents overall conclusions related to the current investigation and offers recommendations based on the completed work.
Chapter 2: Literature Review

This chapter discusses the emergence of digital learning resources as tools to support teaching practice within higher education, examining the types of resources that are being used and the motivations and barriers influencing the uptake of digital resources from a teaching perspective. The study focuses on the diffusion of digital learning resources amongst the teaching community within Irish universities and the many factors influencing their use, with a view to better understanding their adoption or rejection. Rogers’ (1995) Innovation Diffusion Theory is considered to be the most appropriate theoretical framework to use in this study as it examines the way in which individuals accept or reject certain innovations (Medlin 2001; Surry et al 2002; Sahin 2006). Perkins (2011, p.60) asserts that Rogers’ work related to the diffusion of innovations has been the foundation of research in the field for many years with many authors recognising the importance of applying ideas about diffusion to educational technology. This study reflects on the concept of innovation diffusion with respect to digital learning resource use, the changes in practice associated with their use and the key factors motivating or inhibiting their adoption.

2.1 Diffusion Theory

Diffusion theory stems from the early work of Gabriel Tarde (1843-1904) who was one of the most famous sociologists of the 19th century, and is considered to be one of the founding fathers of diffusion research (Kinnunen 1996). According to Kinnunen (1996), diffusion refers to the spreading of social or cultural properties from one society or environment to another. Tarde’s view is that people imitate beliefs and desires or motives that are transmitted from one individual to another. ‘For him diffusion of inventions- or innovations- was one of the basic explanations of social change’ (Kinnunen 1996, p. 432). In modern context, Tarde’s interpretation of ‘imitation’ could be substituted for Rogers’ (1995) idea of ‘adoption’.

Diffusion research is evident across many disciplines. The concept of diffusion is as central to the history of religion and the anthropology of culture as it is to medical epidemiology and marketing (Katz 1999). Interest in diffusion research has been increasing steadily since the 1940’s as it offers a way of describing social and cultural change. However, Katz (1999, p.145) asserts that while the number of diffusion studies continues to increase ‘the growth of appropriate theory is at a standstill’.
Surry and Farquhar (1997) suggest that the most important fact to consider when studying diffusion theory is that it is not a single, well-defined cohesive theory but an amalgamation of theories from a wide variety of disciplines. Surry and Farquhar (1997) and Katz (1999) all agree that the only researcher who has attempted to synthesize all of the disparate findings and theories related to diffusion is Everett M. Rogers (1931-2004). Rogers collated and analysed over 500 diffusion studies and produced a theory of the adoption of innovations among individuals and organizations, which he published in his seminal work: *Diffusion of Innovations* (1962). In his book, Rogers (1995) proposes that a study in the field of rural sociology conducted in 1943 by Ryan and Gross provided the genesis on modern diffusion research. Ryan and Gross (1943) used interviews with adopters of an innovation to examine a number of factors related to adoption. This interview-based methodology has prevailed as the dominant diffusion research methodology used today (Surry and Farquhar 1997).

Surry and Farquhar (1997) examine diffusion theory in relation to instructional technology and the evolution of diffusion theories that are specific to this field. According to Surry and Farquhar there are two main and opposing instructional technology related diffusion theories, namely, Systematic Change Theories and Product Utilization Theories. Systematic change theories focus on the reform and restructuring of education institutions with the help of innovative technology. These theories typically involve the adoption of a wide range of technologies and practices on a large organization scale. They go on to say that Systematic Change theories can also be referred to as Developer Based Theories that assume the best way to bring about change is to create a superior system or product.

Product Utilization Theory conversely, focuses on increasing the individual adoption and use of specific instructional technology products. Surry and Farquhar refer to Product Utilisation Theories as Adopter Based Theories which they claim are focused on the individual and interpersonal aspects of innovation diffusion.

Neither of these theories were considered for this study as the diffusion of digital learning resources is a bottom-up diffusion process and therefore the top down reform efforts prevalent in the Systematic Change Theories do not apply. Equally, this study examines the use of digital learning resources which includes a combination of media and products and is not limited to a single product. As a result Product Utilisation Theories were not considered to be relevant or suitable.
Based on prior studies in the field of technology-enhanced educational innovation, the most appropriate theory selected to frame this study was Rogers’ Innovation Diffusion Theory (1995).

2.2 Rogers’ Innovation Diffusion Theory
The process of adopting new innovations has been studied for over 40 years, with Everett Rogers’ Innovation Diffusion Theory (1995) recognised as the most widely cited author in the area of general diffusion (Surry et al 2002). According to Surry, Rogers’ theories form the basis of most studies related to adoption and diffusion. Sahin (2006) agrees, and argues that research from a variety of disciplines, including technology and education, has used his model as a framework. In fact, Medlin (2001) goes as far as saying that Rogers’ diffusion of innovations theory is the most appropriate for investigating the adoption of technology in higher education and educational environments.

Rogers (1995, pp. 5-6) defines diffusion as ‘the process by which an innovation is communicated through certain channels over time among the members of a social system’. He also maintains that diffusion is a kind of social change, ‘defined as the process by which alteration occurs in the structure and foundation of a social system.’ Ubiquitous technology is transforming formal education and causing both institutions and educators to re-evaluate traditional methods of teaching and learning. This social change brings with it many challenges with respect to both culture and pedagogy which are discussed in detail later in the chapter.

Rogers’ Innovation Diffusion theory hinges on four key elements that influence the diffusion process: the innovation itself, how information about the innovation is communicated, time, and the nature of the social system into which the innovation is being introduced (Rogers, 1995). According to Surry and Farquhar (1997) diffusion research, in its simplest form, investigates how the four major factors interact to facilitate or impede the adoption of a specific product or practice among members of a particular social group.

In addition to the four key elements influencing innovation diffusion, Rogers’ theory incorporates four widely-used models of diffusion: Innovation Decision Process; Individual Innovativeness; Rate of Adoption; and Perceived Attributes.
2.2.1 Innovation Decision Process

The innovation decision process theory states that diffusion is a process that occurs over time and can be seen as having five distinct stages. The stages in the process are Knowledge, Persuasion, Decision, Implementation, and Confirmation. According to this theory, potential adopters must first become aware of an innovation, be interested to learn more about what potential benefits it may bring to them, decide to use it, experiment with it in a real work/life context and then confirm their decision to adopt the innovation or reject it. Various social factors influence individuals as they pass through the different stages, for example; the type of communication channels utilised by a potential adopter may influence their perceptions of the innovation. Rogers (1995, p. 169) states that ‘inter-personal communication from a near-peer who is a satisfied adopter often pushes a potential adopter over the edge of decision into adoption’. On the other hand, individuals with relatively low self-efficacy could be inhibited by their lack of confidence to adopt an innovation. The trialability of an innovation is also an important attribute for potential adopters during the decision process as this gives them a chance to experiment and use the innovation as they form either a favourable or unfavourable attitude towards the innovation.

The structure of a social system, which according to Rogers, is a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal, can also facilitate or impede the diffusion of innovations.

Katz (1961) as quoted by Rogers (1995, p. 25) believes “It is as unthinkable to study diffusion without some knowledge of the social structure in which potential adopters are located as it is to study blood circulation without adequate knowledge of the veins and arteries”. The social structures surrounding educational institutions and also the academics within them, it would seem according to Rogers’ innovation diffusion theory, play a significant role in influencing the perceptions, attitudes and ultimately adoption of digital learning resources for teaching and learning.

2.2.2 Individual Innovativeness

Individuals in a social system do not all adopt an innovation at the same time (Rogers 1995, p. 252). Adopters have been categorised based on their innovativeness and the most widely used categorisation in diffusion research today proposes five types of adopters: innovators, early adopters, early majority, late majority and laggards. Each adopter category has its own characteristics particular to the individuals within that category.
Innovators are venturesome and enjoy taking risks with new things and play an important role in launching innovations into social systems.

Early adopters are the opinion leaders of a social system and are often the ‘go to’ people for advice about an innovation. They are respected by their peers, tend to make ‘judicious innovation-decisions’ and are central to the social communication networks (Rogers 1995 p. 264).

Early majority adopters take longer to deliberate over an innovation than innovators or early adopters but are the most numerous making up one-third of a social system.

The late majority are the sceptics of the social system and need to wait until an innovation has been accepted into the social norms of the system before adopting it. Like the early majority they also make up one-third of the social system.

Laggards are traditionalists and possess almost no opinion leadership. They are the last to adopt an innovation and must be certain that a new idea will not fail before they adopt.

In examining the adoption of digital resource use as an innovation in teaching and learning it is important to consider the personal characteristics of the individual and the influence that plays on the likelihood or rate of adoption.

2.2.3 Rate of Adoption
Rate of adoption is the relative speed with which an innovation is adopted by members of a social system (Rogers 1995, p. 206). Rogers asserts that there are five variables which determine the rate of adoption of innovations, namely, 1) perceived attributes of innovations, 2) type of innovation-decision, 3) communication channels, 4) nature of social system, and 5) extent of change agents’ promotion efforts.

The perceived attributes of an innovation relate to its relative advantage to the potential adopter, compatibility with systems and approaches, complexity in terms of usability, ability to trial before deciding and observability of the innovation in use.

The type of innovation decision corresponds to whether the potential adopter is making optional, collective or authority innovation decisions. Optional innovation decisions rely on the individual deciding independently to adopt or reject an innovation. Collective innovation-decisions occur when a social group such as a department decides
to adopt an innovation. Authority innovation-decision happens when an organisation or institution decides to adopt an innovation and all members are obliged to follow suit.

The communication channels used to diffuse an innovation may also influence the rate of adoption as certain innovations are better communicated through interpersonal communication networks and others through mass media channels. The nature of a social system with respect to the norms and the degree of network interconnectedness also affects an innovation’s rate of adoption.

Change agents, according to Rogers (1995), are individuals who influence innovation decisions and usually seek to obtain the adoption of new ideas often using opinion leaders within a social system to assist with this task. A change agent’s promotion efforts can impact the rate of adoption at different stages, the most crucial is getting the opinion leaders to adopt. Once this has occurred, the innovation will generally continue to spread until a critical mass is reached with little effort from the change agent.

2.2.4 Perceived Attributes
The characteristics of an innovation as perceived by the members of a social system also effect its rate of adoption. Rogers proposes the five attributes of innovations as being: relative advantage; compatibility; complexity; trialability; and observability.

Diffusion scholars, according to Rogers (1995, p. 216) have determined relative advantage to be one of the best predictors of an innovation’s rate of adoption and maintain that relative advantage indicates the benefits and costs resulting from adoption of an innovation. With reference to this study, individuals need to consider and decide whether or not the benefits they will realise through the use of digital learning resources is worth the cost of effort needed to learn how to use them.

Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters (Rogers 1995, p. 224). The more compatible an innovation is the easier it is to integrate into an individuals’ work or social practice.

Complexity is the degree to which an innovation is perceived as relatively difficult to understand or use. Rogers asserts that the complexity of an innovation negatively impacts its rate of adoption.
Trialability relates to the ability to experiment with an innovation before deciding to adopt or reject it. Rogers believes that the trialability of an innovation has a positive impact on the rate of adoption.

Observability is the degree to which the results of an innovation are visible to others. Rogers suggests that the more visible the positive results of an innovation are the more likely individuals will adopt. The difficulty however with software related innovations such as digital learning resources, is that the results are not as easily observed and often have a slower rate of adoption as a result.

Having summarised the key characteristics of Rogers Innovation Diffusion theory, it is apparent that the decision to adopt an innovation is a complex one with many influencing factors such as: the social environment, an individual’s personal characteristics, the innovation’s characteristics and the communication channels diffusing the innovation, all play a part in whether or not an idea is adopted. In some cases the decision to adopt an innovation can defy simple logic where the best products are not always the ones people want to use. As MacKenzie (1996, p. 7) writes: "Technologies . . . may be best because they have triumphed, rather than triumphing because they are best".

Surry (1997) asserts that by better understanding the multitude of factors that influence adoption of innovations such as the use of digital resources, educational researchers will be better able to explain, predict and account for the factors that impede or facilitate the diffusion of educational innovations. While the ‘diffusion of innovation is an uncertainty-reduction process’ (Rogers 1995, p. 216) one certainty remains and that is that technology's advance in the 21st century however gradual it will be within our education institutions.

2.3 The Diffusion of Digital Resource Use
This section reviews some of the key factors influencing the diffusion of digital learning resource use within education today.

2.3.1 Digital Learning Resources for Teaching
Our education systems, institutions and practices are being impacted by the technological advances experienced particularly in the last decade. The diffusion of digital learning resources amongst the teaching community has occurred to date as a result of ‘optional innovation-decisions’ which according to Rogers (1995) are
decisions made by individuals independent of the decisions made by others in the social system. In other words this has been a bottom-up diffusion of innovation. Rogers’ (1995) ‘Innovators’ category of users first identified the potential benefits to be realised from integrating digital resources within their teaching material and initiated this change in their practice. The ‘Early adopters’ soon followed experimenting with new ways of enhancing the learning experience. The diffusion of digital resources use to date has happened ad hoc as a result of the communication channels within and between the various professional and social networks of the teaching community.

Digital learning resources are one of the many types of teaching support tools that have arisen as a result of this digital revolution. This study uses the definition of digital learning resources, as proposed by Professor Rory McGreal (2007), the UNESCO/Commonwealth of Learning Chair in Open Educational Resources, which defines digital learning resources as electronic text, simulations, websites, .gif graphic images, Quicktime movies, Java applets or any other digital resource that can be used in learning. In simple terms a digital learning resource is anything that can be stored in digital format and adopted for use in learning. Digital resources can also be referred to as learning objects which according to Wiley, (2001, p. 7) are ‘any digital resource that can be reused to support learning’.

Digital learning resources form the basis for all forms of e-learning and online distance learning and encompasses such terms as reusable learning objects (RLO’s), information communication technology (ICT), technology enhanced learning, and open educational resources (OER’s) all of which centre around the support of teaching and learning through a digital medium.

The last two decades in particular have seen the emergence of digital resource use in higher education. According to an OECD study (2005b) carried out in conjunction with their Centre for Educational Research and Innovation (CERI) and the UK-based Observatory on Borderless Higher Education (OBHE), the use of ICT to enhance or support learning and teaching in education is becoming increasingly prominent in higher education. There are now many noteworthy repositories storing vast amounts of free and open digital learning material such as MIT Open Course Ware (OCW), Rice Universities Connexions, International consortium Merlot, the JISC funded repository of Jorum in the UK and the National Digital Learning Resources (NDLR) repository in
Ireland, funded by the Higher Education Authority and many more. The establishment and growth of these repositories is a reflection of the changing culture of higher education with more peer-to-peer resource sharing and cross institutional connections. Baldridge and Deal (1983) argue that to understand opportunities for change in universities, we must understand that the external environment is by far the most powerful source of internal change. Technology is changing the way we teach and learn and impacting traditional methods and mediums.

The use of digital resources in higher education to support teaching and learning is emerging within our institutions at varying paces. Even with transformative technological advances there is still an absence of a cohesive national or international policy, relating to the uptake and integration of new technologies to enhance teaching and learning practice in higher education. This apparent lack of support and strategic direction is resulting in an ad hoc approach to and adoption of digital learning resources - with some institutions embracing change and others not. Laurillard (2007) expresses some plausible explanations as to why institutions are slow to progress: the drivers behind institutions such as curriculum, funding, research and quality requirements have not changed significantly in recent years and it’s these drivers that determine the ways in which teachers and learners invest their attention and focus.

Laurillard continues by stating that education is a political activity and institution leaders need direction to be set at the national level and to be given more support for the changes they need to direct and initiate within their own institutions. According to Laurillard, education systems change slowly because of the hierarchical command-control systems that afford little power to teachers and lecturers at grassroots level to improve nature and quality of the teaching and learning process.

Technology is not only making an impact on pedagogy but also on the ICT training and support services within schools and higher education institutions. Education institutions need to be able to provide teachers with the appropriate technology infrastructure in the form of bandwidth, software licences and equipment as well as ongoing training in the use of the technology in order to effectively integrate digital learning resources into their teaching practice. The European Commission has a number of programmes in place (EC COM(2010) 245 final/2, EC COM(2011) 567 final and EC COM(2012)) to ‘promote innovation in higher education through more interactive learning
environments and strengthened knowledge-transfer infrastructure’, and to support the upgrade and availability of technology infrastructure for all citizens. The Irish Government, in line with the guidelines and recommendations for member states outlined by the commission, launched a National Digital Strategy (Department of Communications, Energy and Natural Resources 2013, p.1) summarizing the government’s plans to increase the use of digital technology and reach the ‘optimal economic and social use of the internet by Business, Government, and Individuals’. Strand 3 of the strategy relates to education and learning with the goal of putting the necessary support in place in order to utilise ICT to its full potential across the education system including the use of the internet in learning. The National Forum (2014) has also acknowledged the importance of improving digital capacity in higher education in Ireland and claims it to be a vital part in the Forum’s work plan. Particular reference is made to the importance of developing and supporting digital literacy and digital literacy skills for both teachers and students.

While some institutions and policy leaders may still be a little uncertain about the merits of using of digital learning resources it seems inevitable due to the ubiquitous nature of technology that digital learning resources will become mainstream in time and as embedded in our education systems as it has already become in our social lives.

The question may move from whether people are in fact using digital resources instead to how people are using them?

2.3.2 Open Education Resource Movement
As mentioned previously in section 2.3.1, digital learning resources include any digital object that can be used to enhance the teaching and learning experience. These resources can come in many forms and be proprietary or open. Recent years have seen the emergence of a new type of digital learning resource which is commonly referred to now as an Open Education Resource (OER). The fundamental characteristic of an OER is that they are digital, this medium facilitates the ease of dissemination, reuse and sharing of the resource among users. According to Richard Baraniuk (2008), founder of Connexions digital resource repository, the Open Educational Resources movement has the potential to greatly impact the academic world. The OER movement is based on the shared notion that knowledge should be free and open to use and reuse; that collaboration should be easier, not harder; that people should receive credit and kudos for contributing to education and research. The creation, provision, sharing and reuse of digital learning resources is at the heart of this movement.
The term Open Educational Resource (OER) first came into use at a UNESCO conference in 2002 when participants defined OERs as:

*technology-enabled, open provision of educational resources for consultation, use and adaptation by a community of users for non-commercial purposes*. They are typically made freely available over the Web or the Internet. Their principal use is by teachers and educational institutions support course development, but they can also be used directly by students. Open Educational Resources include learning objects such as lecture material, references and readings, simulations, experiments and demonstrations, as well as syllabi, curricula and teachers’ guides.

*(UNESCO, 2002)*

Currently the most used definition of OER is: “digitised materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research” OECD (2007a). There is still some ambiguity around the concept of ‘open’, and Sir John Daniel former President and CEO of Commonwealth of Learning, speaks of ‘the 4 As: accessible, appropriate, accredited, affordable’ (Downes, 2007) while Downes argues that while Open may imply ‘without cost’ it does not mean ‘without conditions’.

The OER movement is significant and relevant to this study as the use of digital learning resources is its central focus. The OER movement is heightening the awareness of the use of digital learning resources within an educational context and contributes greatly to the availability, diffusion and support of digital learning on a global scale. (Daniel 2011; Baraniuk 2012; Papanno 2012).

The OER movement emerged around 2002 when MIT began to make their course material freely available online. A recent report (Wiley 2006a) produced for OECD clearly shows the extent to which educational institutions are embracing digital technologies for teaching and learning. In this report, the OECD identified over 3,000 open courseware courses available from over 300 universities worldwide. Repositories such as MERLOT, Connexions, Open Learn and others, comprise hundreds of thousands of digitised pieces of content in many forms all freely available to any and all to use to enhance their teaching and learning (OECD 2007a). At the end of 2011, the Open Courseware Consortium hosted 6,500 different course modules from 65 different sources. The registry of Open Access Repositories at the University of Southampton, recorded over 2,700 separate open access repositories globally at the end of 2011. The
ten largest repositories on this list host in excess of 15 million records between them. Source Forge, a global repository of open-source software, lists over 1,300 different software applications under the heading of ‘Education’.

Wiley (2006a) states that approximately 175 universities worldwide currently participate in programs through which they provide free and open access to the content of over 2,000 university courses; MIT Open Course Ware provides the majority of these courses, but the move to the open sharing of university courses is growing at an amazing rate.

According to Hylén (2006b) the academic community is gradually embracing the notion of sharing despite the fact that intellectual property is generally perceived as a competitive advantage in higher education institutions. Brown and Adler (2008) support Hylén’s view and claim that the Internet has fostered a new culture of sharing, one in which content is freely contributed and distributed with few restrictions. They go on to say that improved access to content through emerging Web 2.0 technologies is facilitating this change, largely being driven by the students, which is apparent through the mass participation in online social media forums (Facebook, Myspace etc.) and global networking through online games.

Brown and Adler (2008) also claim that academics are now moving towards a new phase of collaborative construction, extension, and revision of course materials across disciplines which have been a valued common practice in research over centuries and is finally gaining momentum in teaching and learning.

Sir John Daniel (2012), speaking at the Launch of the UNESCO Open Educational Resources Platform, said ‘Educators have long desired to share teaching and learning materials but until recently the ideal of sharing has encountered three obstacles; First, teachers and institutions often suffer from the ‘not-invented-here’ syndrome. Second, until materials development went digital sharing was tiresome. Third, intellectual property rights were problematic’. According to Daniel, OERs remove these obstacles as the digital nature of them, make them easy to exchange and adapt. Daniel goes on to suggest that open licences for sharing OERs allow educators and students to proceed with confidence both to their distribution and adaption.

‘The OER movement has the potential to have a truly transformative effect on the way education is governed, delivered and experienced’. (Windle et al. 2010)
According Bradwell (2009) providing free access to a high volume of content has the potential to increase the profile of the quality of the institution’s work and is a valuable marketing tool. Innovative institutions can see that technology can help universities move from where they are now to where they need to be. However, Bradwell goes on to say that it is not enough to simply use the tools technology provide, higher education institutions must work towards instilling a culture of openness, commit to long term strategies for sharing resources and invest in the management and curatorship of knowledge and content. Universities of the future will need to offer new kinds of courses, accreditation and affiliation that use informal learning and research networks and connect them to the formal system. Bradwell continues this argument saying that knowledge is no longer restricted within the boundaries of universities and higher education facilities instead they are becoming partners in learning and research rather than sole providers and this is the way in which universities are becoming ‘edgeless’.

With respect to Rogers’ Innovation Diffusion Theory we are currently living through and experiencing the impact of this significant social change that has come upon us as a result of growing access to technological innovations. At a macro level, the diffusion of the concept of digital learning and the use of open educational resources within educational institutions has moved through the knowledge stage of the innovation decision process and would appear to be at varying stages between persuasion and implementation depending on the ‘innovativeness’ of the institution. Innovators and early adopters such as MIT, USU, Rice University (Connexions) and Stanford (Udacity), were soon followed by the early majority like Harvard (edX), Open University (Open Learn), Oxford University, Trinity College Dublin and the hundreds more providing access to lectures on iTunes U.

Social conditions are becoming more supportive of digital resource use and online learning strategies, which is evident through the numerous European and global programmes and initiatives in place. Countries around the world are developing and implementing digital strategies to ensure their citizens have access to the technology skills and infrastructure needed to function prosperously and efficiently in the knowledge society.

Rogers asserts that the diffusion of an innovation is an uncertainty-reduction process. Institutions must now determine the perceived attributes and advantages of digital learning and what benefits they can realise from adopting its use. One thing is certain
however and that is with the rapid pace of change in the accessibility and delivery of higher education, time is of the essence.

2.3.2.1 Quality
One characteristic of the openness of OER which may be impeding the diffusion of digital learning resources is the issue of quality. The question of quality with respect to the multitude of OERs available today is multi-layered. Should OER repositories have quality review systems? Should the resources be peer reviewed? Would a quality review system negatively or positively impact contributions? Who determines the quality benchmark? Does the application of a quality review process contradict the spirit of open sharing? These questions and more are currently being debated within the OER movement (Browne et al. 2010; Clements and Pawlowski 2012).

One side of the argument believes that the introduction of a quality management process could act as a deterrent for contributors. There is a concern that some academics might be less inclined to contribute resource material if they felt there was a chance it would be rejected.

In contrast to this argument, Dundon et al. (2012) found significant support for a quality management process in their study of shared repositories. This suggests that certainly from a user’s perspective, having a quality review process protects the standard and quality of the resources stored within the repository.

Another study contending the benefit of quality control, found that people are more inclined to use shared repositories of knowledge and information ‘if they trust it to be a course of reliable and objective information’ (Ardichvili et al. 2003).

Quality remains an ongoing concern with Andrade et al. (2011) listing in the OPAL report, ‘lack of quality or fitness of OER’ as one of the main barriers to be overcome if educational institutions are to encourage the use of OER. Hylén et al. (2012) also mentions the poor quality of OER as a significant barrier to OER diffusion.

2.4 Digital resource users
It is evident from the literature that there is a growing interest in and availability of digital learning resources amongst both the users and contributors. This section focuses on the different types of users and examines their characteristics, the types of digital resources they like to use and why they choose to use them.
Users can be differentiated by a broad range of characteristics which influence whether they use digital resources at all, the purpose and extent of use and the type of resources used. As a result, it is difficult to collectively classify digital resource users. In very broad terms, users could be defined as those that use digital resources to teach and those that use them to learn. The users referenced in this study concentrates mainly on those that use digital resources to teach.

While the growing use of digital resources is becoming apparent, there is much still to learn about the users of digital learning resources. Harley et al. (2006) conducted an in-depth study in America on the use and users of digital learning resources and determined that there was very limited user research that could apply to the vast array of resources in any general sense, as the studies were fragmented by purpose, method and context. When defining users of digital resources Harley (2008, p. 201) draws attention to the broad spectrum of users which could be categorised by proficiency, ranging from “the non-user to the inexperienced-novice user, to the highly proficient and advanced user of digital learning resources.” However, each of the user types contains subcategories; for example, the non-user could be defined as those who are passionately opposed to the use of digital resources for pedagogical reasons or alternatively, non-users could be enthusiasts who simply don’t have time to learn about the technologies or how to use them in their teaching.

Harley considers that individual opinions and attitudes, skill level and educational goals have a greater effect on a person’s total level of digital resource use than do institutions, disciplinary or demographic characteristics.

2.4.1 Teachers as users

This study focuses primarily on the use of digital resources from a teacher’s perspective and discusses their preferences and characteristics.

The nature of the internet and the digital resources that can be accessed via the internet accommodates the exchange and sharing of content. The difficulty however is the lack of traceability once the resource has been downloaded. Brown and Adler (2008) believes that the ‘openness’ of digital learning material found online allows people to download, reuse or repurpose resources with very little control or visibility of who is downloading or trace on how they are using the resources. The little user data available through the research to date seems to centre on the users of particular repositories and collections of resources (Carson 2005; NDLR 2013) as the user data is more readily
available through member registrations. However, it is unclear as to how universal the findings are in relation to the characteristics of these users. One such study was conducted by Carson (2005) on the traffic to the MIT Open CourseWare (OCW) website. These findings showed that the majority (36%) of OCW website users came from North America. A significant (48%) of the traffic were typically self-learners with a bachelor’s or master’s degree, followed by students (31%), and educators (15%). This study is however limited as technology can only track the location of the traffic to the website, once the resources are downloaded the trace ends. Some repositories encourage their users to input comments relating to the pedagogic context in which the resources could be used. This information is of great value as it not only informs other potential users how they might use the resource for their teaching but also provides valuable user data on how and for what purposes the resources are being used. More and more studies (OECD 2007b, Higher Education Authority 2009, Andrade et al. (2011) are now focussing on the use and impact of digital resources, collecting evidence of use and how they are influencing teaching and learning practice. Andrade et al. (2011) affirm in the OPAL report that the focus up to 2011 has been on populating digital repositories in order to collect and provide a critical mass of learning materials while the new focus is now on users and impact.

The ‘contributor’ is yet another category of digital resource user, who not only accesses and reuses resources, but also creates and shares their digital resources with the wider online community. Some repositories request their users to register before they can access or contribute to the repository and the data collected can provide an insight into the general characteristics of its users. Connexions digital learning resource repository, which was launched in 1999 at Rice University in the USA, invites worldwide communities of authors to create, expand, revise and maintain the vast collection of its resources. Founder of Connexions Richard Baraniuk (2008) describes some of the key characteristics of the Connexions user, and states that the primary motive for the majority of academics who contribute resources to their repository is to have the “greatest possible impact on scholars, practitioners and students within their discipline through the widespread dissemination and use of their educational materials.” While some academics enjoy contributing their teaching material, studies show that more people are likely to reuse resources from a repository than contribute to them (Nielsen 2006; Davis et al 2010). This is a major issue when considering the long-term

2 cnx.org and www.merlot.org
sustainability of digital learning resource repositories. Repositories need new and repurposed content to be frequently deposited in order to maintain the interest of its users. According to Davis (2009, p. 10) users of digital resources are hesitant to transition from being ‘consumers of other people’s resources to becoming active participants and providers themselves’. While Nielson (2006) believes that 90 % of Web 2.0 users are lurkers, 9 % contribute occasionally, and only 1% contributes heavily. Many studies have been conducted on the motivations and inhibitors surrounding the contribution of digital resources to repositories (Harley 2006; Dundon 2012; Masterman and Wild 2011) to understand why some people do or don not contribute. This question is explored in more detail later on in this chapter.

The rich user data identifying the pedagogic framework or context in which the resources are used and the impact they have on teaching and learning is where the interest lies currently (Andrade et al. 2011). The European Commission through its Centre for Educational Research and Innovation, published studies in 2009 on the use of digital resources within Scandinavian countries, with the aim of reviewing and evaluating the process of innovation in initiatives designed to promote the development, distribution and use of digital learning resources for the education sector. The studies found in general that the use of resources was variable with users engaging more with the use of digital resources when they were incentivised.

There was no indication of how the resources are being used nor the degree of innovation involved. When the OECD embarked on conducting a study on E-Learning in Tertiary Education (2005b) they found that ‘practical and experimental knowledge of e-learning is too often scattered within and across institutions so that even successful practices and interesting experiences have limited impact and visibility’. The open nature of the internet makes it hard to track and measure the extent of use and reuse of resources as once they are downloaded they can be passed offline amongst academics and students without a trace. White and Manton (2011, p. 5) likened the reuse of digital resources across an institution to an iceberg. ‘Above the surface is a small amount of highly visible licensed resources that officially bears the name of the institution and below the surface, often invisible beyond a specific course, is a much greater volume of reuse of other digital resources by staff and students’. Successful case studies of digital resources in action remain unpublished and the benefits of use are being passed on anecdotally from peer-to-peer. More research and evidence on the pedagogic value of using digital resources is needed in order to gain a critical mass of users within the
education sector. Rogers’ Innovation Diffusion Theory supports this method and affirms that observability of positive results and perceived attributes and advantages can accelerate the rate of adoption.

One such publication assisting with the diffusion of digital resource use titled *The Digital Learning Revolution in Ireland* (Marcus-Quinn *et al.* 2012) is a collection of 16 case studies highlighting the positive impact of digital resource use in action in the classrooms of higher education institutions in Ireland. The case studies cross a variety of subject disciplines from 18\(^{th}\) century literature to clinical infection prevention tutorials and use a diverse range of digital learning resources. Academics from 12 Higher Education Authority (HEA)-funded higher education institutions contributed to the publication describing the types of resources they are using, how they are using them and the impact they are having on their teaching practice. From an Irish perspective this volume provides a unique insight into the challenges and rewards of using digital learning resources to enhance teaching.

The types of digital learning resources used by the authors of this book included video, interactive quizzes, e-books and simulations, many of which were made available through the institutions local virtual learning environment (VLE). Each of the case studies reported on positive feedback received by their students and others (Griffin and Diggins, 2012, p. 230; Kingston, 2012, p. 130) also evaluated feedback from the lecturers which showed great enthusiasm for the value which these resources could bring to the learning experience. Some case studies even reported an improvement in student results and general understanding of course material (Nash *et al.* 2012, p. 9 and Robinson *et al.* 2012, p. 181). The publication of these case studies help to inform other lecturers who may be teaching similar subjects of the potential benefits of using digital learning resources. This type of evidence is critical to the diffusion process as the information is being communicated to potential users by their academic peers within the higher education social system. According to Rogers the early adopters within a social system will influence their peers and have the potential to increase the rate of adoption of innovations which in this case is the use of digital learning resources.

Over the last decade in particular the extent of digital resource use has become more apparent which is reflected in the number of digital repositories available, developed and supported largely by the higher education community around the world, including:

- Open education Europa  
  [http://openeducationeuropa.eu/](http://openeducationeuropa.eu/)
In addition to the teaching and research repositories, other forms of digital learning resources have emerged giving users additional and flexible learning options. These learning portals are now commonly referred to as MOOC’s as they allow users to avail of Massive Open Online Courses. Some of these include:

- Udacity  
  https://www.udacity.com
- Futurelearn  
  https://www.futurelearn.com/
- edX  
  https://www.edx.org/
- Coursera  
  https://www.coursera.org
- Open Yale  
  http://oyc.yale.edu/
- iTunes U  
- Alison  
  http://openeducationeuropa.eu/

While educators are using these learning portals to acquire teaching material the majority of users engaging with these resources are learners. Wiley (2006a, p. 4) claims that while UNESCO states that teachers are the primary audience of open educational resources and that students are secondary users, in practice learners make up the great majority of users. MIT OCW, one of the most popular collections of open educational resources, reports that only 16% of its users are educators and the majorities of users are students and faculty who use the site to support their study and teaching (Carson 2006; Friesen 2009). In a more recent report MIT OCW (2011) have found that educators who use their site do so mostly to enhance their personal knowledge but also gain benefit in finding reference material for students and learning new teaching methods. It is also reported that 16% of educators have reused content from the site and 33% expect to do so in the future. Student uses are mainly for complementing a course or enhancing their personal knowledge and self-learners use the site to explore interests outside of their
professional field, to help them plan further study and to keep them current in their field.

### 2.4.2 Learners as users

According to many schools of thought, the Net-Generation of learners have expectations that are not being met within the traditional model of mainstream higher education (Castle and McGuire, 2010; Prensky 2001). Irvine et al. (2013) assert that higher education institutions should realign themselves to keep relevant to the 21st century learner and that multi-access learning could facilitate this transition. They affirm that a multi-access framework for learner choice would provide traditional higher education institutions with a means to support a variety of learners and provide the opportunity to "open" their on-campus courses to the MOOC phenomenon (Irvine et al. 2013, p. 174).

Baranuik (2012) believes the canonical success story of a MOOC is the 2011 Stanford University Artificial Intelligence course that enrolled over 160,000 students from 190 different countries. Over 23,000 students completed the course; volunteers translated it into 44 languages and thousands of study groups formed spontaneously via social networking sites, locally and globally. Whether it is the flexibility and control that learners have over their learning or the affordability or in some cases free access to these courses that drives the great numbers of learners to register for MOOC’s – there’s no denying their popularity. Coursera (2013) are now partnering with over 100 institutions, offering 500 courses to over 5 million learners. Alison also claims to have 500 courses available with over 2 million users and 300,000 graduates’ worldwide (EUR Ireland 2013). iTunes U reported in 2010 that they have had over 300 million downloads from their collection of over 350,000 files which consists of digital material contributed by over 800 universities. The number of learners using digital resources as indicated by these figures demonstrates the ubiquitous nature of digital resources for the 21st century learner.

While digital technologies are pervasive in today’s society (JISC 2009a) a digital divide persists in several dimensions: in access to, and engagement with, technology; the capability of the technology; and in individual competence. According to recent figures published by the Irish Higher Education Authority EU Ireland website (EUR Ireland 2013) between 50% and 80% of students in EU countries never use digital textbooks, exercise software, broadcasts/podcasts, simulations or learning games to enhance their learning. Educators need to be mindful of access issues to technology to avoid scenarios...
where those from a better socio-economic environment find it easier to benefit from technologies, and thus increase their advantage and privileged situation in comparison to those who lack such an accompanying capital (OECD 2007b).

**2.4.3 How do users find appropriate digital resources?**

With the enormous volumes of digital learning resources available on the internet users need to navigate this vast online library of material to find what they are looking for. This in itself is a skill in many respects as content needs to be reviewed, verified and validated before determining its value (Oblinger 2008).

Despite the increase in recent awareness-generating programmes with regards to Open Education Resources especially, few users tend to think of digital repositories as their first point of call. Research shows that the most common way of beginning a search for digital learning resources is through a search engine the most common being Google (Hanson and Carlson 2005; Davis *et al.* 2010; Richter and Ehlers 2010; Masterman and Wild 2011). Davis *et al.* (2009, p.1) claim to have significant evidence that teachers frequently use search engines to identify suitable resources on the Web, which they then cut and paste and mash-up in numerous ways to create new, tailor-made resources. The MIT OCW (2011) summary report supports this idea and states that the majority of their site visits most often begin through search engine referrals.

McMartin *et al.* (2008) also found Google search engine to be the predominant method of searching for digital materials to use in class and states that users often reported starting with Google to find materials they already knew to exist and suggests that Google itself has become a trusted source of information retrieval.

While search engines may appear to be the first port of call when initiating a search for digital learning resources Hanson and Carlson report that it’s not always satisfactory as the results can be too broad and can require a lot of filtering before pertinent content is retrieved. Masterman and Wild in their study (2011) on the impact of Open Educational Resources (OER) identified challenges around the discoverability of digital resources. These included the low volume of resources available in certain disciplines, poorly indexed material, inadequate search engines, the requirement to register with a site or download an application in order to retrieve or run a resource, and unreliable hardware or software on the hosting site. They also found that when looking for factual content lecturers will tend to go to other reputable university websites, such as MIT, or public institutions and repositories to ensure the quality of content. Provenance is a key
influencing factor for lecturers especially when searching and selecting digital resources.

Green (2006) noted that in addition to search engine searches, faculty use digital images primarily from their own or others’ personal collections. With respect to digital images Green found that over 90% of users within Liberal Arts Institutions in the US use their own personal collections; this is the source most “always” used. McMartin et al. (2008) similarly noted in their study that users rely more heavily on trusted sources and personal networks for finding materials than they do on educational digital libraries or general web browsing. Word of mouth is not to be underestimated within the education social system and Masterman and Wild (2011, p. 19) report that teachers try to locate resources they can trust through peer or community recommendations and some act as a gateway for others through circulating useful information on where to find digital learning resources to their colleagues. In an evaluation of MIT OCW site Carson (2006) reports that significant traffic generated to the website comes from learners referring each other through social bookmarking sites such as stumbleupon.com, digg.com, fatwallet.com and del.icio.us and informal learning sites including kaifulee.com, slashdot.org, linuxforum.net, and others demonstrating the importance of informal social networks in the diffusion of information.

We are still in the early stages of adopting digital resources as part of teaching and learning practices and as a result we have yet to reach a critical mass of resources in many disciplines. White and Manton (2011, p.14) reported that finding ‘the hoped-for volume of suitable online resources to support their teaching’ still challenges academics. Furthermore the repositories that are available are contributed to on a voluntary basis and are governed in many cases with limited funding which can impact the technical capabilities available. These limitations need to be addressed and imbedded into international strategic plans for higher education supporting the improvement of discoverability of digital learning resources.

2.4.4 What types of resources do they use?
As digital technology becomes more pervasive within our educational systems the use of some form of digital learning resource becomes more likely. It has become a standard approach, for instance, for many lecturers to use PowerPoint presentations when giving their lectures, use their local Virtual Learning Environment (VLE) to provide access to electronic documents such as MS Word or Adobe PDF and to recommend online reading lists. Others will integrate digital images, simulations, audio or video clips into
their course material or create online quizzes as revision and assessment tools. These are just some of the many ways in which digital learning resources can and are being used for teaching and learning. Masterman and Wild (2011) report that teachers tend to use digital learning resources both as enhancements to their core teaching material and as supplementary resources for students to access and use in their own time.

The use of Microsoft PowerPoint presentation software has become for many lecturers a standard teaching tool. According to recent figures Microsoft PowerPoint has over 95% share of the global presentation software market; more than 500 million people are using PowerPoint presentations worldwide with over 6 million teachers using it for classroom lectures (PowerPoint Info 2012). Similarly MS Windows is the standard desktop operating system supported by educational institutions running standard MS software products making desktop publishing the norm. Davis et al. (2009) support this claim and found in their study that PowerPoint slides and PDF files were the most commonly shared files by lecturers. According to Wiley (2006a) textual content is by far the most frequently shared type of content in current open educational resource collections. Wiley goes on to say that collections with large amounts of scientific or mathematical content tend to favour PDF because of its ease of publishing.

MIT OCW site reported (Carson, 2006) that visitors most often cited lecture notes (66%) and full text readings (47%) as their preferred type of digital resource to use from the site. McMartin et al. (2008) found in their study that textual content, in the form of scholarly articles, were the most commonly used digital resource which they tended to use for the purposes of professional development. The use of electronic documents has become a universal mode of communication to such a degree that it is nearly overlooked as a digital learning resource per se, and its use is presumed to form part of all current teaching and learning practice in the developed world.

Another very commonly used type of digital learning resource is images (Green 2006; Harley et al. 2006; McMartin et al. 2008; Richter and Ehlers 2010; Masterman and Wild 2011). Richter and Ehlers (2010) claim that teachers mainly use pictures and movies to illustrate or enhance their lectures. They also note the importance of not labelling or including and textual content within the image as this renders it in many cases unusable to others. Masterman and Wild found that the granularity of digital resources influenced their usability and lecturers looked for images and visual aids that
they could incorporate easily into their learning material ‘as is’ and without any modification.

Other types of digital learning resources growing in popularity and reuse seem to centre on those that the majority of users find time-consuming to produce or which they may not have the relevant skills to produce, such as diagrams, videos and multimedia (White and Manton 2011). The use of video as a learning resource has grown exponentially in the last decade. One recent report, funded in the US (Copyright Clearance Centre 2009), found that educational use of video on campus is accelerating rapidly in departments across all disciplines—from arts, humanities, and sciences to professional and vocational curricula and is expected to grow significantly in the future. Video lectures were reported to be the third most valuable resource on the MIT OCW site (Carson 2006) with increasing numbers of courses offering video lectures online. Innovators such as the Khan Academy3 demonstrated the power and effectiveness of short video clips for explaining difficult mathematical concepts and have set the benchmark for others to follow. Founded in 2008, the Khan Academy boasts over 10 million visitors per month, 200,000 of which are educators. It has delivered over 347 million lessons using their vast bank of instructional videos.

Their formula of each video lasting from seven to twelve minutes is one which other MOOCs are now following.

You Tube is another website heavily used by students and educators alike and offers access to an extensive selection of educational video channels aimed at primary, secondary, tertiary and lifelong learners. Recent statistics claim that You Tube4 has more than 1 billion unique users each month with over 6 billion hours of video watched each month which has increased by 50% in the last year and the number of daily subscriptions is four times more than last years’ figures.

One of the greatest attributes of video is that it has the advantage of contextualising theories and concepts in real life scenarios and now with improved broadband access and speed can be easily accessed from home, work or on the move. Costly field trips can now be experienced online, online tutorials and lectures can be revisited and viewed at the convenience and pace of the user, up to date medical case studies methods can be viewed and shared in an instant around the world. Masterman and Wild (2011) support

3 https://www.khanacademy.org/
4 http://www.youtube.com/yt/press/
this opinion saying that the perceived advantages of using rich media resources, such as video, helps students to visualise and grasp difficult concepts, and to practise skills in their own time. They add however, that audio and visual media should be accompanied by transcriptions to aid selection and evaluation.

Simulations are another form of digital learning resource which can bring traditionally inaccessible learning scenarios to the learner such as virtual chemistry labs and experiments. The development of simulations however requires a higher skill level than for instance recording a video or audio clip and as a result the volume of such resources are not as comprehensive as other types of resources (Wiley 2006a). McMartin et al. (2008) also noted that online simulations and animations were used the least by their respondents.

Web 2.0 technologies can also be used to generate digital learning resources and more and more courses are using wikis, blogs and social networking and to a lesser extent immersive technologies like Second Life to enhance the learning experience (JISC 2009a). According to the Higher Education in a Web 2.0 World report, Web 2.0 enables learners to use digital learning resources and also create their own.

Blogs are used as reflective journals; Wikis are used for group activities to create content for projects and other group assessments; Social Bookmarking sites are used to create recommended reading lists and links to related information; Social networking sites can be used to host group discussions and for answering queries; and Immersive technologies are used for role playing especially in professional courses in the social sciences, medicine and healthcare.

Teachers and students also value resources that are up to date in relation to current affairs or to current academic research (Masterman and Wild 2011). The topicality of content is key for certain disciplines and the use of news and other websites facilitates ease of access to live issues and developments as they unfold or in the case of academic research are published online.

In some instances, students and educators driven by different needs value different types of digital resources. Carson (2006, p.35) describes how ‘educators exhibit markedly different materials preferences than students and self-learners, expressing lower value for lecture videos and higher emphasis on syllabi’. Learning activities such as exams and solutions, projects and assignments, documenting how students developed or
demonstrated understanding of the subject matter were also rated as valuable resources to educators. Hanson and Carlson (2005) in their study on teachers’ use of digital technologies in STEM teaching found that teachers would like more lesson plans with guidelines as to how the resources can be used within the class, to be available as digital resources.

The types of digital resources that educators like to use are generally those that they can easily integrate into their own course material. MIT OCW users have reported that a significant number (48%) combine OCW materials with other content; 36% adapt course syllabi and 28% adapt assignments or exams supporting Davis et al’s (2010) idea of content ‘mash up’. In Carson’s MIT OCW evaluation report (2006) he noted that educators most frequently report making adjustments to OCW content to account for differences between the academic level of their students and the MIT student population. Other reasons mentioned were to update the content, make technical changes to the file formats or to adjust the content to suit cultural differences.

Within the Irish context, the predominant type of digital resource found and shared within the National Digital Learning Resource repository is textual content in the form of PDF, MS Word and MS PowerPoint slides (NDLR 2013).

In response to the growing demand of video resources the NDLR introduced a Vimeo channel5 in 2010 where lecturers could upload their video lectures and resources. The NDLR Vimeo channel currently comprises over 400 video presentations. While an analysis of the trend in digital resource type development was never formally undertaken by the NDLR, anecdotal evidence based on the hundreds of Local Innovation Projects (NDLR 2011b; NDLR 2012b) and the 34 national Learning Innovative Community Supported projects (NDLR 2011c; NDLR 2012c), and joint editorship of the proceedings from the NDLR Symposium 2012: The Digital Learning Revolution in Ireland, has revealed a growing interest and spread in the use of digital learning resources in general with particular preference towards video based instruction. (NDLR 2011b; NDLR 2011c; NDLR 2012b; NDLR 2012c).

However, irrespective of the types of digital learning resources being used, it is worth reiterating that these and all resources are best used by teachers and learners alike when integrated within a mode of learning specifically suited to the subject. It is not necessarily what you use, but how you use it.

5 http://vimeo.com/channels/ndlr
2.4.5 Disciplinary differences in digital resource use

Previous research has identified that disciplinary differences influence pedagogy and the way in which work is organised (Becher 1994; Smeby 1996; Neumann 2001). Becher (1994) describes academic disciplines as being similar to tribes each with their own ‘distinct language or at least a distinct dialect and a variety of symbolic ways of demonstrating its apartness from others’ while living within a common university culture. Many studies refer to Biglan’s (1973) categorisation of disciplines which he labels as hard pure, soft pure, hard applied and soft applied which relate to natural sciences, the humanities and social sciences, the science-based professions and the social professions respectively. Building on Becher’s research, Smeby (1996) discovered that significant differences in faculty member’s use of time for teaching, preparation and the distribution of time between types of instruction is greatly influenced and sometimes determined by their particular discipline. In general Smeby suggests that hard fields place a greater emphasis on the student research experience while soft fields are more concerned with the overall growth and development of the student, and focus on discussion, oral and written communication skills.

Citing Ballantyne et al. (1999), Neumann (2001) states that while the lecture method is the most common method of teaching across all disciplines, the approach and time spent on teaching varies greatly between the disciplines. For instance, academics in the humanities spend the most time on lectures, seminars and tutorials while academics in the natural sciences, technology, engineering and medicine spend most time on laboratory teaching, exercises and field trips and academics in technological disciplines spend most time on lectures and little on seminars (Neumann 2001; Smeby 1996).

Disciplinary differences also pervade research activities and influence academics’ commitment to research which is apparent through the number of journal articles, monographs, and technical reports that they publish and the number of dissertations that they sponsor (Biglan 1973). The rate of publication and the level of interest varies greatly between disciplines and are dependent upon disciplinary conventions, reward systems, and the practice of peer review (Harley et al 2010). The recent emergence of the Open Access (OA) movement, promoting and supporting the open and free publication of academic literature, has further emphasised the differences in attitudes and behaviour between disciplines with respect to research and scholarly work (Meier zu Verl and Horstmann 2011). In their study of Subject-Specific Requirements for Open Access Infrastructure, Meier zu Verl and Horstmann assert that OA is disrupting
the current system of publication by providing faster and easier access to the
distribution of knowledge and assisting in the development of academics’ international
reputations. They found that OA to digital literature has been accepted and adopted
more in certain disciplines like natural sciences, while OA in the humanities or social
sciences is not equivalently established. McCracken (2006) found that authors of
physics journals are particularly receptive to open licensing models in contrast to other
disciplines such as chemistry which reports a greater reluctance on the part of their
authors.

With the growth of the internet and increased practice of technology-enhanced learning,
more researchers are turning their attention to the impact of disciplinary differences
with respect to the use of digital learning resources both open and closed (White and
Liccardi 2006; Kemp and Jones 2007; Smith et al. 2008). Kemp and Jones (2007)
believe that the way in which academics use, or in fact whether they use, digital
resources at all, is influenced to a degree by the disciplines and subject areas they teach,
yet they emphasise that more research is needed to explore the degree to which
disciplinary and subject differences impact the use of digital resources.

In general, the findings from earlier studies on disciplinary differences (Becher 1994;
Smeby 1996) appear to carry over into the use of digital resources within varying
disciplines. Kemp and Jones (2007) found that the divide between hard and soft
disciplines is persistent in the use of digital resources. They found that hard subject
areas such as physics and engineering display a distinctly different relationship to
digital resources based on the need for mathematical skills and understanding of
difficult concepts within these subjects. In physics, engineering and mathematics the use
of digital resources was closely linked to the use of specialist software, and digital
resources such as images, animations and simulations were commonly used in these
subjects in particular Biological Sciences. Another difference found between the hard
and soft disciplines is that students of mathematics and science based subjects were not
directed or encouraged to use journal articles until the final stages of their
undergraduate programme. In contrast, social science and arts students were more
likely to use journals and e-journals throughout their degree.

Kemp and Jones report that the predominant type of digital resource used by teachers
within soft subject areas such as Politics, Languages and Applied Sciences are web
based materials. These subjects need access to the most current up-to-date content often
sourced from government or specific agency websites. Some of the Humanities, such as Languages, often need to access news media websites and local language newspapers online. They also noted a distinct difference between the hard sciences and soft disciplines such as arts, humanities and social sciences but contrary to Becher and Smeby’s findings discovered the division between pure and applied subjects to be less in evidence in relation to digital resources.

One common interest, which Kemp and Jones found, across all disciplines was the use of digital searches for materials especially in the subjects of History and Law where large databases of non-copyright material are available for teaching. Music, however, was found to be constrained by copyright restrictions from using large amounts of available digital material for teaching.

Since the turn of the century, more and more researchers are highlighting the importance of disciplinary difference with respect to designing digital resources (White and Liccardi 2006; Smith et al 2008).

White and Liccardi discovered, in line with Smebys’ findings (1996), that students of hard subject areas value e-learning methods that reinforce facts, principles and concepts, while students in soft subject areas value methods that support the development of argumentation skills and critical thinking. More recently, Smith et al. (2008) conducted a comprehensive study at a large metropolitan university in the US over five years and determined that e-learning in pure disciplines has become more commoditized, while e-learning in applied disciplines has become more diversified and more oriented to community practice. This study also revealed that the type of digital learning tools used varied significantly between disciplines particularly for assessment tools. Hard-pure courses used test tools more often than the soft-pure courses while documents and Dropbox tools along with messaging and email tools were used more in applied courses than in pure courses.

Smith et al. (2008) caution e-learning developers and educators to remember that each discipline has different types of content, with different pedagogical approaches and therefore the e-learning solutions and instructional design needs to be different to meet these needs successfully. According to an OECD report on e-learning in tertiary education (OECD 2005a), the intensity of online learning varies significantly across disciplines with IT and business/management identified as the most commonly cited disciplines that make significant use of some form of e-learning. Results also showed
that institutions had differing views on the suitability of e-learning for all academic users. Similarly Smith et al. (2008) pose the suggestion that e-learning may not be suited to all subjects and that certain disciplines may work more gracefully with the current digital learning tools available than others. Perhaps it is still too early to tell.

2.5 Motivations and Barriers to the Diffusion of Digital Resources

The adoption of technology-enhanced learning, in terms of the use of digital learning resources and tools, is happening at varying speeds and to a varying extent throughout all levels of education. This section reviews the contributing factors to this disparity of adoption. It highlights and discusses the motivations and barriers to using digital learning resources from a teachers’ perspective with reference to Rogers’ Innovation Diffusion Theory.

Ryan and Deci (2000) say that ‘to be motivated means to be moved to do something’, it is a conscious effort to be ‘activated toward an end’. However, people not only have varying levels of motivation but also differing orientations of motivation in terms of their type of motivation. A basic distinction between types of motivation is the difference between intrinsic and extrinsic motivation. People who are intrinsically motivated perform an action because it is inherently interesting or enjoyable while those who are extrinsically motivated perform an action because it leads to a separable outcome (Ryan and Deci 2000).

Rogers (1995) states that the innovation decision process comprises five distinct stages, namely, Knowledge, Persuasion, Decision, Implementation, and Confirmation. During the decision process, individuals make countless decisions. Potential adopters must first be motivated to learn more about the perceived attributes of an innovation, such as digital learning resources, before deciding to experiment with them in a real work/life context. Subsequently, there is the decision of whether or not to continue using and integrating digital resources into their teaching practice and deciding if the expected value of use is worthwhile, in exchange for the effort required. Rogers (1995) emphasises the importance of potential adopters believing they can use an innovation without too much difficulty and observing the impact of use within their social network of peers. The decisions that potential adopters make during this decision process are influenced by a myriad of environmental factors. These factors include the individuals’ personal interests, career goals, social network of peers, work culture and environment. Medlin (2001, p. 28), asserts that motivation of university faculty varies with different
personal goals, with professorial ranks, and with the type of institution in which they are employed.

She states that faculty at large research-oriented universities generally have different career goals and values than faculty at teaching-oriented universities and that associate professors have more short-term priorities such as publishing or tenure pressures, whereas full professors’ work encompasses consulting, entrepreneurial endeavours, advising, and possible increased involvement in administration. She goes on to mention how institutional culture such as its value, norms and reward structure can also influence in what way and to what extent faculty are motivated.

The use of digital resources within education is not prescribed nor advised which provides teachers with the freedom of choice as to whether or not they wish to use them. Rogers (1995) describes this type of decision as an ‘optional innovation decision’ where the decision is made by an individual within a social system. This is distinct from ‘collective’ or ‘authority’ innovation decisions which are made either collectively by all individuals within a particular social system or by a few individuals in positions of influence and power. With optional innovation decisions, it is important to recognise the individuality of each potential adopter’s motivation.

Expectancy theories are often referenced when studying motivational behaviour. Lunenburg (2011) claims that Vroom’s expectancy theory (1964) differs from other motivational theories in that it provides a process of variables that reflects individual differences in work motivation. In this respect, institutions should acknowledge that a ‘one size fits all’ approach to reward may not be the most effective way to motivate the academic community at large. Vroom’s theory is based on three key elements: expectancy, instrumentality and valence. According to Palmer and Collins (2006, p. 196) ‘expectancy is the extent to which individuals feel an objective is achievable, instrumentality is applied to deciding if working towards the objective will achieve what is required and valence is the subjective value placed on the attainment of the objective’. Prior to investing effort the individual goes through a process of evaluating the value of rewards, the probability that effort will achieve results and that effort will achieve the performance required. In other words, the more positive the potential outcomes, associated with a given action, are perceived by a person, the more inclined the person will be to perform that action (Cabrera et al 2006).
Social exchange theories are also relevant to motivational behaviour. Homans (1958) defined social exchange as the exchange of activity, tangible or intangible, and more or less rewarding or costly, between at least two persons.

Social exchange theory posits that human relationships are formed by the use of a subjective cost-benefit analysis. According to Blau (1964) social exchange refers to relationships that entail unspecified future obligations and infers an expectation of some future return for contributions. Similar in nature to expectancy theories, social exchange theories propose that individuals will be motivated to take certain actions if they believe that their effort will be rewarded or reciprocated in the future. Rogers’ theory (1995) also emphasises the importance of an innovations ‘perceived attributes’ or ‘relative advantage’ for potential adopters, as they decide whether or not to trial and adopt an innovation. Academics are faced with the same motivational decision of evaluating if the rewards to be realised, within their social network, from using a digital learning resource outweighs the effort involved in learning about it and using it.

Another consideration when discussing motivation is the notion of reward. Understanding what motivates individuals is one of the key challenges for any organisation and while it is not possible to directly motivate others, it is nonetheless important to know how to influence what others are motivated to do (Milne 2007). The concept of reward is very subjective, for some it might be institutional recognition, or monitory reward and for others the concept of external reward is not even considered. Palmer and Collins (2006) argue that the degree of satisfaction that an individual experiences is affected by their preferences for intrinsic or extrinsic rewards. Some studies have shown that introducing tangible extrinsic rewards can even reduce intrinsic motivation and the feeling of community spirit resulting in competitive actions (McLure Wasko and Faraj 2000; Deci and Ryan 2000; Cabrera and Cabrera 2005). Colbeck (1992), citing McKeachie’s study, states that professors’ joy in teaching decreases as they pursue external rewards, and that their interest in doing a task for its own sake declines.

Intrinsic and extrinsic rewards can produce differing behaviours. In the context of this study, understanding what will motivate academics to use digital learning resources in higher education is central to its purpose. Koppi et al. (2004, p. 455) put it well when they say ‘There must be a good answer to the question teaching staff ask themselves:'
"Why should I bother?" in reference to their study of institutional use of learning objects.

Wiley (2006a) attempts to answer the question when he says that:

People will often volunteer to do things you could never pay them enough money to do......it is a simple matter of value versus cost. When people find more value in participating in an activity than the cost of participating in the activity, they are likely to participate.  

(Wiley 2006a, p. 6)

2.5.1 Motivations
An academic’s role comprises research, teaching and administrative activities. The degree of time and attention given to each of these activities depends largely on how and to what extent the individual academic is motivated. The following sections discuss what has been identified in literature as some of the key motivating factors for the use, reuse and sharing of digital learning resources by teachers.

2.5.1.1 Enhance learning experience
Integrating digital teaching materials such as images and videos or using teaching methods or materials that are only available digitally enhances the learning experience and has the potential to improve the quality and ease of learning of a subject or concept by supplementing the more traditional teaching resources (Green 2006; OECD 2005b; Marcus-Quinn et al. 2012). Digital learning resources offer teachers additional or alternative methods of teaching which can help address the disparity of learning styles often found in the classroom. The National Digital Strategy for Ireland (Department of Communications, Energy and Natural Resources Skills 2013, p. 29) states that Irish teachers are increasingly using online resources to enhance lessons and learning outcomes which provide opportunities for richer, more engaging learning experiences.

Studies affirm (Harley 2006; Browne et al. 2008; Browne et al 2010) that one of the primary drivers to using digital learning resources is to improve students’ learning. Hylén et al. (2012) support this statement as they found, in a recent OECD study of the use of Open Educational Resources (OER), that the most commonly reported motive for using OER was to gain access to the best possible teaching resources and to have more flexible materials. White and Manton (2011) propose that from lecturers’ perspective, the value of online resources may lie more in enabling them to enrich their students’ learning experience than in saving time. MIT (2011) report that 89% of educators using
the website say that it has had a significant impact on their teaching and learning practice and say the OCW site has even improved their motivation to teach.

Medlin (2001) found that a faculty member’s decision to adopt electronic technologies for use in the classroom was influenced by three key personal motivational factor variables namely: personal interest in instructional technology, personal interest in improvement in teaching, and personal interest in enhancing student learning. All three of the variables were identified as statistically significant and appeared as the most influential among all of the variables tested.

Andreatos and Katsoulis (2012) say that the net-generation students usually prefer watching videos, animations and presentations to reading text and that studying from many sources rather than a single textbook is considered a pedagogically correct practice today.

According to Ferguson and Morris (1993), and cited in Medlin (2001), successful instructional technology adoption has allowed teachers who take pride in their work to improve their teaching, and in return to become the recipients of student gratitude. They go on to say that teachers who effectively use digital technologies in the classroom can develop a reputation for good teaching which in turn can attract hard-working students who will positively contribute to the academics department, college and university.

2.5.1.2 Community Spirit
The Oxford English dictionary describes community spirit as ‘a feeling of involvement in and concern for one’s local community’. In the context of this study the community is represented by the users and contributors of digital learning resources around the world. The idea that a feeling of involvement in a community could motivate participation is extensively demonstrated by the OER movement which would not exist without the community of educators freely contributing their work for all to use. The OER movement is founded upon this sense of community spirit and the simple and powerful idea that the world’s knowledge is a public good and that technology in general and the Worldwide Web in particular provide an extraordinary opportunity for everyone to share, use, and reuse (Smith and Casserly 2006).

One of the main motives for sharing digital learning resources, as identified by the Centre for Educational Research and Innovation (CERI), is in fact altruism or community support. (Arendt and Shelton, 2009, p. 4) Why do some people go out of
their way to share their knowledge and resources? According to the OECD report *Giving Knowledge for Free* (2007a), sharing is an academic value.

Prior research has shown that individuals, and teachers especially, are intrinsically motivated to share their knowledge and material because of the intangible benefits they receive in return, such as, achieving a sense of self-worth, enjoyment by helping others, feelings of pride when others use their resources and feelings of accomplishment when learning from others. (McLure Wasko and Faraj 2000; Cabrera 2006; Chiu et al. 2006; Browne et al. 2010; Dundon et al. 2012; Van Acker et al. 2013). Van Acker et al. (2013) believe that altruism is a key influencing predictor of teachers’ intentions to share and that, teachers are more inclined to share their digital resources openly online if they believe they could be of value to others in the community. They go on to say that, teachers who enjoy the activity of sharing do so because of the positive emotions they experience when sharing and that this reward is their primary motivation. Dundon et al. (2012) also concluded in their study of the incentives and barriers to contributing to a shared digital repository, that the principal incentive to contribute a digital resource to an open repository was community spirit and believe that being a community minded individual strongly encourages interest and use of shared repositories in general. Hylén (2006b) asserts that despite the fact that higher education institutions have traditionally nurtured a very guarded approach to sharing, as an academics learning resources are often considered key intellectual property, more and more individuals and institutions are openly and freely sharing their resources online.

Etienne Wenger⁶ coined the term Community of Practice which is essentially a group of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. One could argue that a community of practice exists around the development, reuse and sharing of digital resources and according to Windle et al. (2010) true engagement in such a community, including a sense of belonging, shared purpose, empowerment and activity, is the greatest driver for participation. Davis et al. (2009) however would disagree with this sentiment and maintain that sharing in the greater altruistic sense is merely a side effect of more selfish and pragmatic motives. They claim that while users see the value of sharing, that altruistic sharing is not a good enough incentive on its own. Hylén (2006b) also found in his OECD report on the opportunities and challenges of OER, that altruistic ambitions, such as assisting developing countries, outreach to disadvantage communities or bringing down costs for

---

students were perceived by the teachers and researchers who took part in the study as less important than other motives like gaining access to quality learning material.

At the same time Hylén states that the least important factor of all was to be personally financially rewarded.

2.5.1.3 Efficiencies
There has been much debate about the potential cost savings associated with the sharing of digital learning resources within education. To date, there has been very little quantifiable evidence that this beneficial cost efficiency is being realised, largely due to the difficulty in tracing the reuse of digital resources. It is impossible to measure how many people reuse a digital resource once it has been downloaded from its location. However, it is hard to refute that reusing digital resources can potentially save teachers hours in preparation and also save on the cost of purchasing licences. Dundon et al. (2012) report, that the greatest perceived benefit to a lecturer to be gained from reusing digital resources was identified as being ‘time-saving’. They state that a repository of teaching and learning resources that can be reused and repurposed is perceived to provide a means of reducing the amount of time that an academic spends on preparing course notes and support material. As Sir Daniel (2011), former president and CEO of the Commonwealth of Learning, speaking at the Launch of the UNESCO OER Platform and Policy Guidelines said, ‘the rich resources of the Internet and social software are steadily encouraging the reuse of resources as most teachers no longer want to spend their time re-inventing the wheel.’

Sir Daniel’s opinion is echoed in the recent National Digital Strategy for Ireland (Department of Communications, Energy and Natural Resources 2013, p. 25) which states that quality online educational content enables teachers and students to have seamless access to high quality learning resources. Providing ease of access to digital learning resources supports the sharing, adapting and reuse of quality content, reduces duplication, leads to greater collaboration and sharing of learning materials and can reduce the overall cost of learning resources. The strategy document maintains that the efficiencies to be gained from using digital resources allows teachers to focus more time and attention on higher level skills such as problem solving, critical and collaborative thinking, team working, creativity and innovation. Spotts (1999) also noted that the time savings experienced from reusing existing digital resources in the preparation of course material allowed lecturers to concentrate more on research activities.
Students too, can benefit from the efficiencies that digital technology provides them as learners. Oblinger (2008) claims that students place a high value on the convenience technology provides, whether that means accessing course material from anywhere at any time or being able to access live events as they are happening. Many students, she says, describe education as a business where efficient, convenient, technology-mediated transactions are expected. Tapscott and Williams (2010) support this claim and suggest that research evidence shows that students who use ‘well-crafted’ digital resources experience improved learner effectiveness and increased learner efficiency as they completed their lessons in less time than students enrolled in conventionally taught courses.

Hylén (2006b) points out how educational institutions could leverage on taxpayers’ money by allowing the free sharing and reuse of resources developed by publicly funded institutions. Hylén says that to lock in learning resources behind passwords, means that people in other publicly funded institutions sometimes duplicate work and reinvent things instead of standing on the shoulders of their peers. This point is again reiterated in a later report (OECD 2007a) which states that OER enables taxpayer’s money to be leveraged through the free sharing of resources which can in turn reduce the cost of content development and also improve the quality. According to Pearce et al. (2010) new web-based technologies are taking advantage of the ‘infinite reproducibility of digital media at zero marginal cost’.

However, Dundon et al. (2012) caution that in order to realise this time saving benefit the relevance and pedagogic fit of the resources in the repository is crucial. If a resource needs to be modified significantly it reduces the time saving benefit. From a teacher’s perspective, repurposing digital resources for reuse is not always thought to be a time saver by everyone (Browne 2010).

2.5.1.4 Professional Development
The openness of content on the internet enables access to any and all kinds of formal or informal learning. Teachers at all levels can be self-learners too and use the vast collection of digital content to improve their skills and keep abreast of new and emerging areas in their fields of expertise. MIT OCW (2011) report that 42% of educators who visit the site, do so for the purpose of enhancing their personal knowledge.
In addition to MIT, many other top ranking universities in the world also provide open access not only to their video recorded lectures and online courses but also to course notes, exam questions and other course material. This open access provides educators with a means of viewing the standard and format of the course material being used by their peers in other educational institutions.

White and Manton (2011) found evidence, in their study of OER use amongst third level teachers, that digital resources are being used for professional benchmarking and also as a form of inspiration. They maintain that the perceived benefit of reusing digital resources amongst the teaching community is in the form of professional development which in turn can potentially improve the programme of study. Casserly and Smith (2010) argue that the transparency of open education resources also raises the standard of quality, as the reputations of scholars and educators are exposed. They say that ‘when OER contributors know the world will scrutinize the accuracy and worth of shared content, increased levels of effort follow.’

The internet provides quick and easy access to current up to the minute information which is of critical importance to certain disciplines. Open digital research repositories, online communities of practice websites, blog posts, media websites and other social media sites enable teachers to continually advance their professional development.

Teachers have traditionally worked in isolated units, conditioned to guard their knowledge and denied of the opportunity to discuss challenges or share ideas with their peers from other institutions. Web 2.0 technologies now offer new forms of communication and collaboration, connecting people on a global scale and supporting a rich diversity of digital communities. These virtual communities facilitate the sharing, exchange, debating and co-creation of ideas across different communities of users (Conole 2010). Online communities, through their exchange and use of digital learning resources, are a major enabler of collaborative innovation, which in turn results in feedback and a continuous improvement process by enhancing the quality and currency of content. This process is also known as the peer-production phenomenon (Andrade et al. 2011). Iiyoshi and Kumar (2008, p.3) corroborate this phenomenon and believe more and more people are moving toward the collaborative construction, extension, and revision of course materials across disciplines. They say that the practice of teaching and learning is finally beginning to see the benefits of ‘building upon each other’s work’, something which has been a valued common practice in research for centuries.
Ireland’s education system has a network of informal digital users, developers and curators in education. These are teachers from all levels of education, who share resources and ideas through social media and other online networks with significant numbers of other teachers (Department of Communications, Energy and Natural Resources 2013).

One of these networks was the NDLR service, which provided the community of digital resource users and developers with the opportunity to network and collaborate through their communities of practice, local and national seminars and showcases (NDLR 2012d). The NDLR, through its events and online repository of digital resources, allowed people to see what their peers were using and developing for their teaching and gain inspiration for new resources or approaches to teaching.\textsuperscript{7}

According to the National Digital Strategy for Ireland (Department of Communications, Energy and Natural Resources 2013) the high levels of online educational resource use illustrates the appetite that exists amongst teaching professionals and the value Irish teachers already place on sharing and contributing to online educational content. The National Forum (2014, p.21) in their recent sectoral consultation on building digital capacity in Irish higher education, affirm the interest in digital learning that is prevalent amongst the teaching community. The Forum suggests that higher education institutions should take action to improve and enhance their digital capacity at institutional level through their policies, practices and open-education principles. It is through the power of sharing ideas and experiences that people learn and improve their skills. Web 2.0 technologies are facilitating the creation of virtual communities where digital content and dialogue is being exchanged and providing a means for teachers to interact and communicate on a global scale ensuring the dissemination of good practice ideas.

2.5.1.5 Self-promotion

Another motivation for reusing and contributing digital resources is one that is driven more by a need for extrinsic reward, and that is self-promotion. The focus of this study concentrates on the micro level of digital resource diffusion amongst teachers and particularly teachers within higher education. However, motivation to engage actively in the use and development of digital resources with the expectation of enhanced reputation, is also evident at institutional or the macro innovation diffusion level.

\textsuperscript{7} \url{http://www.ndlr.ie/resources/lips.php}
In a recent study on the motives behind the contributors to Rice Universities Connexions digital resource repository, it was found that the primary motive for contributing original content was to have the greatest possible impact on scholars, practitioners, and students within their disciplines through the widespread dissemination and use of their educational and scholarly materials (Baraniuk 2010, p. 238).

Other research concurs and indicates that people are more likely to share their knowledge if they believe they will be provided with tangible returns such as promotion, bonuses or intangible returns such as enhancing their reputation and status (McLure Wasko and Faraj 2000; Chiu 2006; Van Acker et al. 2013). Van Acker et al. (2013, p. 179) reference several scholars who believe that ‘impression management’ may be an important reason why people choose to share knowledge and that individuals may be motivated to share their knowledge through the use of ‘reputation points’ in online communities. They believe that teachers share digital resources as a way of showing their competencies to their peers and thus improve their reputations. They go on to hypothesise that an improved reputation is a possible reward of digital resource sharing behaviour.

Pearce et al. (2010) discuss academics’ use of digital technologies as a means of participating in a wider global debate as the internet enables a far greater reach for academics than printed publications. Academic bloggers can gain large audiences and develop a personal brand that is complimentary to their institutional one. Digital technologies are facilitating access to a new audience that they say is displacing many of the conventional channels.

In addition to the many repositories of digital teaching resources, we have also seen in recent times, the growing acceptance and popularity of open access digital research publishing. Andrade et al. (2011) say that a review of studies on open publishing found consistent increases in the number of downloads and article citations from open access journals as compared to subscription-model journals. The report also indicates that open access of data makes a larger impact in non-scholarly contexts. Meier zu Verl and Horstmann (2011) assert that open access to literature not only expedites the distribution of knowledge but also the development of reputations.

---

8 Pearce et al. (2010, pg. 39) provide a list of examples; Open University philosophy lecturer Nigel Warburton has achieved over 5 million downloads of his podcasts and Kansas State University Professor Michael Wesch has had over 10 million views of his YouTube video “The Machine is Using Us.” A “tweet” from British celebrity Stephen Fry led to over 50,000 hits in one day to an Open University site.
Brennan (2007) attempts to quantify the potential depth and reach of open access publishing within the Trinity College open access repository of TARA. She claims that research freely available on the web is more likely to attract an increased number of citations, up to 336%, if publishing in the field of computer science. The average increase in citations across the disciplines is 50% to 250%.

This is of considerable importance and a significant motivational factor to members of academic and research staff as they are most often measured on their personal research impact which is based on citations.

OpenAIRE⁹ is Europe’s central open access repository hosting over 8 million publications from 461 different repositories and open access journals. According to their data, open access articles are much more widely read that those which are not freely available on the Internet and likely to achieve up to three times higher citation rates and to be cited much sooner. An OECD report (2007a) supports this statement and says that educators who contribute to OER stand to benefit through increased reputation and that gaining publicity or reaching the market more quickly could result in an economic advantage.

Individuals and institutions alike are being motivated to use and contribute digital teaching and research resources in order to increase their reputation and in the case of institutions, attract potential students. Hylén (2006b) mentions how institutions like MIT, have received a lot of positive attention for their decision to make their resources available for free. Freisen (2009) believes this to be the most powerful driver of adoption of OERs and calls it ‘enlightened institutional self-interest.’ The benefits to be gained for institutions, he says, includes, student recruitment, the potential for improving teaching and for better supporting learning, and a kind of viral marketing of the quality of teaching and learning in areas of strategic institutional interest. An OECD report (2007a, pp 11–12) lists a number of benefits relating to OER which could be realised by institutions, one of which is the potential to enhance the public image of the institution and attract new students.

Van Acker et al. (2013, p.186) suggest that while research shows there to be a significant relationship between the expected impact of sharing digital learning resources on reputation and intention to share, this impact is in fact in the opposite direction of what was expected. They found that teachers’ likelihood to share resources

⁹ http://www.openaire.eu/
seems to decrease if the act of sharing is directly connected to an increase in peer recognition. This correlation supports Deci and Ryan’s (2000) claim that extrinsic reward can have a negative impact on intrinsic motivation. It seems the more intrinsically motivated the teachers are the less interested they are in personal reward such as enhanced reputations.

2.5.2 Barriers
While it appears that there are many valid reasons for teachers to reuse, share and create digital learning resources, there are just as many barriers discouraging widespread use and engagement with digital learning resources amongst the educational community. The following sections highlights and discusses some of the key barriers to the diffusion of digital resource use from the perspective of the teacher. Andrade et al. (2011) identified five key barriers in the OPAL report, which need to be overcome if educational institutions are to encourage the use of digital learning resources. These have been identified as lack of time, lack of skills, lack of institutional support and recognition, copyright issues and lack of technical support.

2.5.2.1 Lack of time
Without a doubt, the lack of time is perceived as one the greatest barriers to digital resource use and development (Mumtaz 2000; OECD 2005b; Hylén 2006b; Rolfe et al. 2008; Harley 2008; Browne et al. 2010; McMartin 2008; Dundon et al. 2012). Spotts (1999) reminds us that changing teaching practice and particularly introducing new instructional technologies, requires effort by faculty to make it work. Many faculty members need to believe that using the technology will enhance their teaching or improve a process in order to be willing to make the time to learn about the new technology. Rolfe et al. (2008) mention in their study how faculty were apprehensive about the additional workload involved in preparing e-learning materials and finding the time to learn more about the technologies and resources available. One of their respondents stated that "gaining familiarity with e-learning devices is hugely time consuming. As academics work longer hours, juggling various commitments, training courses become less and less appealing…” According to their findings, staff need to be incentivised in order to dedicate more time to training about how to develop and use resources effectively. These findings are in line with Newton’s (2003) study that lists time commitments, lack of incentives and lack of support as the primary deterrents for staff from the use of new technology in higher education. Beggan and Team (2010) draw attention to the time and effort involved in publishing OER materials, which they
assert is also a barrier for staff, not only in the development of materials but also intellectual property rights clearance.

Lack of time, for whatever reasons, remains a consistent theme throughout the literature. Spotts (1999) believes that time relates to the benefit derived from using a technology. If a faculty member sees a benefit they are more likely to invest the time. Dundon et al. (2012) say that in many cases faculty will see the potential time saving benefit in reusing digital resources, yet still feel that they do not have the time to use the technology they recognise will save them time! This suggests that sufficient motivation is absent as people will often make time to do things when suitably motivated according to social exchange and expectancy theories. McMartin et al. (2008) touch on this inconsistency in their study, which showed that by far the most commonly reported obstacle respondents reported was time. However these results were not reflected in the results from their focus groups where respondents expressed their willingness to spend time looking for the right materials and stated that they used digital resources to save them time. The contradictory results highlight the complexity of naming ‘time’ as a barrier when attempting to identify causes of resistance to using and creating digital resources. They say that the danger of including a question that asks if time is a barrier is that it fails to force the user to think about or mention the ultimate barriers that the perceived lack of time reflects. McMartin et al. suggest that it is not really lack of time that is the issue but rather a question of priorities.

An OECD policy brief (2005a) on e-learning in tertiary education found that resistance to e-learning by faculty members may partly be due to their perceptions of the limitations of e-learning which in turn is linked to their lack of time or motivation to carry out what they consider an additional task, since e-learning mostly supplements rather than replaces classroom-based teaching. Browne et al. (2008) mention how career opportunities in technology enhanced learning development appear limited and that lack of time was again identified as the main barrier to the diffusion of technology enhanced learning. Browne et al. (2010, p. 10) noted in their study of OER challenges to academic practice, that academics ‘would struggle to find the time to adapt existing material for OER in an environment in which they were already struggling to fulfill their teaching obligations’. One respondent stated that ‘there needs to be much more consideration, for lecturers work loads’. This ‘lack of consideration’ indicates the absence of awareness at institutional administrative level, about the amount of effort involved in finding, integrating and developing digital learning resources for course
material. This leads us in my opinion, to the very crux of the issue in relation to barriers and that is lack of institutional support.

2.5.2.2 Lack of Institutional support

‘The path of least resistance and least trouble is a mental rut already made. It requires troublesome work to undertake the alteration of old beliefs.’ (Dewey 1933)

What do we mean by institutional support? In this case, I am not referring to access to training, technology, licenses or even educational developers, although these are forms of institutional support which will be discussed in subsequent sections. The lack of support that underlines all other barriers, in my opinion, stems from the traditional values upon which institutions have been founded. These include the traditional view of guarding and protecting knowledge within the walls of the institutions, the hoarding of knowledge amongst individual academics as key intellectual property, the reward and recognition structure based primarily on research achievements and the prevailing attitude that the practice of teaching is of secondary importance to research and just something that academics have to do (Spotts 1999; Carr 1999; OECD 2005a; Cabrera and Cabrera 2005; Borgman 2007; Friesen 2009; Browne et al. 2010; Sharples et al. 2013; Johnson et al. 2014).

These cultural barriers are the most difficult to overcome, yet without the full support and recognition of education institutions, the diffusion of digital resources amongst educators will most likely remain ad hoc. The diffusion process to date has very much been a bottom-up process, starting at grassroots level and slowly working its way up to governing authority level. An OECD report (2005b) mentions the important role that state or national governments play in the strategic direction and funding of higher education and of e-learning in all OECD countries. Browne et al. (2010) found that in response to government edicts and economic pressures, many institutions are re-examining how appropriate it is to hide their course material behind their institutional authentication, where much of it is regarded as the ‘crown jewels’, a highly prized and protected resource. However, concerns remain in relation to the conflict between the sharing of information and the traditional culture of academia, which is based on autonomy and a reward system often based on research. Browne et al. mention the increasing ‘performativity culture’ which in their view mitigates against academics committing to teaching excellence. They state that engaging with producing digital
learning resources is not perceived as enhancing an academic’s career. This is related to a general view that the university will need to decide how important this activity is on the agenda and how relevant it is to the university’s research profile.

Innovating teaching practices such as the use of digital learning resources are in danger of running aground as they suffer from ‘incompatibilities with existing institutional cultures and priorities’ (Friesen 2009, p. 1).

Meyer and Evans (2005), claim that competition for ratings between institutions may discourage collegial relationships and collaborative research among scholars within disciplines across institutions. If the culture of the institution is not supportive of knowledge sharing this will be a strong influencing factor on the academic employed by the institute. This point is also reflected in an evaluation of some Irish academic communities of practice (McAvinia and Maguire 2011, p. 39.9) as it was found that ‘there was an absence of sharing within or between institutions:

The culture within institutions is quite guarded (...) there doesn't seem to be the ethos of sharing even within a department never mind inter-institutionally kind of thing. So there are huge barriers there that need to be addressed and they are cultural barriers that I can see, so it is not something that can turn around in a short time.

(McAvinia and Maguire 2011, p. 39.9)

Traditional concepts are increasingly being challenged and finally being recognised as barriers to progress and innovation within our educational systems. Hylén (2006b) affirms that while learning resources are often considered as key intellectual property in a competitive higher education world, more and more institutions and individuals are sharing their digital learning resources over the Internet openly and for free. A recent report (High Level Group on the Modernisation of Higher Education 2013, p. 15) to the European Commission on improving the quality of teaching and learning in Europe’s higher education institutions, highlights the need to rebalance the preference of research over teaching in defining academic merit. Mary McAleese, Chair of the EU high-level group who prepared the report, says, ‘We believe absolutely that improving the quality of teaching and learning in higher education can bring about a sea-change for Europe’s future. We want to show to a wider public that improving the quality of teaching and learning ..... does not necessarily need huge amounts of additional funding; and yet, which is maybe harder to achieve, does need a change of culture.’
Previous research would suggest that faculty motivation is often linked to promotion and tenure considerations (Spotts 1999; Carr 1999; Medlin 2001; Koppie et al. 2004; Cabrera et al. 2006; Borgman 2007; Milne 2007; Rolfe et al. 2008; Dundon et al. 2012).

Spotts (1999) asserts that promotion and tenure review boards often do not recognise instructional excellence, or development and implementation of instructional materials utilising new technologies, as important. Johnson et al. (2014, p. 24) discuss, in the recently published NMC Horizon Report the ‘relative lack of rewards for teaching’ as a ‘significant challenge impeding higher education technology adoption’. The report draws attention to the fact that a university’s status in the global education marketplace is largely determined on the quantity and quality of its research. Faculty members possess little incentive to provide quality instruction and those that are interested in developing their skills in this area, work on their own initiative without promise of reward or institutional recognition. Indeed some academics feel it is a significant burden and perceive the effort involved in innovating their teaching material as thankless work (Dundon et al. 2012).

Koppie et al. (2004) believe that teaching staff in general would like more reward that is tied to their prospects of self-perpetuation through channels such as recognition of their teaching that leads to promotion. However, as Johnson et al. (2014) point out, Universities in the EU compete for funding from the Research Excellence Framework which provides funding only to institutions with outstanding rankings. Universities, in turn, encourage and support faculty to publish research, which the report states, infers an ‘overarching sense in the academic world that research credentials are more valuable asset than talent and skill as an instructor.’

Carr (1999) points out that integrating a technology, like digital learning resources, into teaching material is time consuming and effort intensive, usurping time and energy that otherwise could be devoted to more traditional and more rewarded endeavours. Carr stresses, that for innovative behaviour to be sustained, there must be a recognized and acknowledged system of rewards parallel to, and equal to that associated with traditional academic pursuits. A point echoed by Lynch, (2003) who believes this to be a cultural problem that must be worked out in the evaluation, tenure and promotion practices in place at an institutional level that supports scholarship in a digital world.

Lack of institutional support and organisational commitment is a significant barrier to technology adoption (Lynch 2002). Lynch claims that the number of faculty willing to
invest time and effort to integrate technology into their courses may begin to level off due to inadequate institutional support and recognition for their efforts.

Bennett and Bennett (2003) believe that these constraints serve as barriers to diffusion, particularly for Rogers’ (1995) definition of the ‘early majority’ technology adopters, who are less enamoured with technology and need assurances that that the benefits of integrating technology outweigh the costs. If teachers in higher education are expected to use instructional technologies, they need support, time allowance for implementing what they have learned, and recognition by the academic community and tenure processes that their effort expended toward instructional technology use is important (Spotts 1999). An OECD report (2005b) found a lack of senior management engagement in the support of digital resources, in e-learning in tertiary education. The report identified a need for improved understanding at Head of Faculty and senior administrator level of the nature and success factors of e-learning. It states that failure to utilise e-learning strategically was seen to increase costs and reduce impact.

Carr (1999) also notes the importance of institutional advocacy and commitment and asserts that without advocacy and resource commitment by the institution, the technology adoption process is likely to be ‘doomed to stalemate.’ He says, that there is a need for advocacy and institutional attention to occur if the conditions and activities that can promote adoption by the early and late majorities and laggards are to prevail. Medlin (2001) found, in her study of the factors that may influence a faculty member’s decision to adopt electronic technologies in instruction, that faculty motivation can be influenced by the institutional culture, its values, norms and reward structure. The study showed that the organizational factor variables which influence the innovation adoption process include: mandates from the university; institutional reward systems; formal recognition on a department, college, or university level; and physical resources such as hardware and software. Interestingly, out of all the organisational factor variables, the presence of an institutional reward scheme rated as the least significant.

While lack of institutional support is indeed perceived by many as a barrier to the diffusion of digital resource use and development in education, the support required to encourage engagement may not necessarily be in the form of promotion or tenure. Institutions should not underestimate the power of positive feedback and recognition. Many educators consistently extend themselves over and above their job responsibilities with no expectation of tangible rewards. This type of behaviour has been defined by
Organ (1988, p. 4) as Organisation Citizenship Behaviour (OCB), which he describes as ‘individual behaviour that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization.’ According to Cabrera et al. (2005), leaders play a key role in influencing OCBs. Higher education institutions, by providing an organisational culture of support and recognition and valuing the differing scholarly contributions of its employees, could break through the cultural barriers and create an environment where knowledge sharing becomes the new social norm. Davis et al. (2009, p.12) believe that the major barriers to digital learning resources are human rather than technical and say it’s the culture and practice of preparing learning materials that needs to change. This change in culture ‘requires alignment of technical, community, and institutional factors..... users see the value of sharing, but altruistic sharing is not a good enough incentive on its own.’

2.5.2.3 Lack of training
Technology has greatly impacted the way in which educators and learners source, use and create teaching and learning material. Traditional methods of teaching are being supplemented or in some courses replaced with new technology enhanced approaches. The innovators and early adopters of our society have been the ones to forge the way, initiating the change and showing the world how technology can be of great benefit to teaching and learning. The difficulty however, and barrier to the uptake of digital resources, is the lack of digital literacy skills, training and know-how of the early and late majority adopters of technology, which according to Rogers’ (1995) diffusion theory form the majority of the population. Friesen (2009) cites the results of a survey conducted in 2003 that showed a lack of knowledge, a lack of technical ability, and a lack of pedagogical skills were among the top factors impeding the adoption of learning objects at one research-intensive university.

The faculty teaching in higher education today have never had to gain formal qualifications in teacher training. Their level of expertise has been, to date, based on their knowledge of their subject. This fact has been acknowledged in an EU report (High Level Group on the Modernisation of Higher Education 2013, p. 15) which identifies this skill deficit as a key issue to reform, as part of Europe’s modernising higher education programme. The report states that ‘it is a key responsibility of institutions to ensure their academic staff are well trained and qualified as professional teachers and not just qualified in a particular academic subject’. A critical part of
teacher training in today’s knowledge society, is the learning and imparting of digital literacy skills.

Johnson et al. (2014) identify in the NMC Horizon report, the low level digital fluency of faculty as a specific challenge which needs to be overcome.

Digital literacy is defined ‘as the ability to use information and communication technology to find, evaluate, create, and communicate information requiring both cognitive and technical skills’ (American Library Association, 2012). The report claims that digital literacy has been deemed critically important to both students and instructors in higher education, yet, despite the widespread agreement on its importance, training in digital literacy skills and techniques is non-existent in the preparation of faculty.

Teacher training at primary and post-primary levels have been more pro-active with teaching digital literacy skills. This is reflected by the fact that ICT has been defined by the Teaching Council (2011) in its Policy on the Continuum of Teacher Education as one of three strategic priorities which should receive particular attention in designing and delivering programmes of teacher education. The National Digital Strategy for Ireland (Department of Communications, Energy and Natural Resources 2013, p. 27) also affirms the Government’s commitment to ensure the inclusion of digital literacy and numeracy skills in teachers’ education courses at this level.

In addition to improving the digital literacy skills of both educators and students alike, there is still much work to be done in training teachers how to effectively use digital learning resources. Andrade et al. (2011) state how OER initiatives have neglected the transfer and mobilisation of knowledge into learning and teaching practice. Lack of training in the - what, where, how and why of digital learning resources is one of the key barriers to its diffusion. (Carr 1999; Mumtaz 2000; Hanson and Carlson 2005; OECD 2005b; Cabrera 2006; McMartin et al. 2008; Rolfe et al. 2008; Friesen 2009; Sharma 2011; Van Acker et al. 2013)

Carr (1999) says that training, in its technical aspects and application to real needs, is crucial if educational technologies are to be integrated beyond the innovators and early adopters. Carr asserts that oftentimes the training courses offered to faculty concentrate on the mechanics of the software instead of how to use it effectively in their teaching. He says that instructors need help to see how to use it in the classroom or in their working situation. Sahin (2006) calls this type of training as ‘How-to-knowledge’. 
Citing Wetzel (1993) Sahin says that, even the faculty who have technical backgrounds may not use technology in teaching, if they do not have knowledge of how to use it correctly. Even more important for the sustainability of an innovation like digital learning resource use, is what Sahin labels as ‘principles-knowledge’.

Faculty training must instruct the teachers on how to use the technology appropriately and convey a clear and coherent sense of the reasons why the technology is of use and the benefits that can be gained. In short, to effectively use digital resources, teachers need time, technical professional development, a feeling of self-efficacy with regard to technology integration, and an openness to change (Hanson and Carlson 2005).

More often than not, teachers who are interested in using digital learning resources will educate themselves in their own time. As discussed in the previous sections, lack of time and incentives for digital skills training impacts the number of faculty willing to participate in training courses. Spotts (1999) says that newer faculty members in particular find it hard to justify time for training with new technologies and the development of new instructional materials using these technologies. McMartin et al. (2008) found that faculty were frustrated at the lack of time to locate and learn how to use digital images. Faculty are rarely granted the time to investigate or experiment with new technologies, it is expected that this learning will be done in addition to their other responsibilities. Therefore, for most people only the simple use of technology is as far as they go, or wish to go, especially in research-intensive universities (Koppi et al. 2004). Carr (1999) suggests that if the technology is perceived as difficult to learn and/or too time consuming to prepare and use, it probably will not be used. Even if the technology is not perceived to be difficult to understand, learning how to effectively apply it to enhance teaching and learning can be. This perception of complexity causes many faculty members to assume, often incorrectly, that learning how to use the technology will take an inordinate amount of time and effort which institutions fail to recognise (Bennett and Bennett 2003).

Institutions should value the importance of continuous professional training for their staff and see ‘technology is not just a tool [for faculty] to do their old jobs better’ but as new tasks that need to be updated on a regular basis in order to avoid ‘becoming outdated to the point where students are unable to benefit,’ as discussed by two IT education thought leaders (Straumsheim 2013). Institutions, they say, need to invest in faculty development at the same rate as investing in any new hardware and as such
these investments in training ‘can’t be a one-time expense …..you have to keep changing with the times.’

2.5.2.4 Personal attitudes
The innovation decision process is the mental process through which an individual passes from first knowledge of an innovation to forming an attitude toward the innovation (Rogers 1995). Rogers believes that subjective evaluation of an innovation, derived from individual’s personal experiences and perceptions, drives the diffusion process.

Personal attitudes towards the use, reuse and development of digital learning resources is hugely influenced by individual’s personal attitudes towards technology and pedagogy (Spotts 1999; Medlin 2001; Hanson and Carlson 2005; Harley et al. 2006; Sahin 2006; Van Acker et al. 2013). Spotts (1999) asserts that, based on research and literature, learners, faculty, technology, and environment should be influential areas in determining instructional technology use. However, the findings of his interview data showed that a faculty member’s attitude seemed more influential in technology use. Harley et al. (2006) found similar results in their study which revealed that individual opinions and attitudes had a greater effect on a person’s total level of digital resource use than any other characteristic. Sahin (2006) states that even if an individual has all the necessary knowledge about an innovation, the individual’s attitudes and perceptions will ultimately shape the adoption or rejection of the innovation.

Hanson and Carlson (2005) also believe that attitude, self-efficacy and subjective norm take a central role in explaining the intention to use digital learning resources. This concept is supported by Cabrera et al. (2005) in relation to knowledge sharing, who suggest that intentions to share are determined by positive attitudes towards sharing knowledge as well as the perception of norms for sharing. Individuals are influenced by the values, actions and ideas of their social network, shaping their personal attitudes which determine how and whether innovations and new ideas are accepted or rejected. Rogers (1995) emphasises the importance of the compatibility of an innovation with reference to the decision process. Compatibility can relate to the technical aspects of an innovation, but what’s more important is the compatibility of a new innovation with the working practice and values of a social system. Bennett and Bennett (2003) believe that the acceptance of an innovation in instructional technology, hinges on the degree to which faculty members feel it is consistent with his/her values and philosophy of teaching.
Another attitudinal barrier to digital resource use, reuse and sharing relates to feelings of self-efficacy (Spotts 1999; Deci et al. 2001; Koppi et al. 2004; Cabrera et al. 2005; Becta 2008; Van Acker et al. 2011). Koppi et al. (2004) claim that faculty can be deterred from contributing digital learning resources to shared repositories as they may feel that their own teaching materials would not stand up to scrutiny. Deci et al. (2001) discuss the relationship between feelings of competence and intrinsic motivation and affirm that events that increase perceived competence enhance intrinsically motivated activities such as knowledge sharing. A study of attitudes towards sharing within a community of practice found that reluctance to share knowledge can stem from fear of criticism or ‘losing face’, should the knowledge they share be incorrect or out of date. Those who are unsure of their level of expertise often wish to remain guarded in order to protect their reputations (Dundon et al. 2012). Van Acker et al. (2013, p. 495) agree and say that teachers’ knowledge and skills with respect to developing and using digital learning resources is an important determinant. They found that teachers need to feel sufficiently self-confident and believe that their contributions will provide an added value in order to have the intention to share. Their study found that ICT skills influence teachers’ intention to use digital resources and was the strongest predictor of self-efficacy. Cabrera et al. (2005, p. 726) suggest that training can be used to enhance self-efficacy levels among employees which will help them to feel more assured of their abilities and consequently they will be more likely to participate in knowledge sharing activities.

Individual attitudes are subjective and difficult to assess. Positive and negative views are developed as a result of many personal events and perceptions which makes it troublesome to decipher why or how a faculty member came to feel the way they do. Spotts (1999) suggests that future research should focus on identifying factors that are influenced by attitudes, such as actions or behaviours. Understanding more about the personal attitudes of faculty would help to uncover some of the more hidden barriers to the adoption of digital resources.

2.5.2.5 Copyright Issues
According to Hylén (2006b) the academic community is gradually embracing the notion of sharing despite the fact that intellectual property is generally perceived as a competitive advantage in higher education institutions. However, as with most cultural
changes this will take time and significant support from legislative authorities, education institutions and other governing bodies.

In the meantime, copyright is deemed to be a significant barrier to use and reuse of digital learning resources (Koppi et al. 2004; OECD 2005b; Wiley 2006a; McMartin et al. 2008; Browne et al. 2008; Davis et al. 2009; Windle et al. 2010; Hylén et al. 2012). In a recent report on OER use amongst OECD countries, Hylén et al. (2012) found that Germany in particular raised a number of fundamental objections to the idea of openly sharing digital learning resources. They feel that there are outstanding legal questions and concerns regarding copyright that need to be resolved before OER can be fully embraced. Turkey was the only country listing copyright issues as not relevant.

Andrade et al. (2011) discuss the importance of rethinking intellectual property law for the 21st century. The digital revolution has changed the way we access use and create knowledge; however IP practices and legislation remain outdated and are stifling innovation, according to the report findings. It states that the link between research, teaching and innovation has largely been ignored from an IP perspective limiting the growth potential of the knowledge economy. A recent initiative launched by the EU Commission (2013) called, Opening Up Education, also identifies the current copyright framework as a barrier to innovative teaching and learning practices. Teachers feel that regulations are not transparent enough and are scared about the perceived uncertain legal consequences of re-using and sharing educational materials.

Copyright is a significant legal barrier in the use and development of digital resources with particular reference to open educational resources. Teachers are uncertain if the content they create is considered the property of the institution, the instructor, the student, or another originator (Arendt and Shelton 2009). McCracken (2009) states that ownership normally vests in the author first and in the employer in the case of work produced in the course of employment. However, ownership is often difficult to disentangle for educational institutions and academic authors. Traditionally academics have been free to exploit the copyright in their lecture notes by turning them into textbooks. Ironically, academics have been eager to give away their IP in the case of journal, book and conference publications yet are hesitant about contributing and sharing their resources online. Koppi et al. (2004) believe this to be due to the clear reward and recognition attached to contributing to such publications. This opinion is supported by Davis et al. (2009, p. 2) who assert that while a few ‘public spirited
academics’ openly share their materials online, many others are hesitant and concerned with losing rights and control of their materials, and thus, forgoing possible financial profit; they are concerned about quality judgments of their materials; and possible copyright claims against embedded content that they have downloaded and reused in their resources.

Wiley (2006a) states that checking for copyright infringements is a resource hungry activity as academics typically use a variety of material and sources when preparing their course material. Universities often require confirmation that all digital resources contributed to a shared repository have an explicit license to reuse or permission from the original author. Referencing retrospectively is an arduous and tedious task that most people would wish to avoid. The time and effort involved in gaining intellectual property rights clearance acts as a real barrier to publishing digital materials particularly OER (Beggan and Team 2010).

The Open Education Resources (OER) movement is slowly lifting the barriers imposed by copyright. The most popular licensing model for OER content is the Creative Commons suite of licences (McCracken 2006). Creative Common licensing grants copyright permissions to copy, distribute, edit, repurpose and build upon digital resources, all within the boundaries of copyright law thus removing the risk for the user. According to Daniel (2011) open licences such as offered by Creative Commons licenses, provide the users and contributors with the confidence and assurance to both distribute and adapt the digital resource without fear of reproach or retribution.

2.5.2.6 Technology Access Issues
The use of technology continues to permeate every aspect of our knowledge society. Yet, despite the ubiquitous nature of technology, the diffusion of instructional technology is not evident in the classrooms of higher education at the level of early expectations (Spotts 1999). This lack of technology is not limited to higher education institutions but is a common theme throughout primary and post-primary schools as well. Recent statistics made available from the EU Commission (2013) at the launch of its Opening Up Education initiative, show that more than 60% of nine year olds in the EU are in schools which are still not digitally equipped with recent equipment, fast broadband (10mbps plus) and high connectivity. The figures also state that only half of 16 year olds are in such 'highly digitally-equipped schools' and 20% of secondary students have never or almost never used a computer in their school lessons.
Ireland, along with other EU countries, is taking steps to improve access to technology at all levels of education. The National Digital Strategy for Ireland (2013) highlights the plan to roll out high speed 100Mbps broadband to all second level schools and their commitment to ensuring all 750 schools will be connected by end 2014. Androulla Vassiliou, EU Commissioner for Education, Culture, Multilingualism, Sport, Media and Youth, who is head of a programme responsible for the modernisation of education in Europe, believes that:

*The education landscape is changing dramatically, from school to university and beyond: open technology-based education will soon be a 'must have', not just a 'good-to-have', for all ages. We need to do more to ensure that young people especially are equipped with the digital skills they need for their future. It's not enough to understand how to use an app or program; we need youngsters who can create their own programs.*

(Vassiliou 2013)

Technology access, in the interim period however, continues to be a barrier to the diffusion of digital learning resources within education (Spotts 1999; Mumtaz 2000; Medlin 2001; Hanson and Carlson 2005; OECD 2005b; Rolfe *et al.* 2008; Harley *et al.* 2008). Spotts (1999) claims that most faculty members will not use equipment or materials unless they are readily available and easy to use. If a teacher has to spend an excessive amount of time setting up equipment or organising support, then they are less likely to use the technology. As one faculty member Spotts interviewed pointed out, ‘the university encourages you to use the technology, and then there are only three classrooms on campus where you can utilize the material you have developed’. Hanson and Carlson (2005) found similar barriers and affirm that despite the massive movement toward “wiring” schools, many teachers do not have easy or low-cost access to technology in the classroom.

Medlin (2001), in her doctoral study of the factors that may influence a faculty member’s decision to adopt electronic technologies in instruction, found that physical resource support was statistically significant in predicting the use of technology in the classroom. Citing the results of another study by Surendra (2001), Medlin states that access in general and training in particular were found to be the best predictors in the diffusion process of Web technology-based educational innovation.

Not all studies rate technology issues as a deterrent to the use of educational technology, as a survey of 19 Higher Education institutions by the Organisation for Economic Co-
operation and Development found that the lack of access to computers and other kinds of hardware, and the lack of software as the least significant barriers. Conversely then in later studies, Harley et al. (2008) and Rolfe et al. (2008) both found that the most cited barriers to the effective use of digital resources were the availability, reliability, expense and lack of support of the necessary equipment, both in the classroom and for personal use. Whether technology access is found to be the most or the least inhibiting factor, it still remains a barrier for consideration.

2.6 Chapter Summary
This chapter begins by discussing the diffusion of digital learning resources amongst educators, in the context of Rogers’ (1995) innovation diffusion process, which is the theory framing this study. The diffusion of innovation is guided and influenced by many factors which, according to Everett Rogers, include social, personal, organisational and adopter behaviour characteristics.

Section 3 examines the diffusion of digital learning resources at a macro level and reviews their emergence in relation to the practice of teaching and learning. The literature suggests that environmental pressures such as the ever increasing availability and use of technology in our social lives is forcing educational institutions and educators in general to engage more and more with digital resources. Some educational thought leaders believe that today’s cohort of students, the ‘Digital Natives’, need a new approach to learning and as a result educational methods need to change in order to remain relevant in today’s knowledge society (Prensky 2001).

The Open Education Resource (OER) movement has had a significant impact on the availability of content. The internet hosts a vast amount of digital learning material which is freely available for self-learners and educators alike to use and repurpose. Traditional views of guarding intellectual property within the walls of institutions are being challenged with the widespread adoption of MOOCS and other online courses. Governments are now rethinking our educational systems in light of these developments and reports forecast the ubiquitous use of digital learning resources across all levels of education in the near future.

Section 4 reviews the different categories of users, the types of digital learning resources being used by teachers, how they source their digital material and whether disciplinary differences are a factor of their usage. This study concentrates primarily on
the diffusion of digital learning resources among the teaching community and recognises the difference between the needs and behavioural characteristics of teachers as users and learners as users. A consensus view among the literature was that text based resources were the most commonly used and contributed digital resource followed by the use of images. Video is also heavily used and is growing significantly in popularity in recent years. Studies show that teachers are generally drawn to use digital resources that can be easily integrated within their course material. The most common method of sourcing digital resources according to the literature is through the use of search engines, typically Google. There is a general lack of awareness of educational repositories with teachers favouring material from trusted sources such as internationally recognised institutions like MIT. Disciplinary differences in relation to digital resource use were evident in the literature and most apparent between the hard subjects like maths, physics and sciences and soft subjects like arts, humanities and social sciences.

Section 5 reviewed the key incentives and barriers to digital resource use as identified in previous studies. In summary, the primary motivational factors encouraging teachers to use and develop digital resources include; desire to enhance the learning experience, community spirit, self-promotion, efficiencies and professional development. Overall, the literature is in agreement that the intrinsic motivation of the teacher is the underlying drive towards digital resource use. The satisfaction they receive in enhancing their students’ learning, improving their own personal skills or contributing useful resources to their peers is their reward and incentive. The key barriers, identified in the literature reviewed include; lack of time, lack of institutional support, lack of training and skills, personal attitudes, copyright issues and technology access issues. The greatest barrier to using and developing digital learning resources and most often cited in the literature was lack of time. However, the literature would suggest that the perceived lack of time was a result of the other barriers such as lack of training and institutional support in particular. According to social exchange theories, when people are sufficiently motivated they will find the time to perform the activities that they believe will benefit them in the future. The most complex barrier to digital resource diffusion is the cultural attitudes and traditional values held within higher education institutions.

This barrier may be the hardest to overcome as ‘cultures, policy, and procedure are not designed and implemented; they evolve – often with excruciating slowness’ (Friesen 2009, p. 9).
Despite the prevalence of the many barriers in the way of digital learning resource diffusion, change is coming. Uncovering the reasons for resistance toward this change will determine the supports needed within our educational systems to help scaffold this change and reform our approach to using digital technology.

“The harder you fight to hold on to specific assumptions, the more likely there’s gold in letting go of them.” John Seely Brown
Chapter 3: Methodology

This chapter describes the methodology used to capture and analyse the data pertaining to the research aims and questions of this study. The research paradigm, approach, instruments used, data analyses, ethical considerations and limitations of this study are discussed in detail.

3.1 Research Aims and Objectives
This thesis is a qualitative and exploratory study of the diffusion and adoption of digital resources in Irish universities. The intention of this study is to provide an insight into the behaviours and attitudes of academics teaching in Irish universities in relation to the use of digital learning resources.

Rogers’ Innovation Diffusion Theory (1995), which is used to frame the study, recognises the subjective nature of innovation diffusion. The research methods and approach taken for the study have been explicitly selected to accommodate the significance of personal attitudes and perceptions in relation to the adoption of digital learning resources. The overall objective is to identify some key factors influencing the adoption of digital learning resources amongst the teaching community, including the support and changes that are needed to encourage more engagement with digital resources.

3.2 Research Questions
Creswell (2002) asserts that attempting to identify a research question consists of ‘specifying an issue to study, developing a justification for studying it, and suggesting the importance of the study for select audiences’. With these guidelines in mind, and considering the background explored in Chapter 2, especially pertaining to digital resource usage in Ireland, the following set of research questions were identified:

To what extent has the use of digital learning resources diffused amongst the teaching community in Irish universities and who is using them?

What types of digital learning resources have Irish university academics adopted to support their teaching practice?
What are the main incentives and barriers for using, reusing and/or developing digital resources?

What support or changes are needed to encourage more engagement with digital resources in higher education in Ireland?

The research intention behind these questions is to establish a point of reference for the use of digital resources within Irish universities, identify the challenges relating to the use of digital resources and document the support measures that academics believe would encourage more use of digital resources in higher education. The following sections explain how this study attempts to address these questions.

3.3 Research Methods and Approach
The research instruments used to conduct this study included a web-based survey, which was designed to gather both quantitative and qualitative data. In addition, unstructured interviews (Patton 2002) were conducted using a purposive sampling approach (Cohen et al. 2007, pp. 114-115) of the interviewees to ensure representation was made from both experienced and novice users of digital resources, across a variety of disciplines and academic positions.

A naturalistic qualitative strategy was adopted for the study due to the exploratory nature of enquiry. Hitchcock and Hughes (1995, p. 26) states that a naturalistic research approach ‘recognises that what goes on in our schools and classrooms is made up of complex layers of meanings and interpretations, values and attitudes’. The focus of this study concentrates on how and why academics adopt or reject the use of digital resources for their teaching practice; uncovers the key incentives and barriers to use; and ascertains the support and changes needed to encourage more use within Irish universities. Hitchcock and Hughes (1995, p. 296) also assert that naturalistic qualitative enquiry is about describing and explaining phenomena that occur within a routine environment. The study required some probing to gain in-depth understanding of the attitudes surrounding digital resource use within the context of the academic’s cultural and social environment and personal perspective. Patton (2002, p. 39) reaffirms this description of naturalistic enquiry:

Qualitative designs are naturalistic to the extent that the research takes place in real-world settings and the researcher does not attempt to manipulate the phenomenon of interest.
The phenomenon of interest unfolds naturally in that it has no predetermined course established by and for the researcher such as would occur in a laboratory or other controlled setting.

(Patton 2002, p. 39)

A case study approach was then identified as the preferred design for capturing and documenting the results of the study. Yin (2009) identifies three types of case studies: ‘exploratory’ ‘descriptive’ and ‘explanatory’. He argues that descriptive case studies give a narrative account of life as it is in a social situation which tends to be high on detail but low on theory. Merriam (1988, p. 326) also provides a similar overlapping classification of case studies: ‘descriptive’, ‘interpreted’ and ‘evaluative’. In line with Yin (2009), Merriam defines descriptive case studies as ‘narratives... rich in detail and atheoretical in the sense that basic description of the subject comes before hypothesizing or theory testing’. As this study is neither testing nor hypothesizing existing theories, a descriptive case study was the method chosen to use within a naturalistic qualitative research strategy.

Creswell’s (2002, p. 61) interpretation of a case study is ‘a problem to be studied, which will reveal an in-depth understanding of a “case” or bounded system, which involves understanding an event, activity, process, of one or more individuals. The ‘problem’ around which this case study is centred is in identifying the key factors that influence or inhibit the diffusion process of digital learning resources within Irish universities. The methods used in the study to gather quantitative and qualitative data for the study included, a web-based survey and five unstructured interviews. The case study was conducted within the boundaries of the seven Higher Education Authority funded universities in Ireland and a total of 170 participants responded to the survey. A detailed discussion of the research methodology and instruments are discussed in chapter three.

According to Hitchcock and Hughes (1995) case studies attempt to tell the ‘story of a certain aspect of social behaviour in a particular setting and the factors influencing the situation.’ While Creswell (2002, p. 61) states that case study is a problem to be studied, which will reveal an in-depth understanding of a “case” or bounded system, which involves understanding an event, activity, process, or one or more individuals. Case studies can be defined within many different contexts as reiterated by Cohen et al. (2007, p.253) while referencing Hitchcock and Hughes (1995).
Boundaries can be created for case studies around geographical location, and or can capture a point of view within a particular time period. Case study boundaries can also be set around characteristics of individuals or groups involved in the study and defined by participants’ roles and functions. This study is set around individuals involved in teaching and learning in the seven HEA funded universities in Ireland. A descriptive case study approach is the appropriate vehicle used in examining the questions posed in this study as it centres on a particular group and their interactions with and attitudes towards digital resources.

Cohen et al. (2007, p. 256 adapted from Adelman et al. (1980)) reference some of the possible advantages of case studies:

1. ‘Case study data, paradoxically is ‘strong in reality’ but difficult to organize. In contrast other research data is often weak in reality but susceptible to ready organization. This strength in reality is because case studies are down-to-earth and attention holding, in harmony with the reader’s own experience, and thus provide a ‘natural’ basis for generalization.

2. Case studies are all generalizations either about an instance or from an instance to a class. Their particular strength lies in their attention to the subtlety and complexity of the case in its own right.

3. Case studies recognize the complexity and ‘embeddedness’ of social truths. By carefully attending to a social situation, case studies can represent something of the discrepancies or conflicts between the viewpoints held by participants. The best case studies are capable of offering some support to alternative interpretations.

4. Case studies, considered as products, may form an archive of descriptive material sufficiently rich to admit to subsequent reinterpretation. Given the variety and complexity of educational purposes and environments, there is an obvious value in having a data source for researchers and users whose purposes may be different from our own.

5. Case studies are a ‘step to action’. They begin in a world of action and contribute to it. Their insights may be directly interpreted and put to use; for staff or individual self-development, for within-institutional feedback; for formative evaluation; and in educational policy making.
6. Case studies present research or evaluation data in a more publicly accessible form than other kinds of research report, although this virtue is to some extent bought at the expense of their length. The language and the form of the presentation is hopefully less esoteric and less dependent on specialized interpretation than conventional research reports. The case study is capable of serving multiple audiences. It reduces the dependence of the reader upon unstated implicit assumptions, and makes the research process itself accessible. Case studies, therefore, may contribute towards the ‘democratization’ of decision making (and knowledge itself). At its best, they allow readers to judge the implication of a study for themselves.

The advantages raised in points three and five are particularly pertinent to this study. The issues surrounding the use of digital resources are strongly influenced by the ‘social truths’ held by individuals and the institutions and a case study approach lends itself to capturing and documenting these ‘truths’. It is also an aspiration of this study that it will support a ‘step to action’, as discussed in point five above, based on its findings and recommendations.

The social attitudes of the participants with respect to the use of digital resources in their teaching and learning are documented and considered. The complexity of differing social and cultural attitudes not only amongst individuals but also the varying cultures within universities lends itself very well to a descriptive case study approach. The study also discusses and documents the support measures identified and referenced by the participants which could be viewed as a potential ‘step to action’ for higher education institutions with relevance to their educational policy-making procedures. Cohen et al. (2007, pp. 257-258) affirm the importance of the selection of information for case studies and note that this form of research focuses more on the quality and intensity of the information received rather than the quantity: ‘Significance rather than frequency is the hallmark of case studies, offering the researcher an insight into real dynamics of situations and people’. Employing a case study approach, this research offers an insight into the use of digital resources in higher education and helps to uncover some of the inhibitors towards use while at the same time provides an understanding of the motivating factors that have the potential to encourage more use.
Further arguments in favour of the use of case studies come from Burgess (1984 p. 117) who contends that case studies have a number of qualities that are suited to informing decision making as they allow judgements to be made to particular circumstances while allowing more of the educational processes to be portrayed. Burgess goes on to support the case study as an evaluation tool as he claims that one of the main priorities of case studies are to inform judgements and that knowledge generated through case studies can be used as political resources. Hitchcock and Hughes (1995, p. 322) also advocate the use of case studies when ‘How’ and Why’ questions are being posed. ‘When the investigator has little control over events or when the focus is on a contemporary phenomenon within some real-life context then it is here that the case study will come into its own’.

A case study approach is not, however, void of weakness and limitations. The weaknesses of case studies defined by Nisbet and Watt (1984) and listed in Cohen et al. (2007) include the difficulty in generalising the results of a case study, as the parameters around a case study cannot ever represent the views and dynamics of the general population. Hitchcock and Hughes (1995, p. 325) suggest though, that generalisation is possible from case study research but that it must be defined differently to the generalisation terms used in other forms of quantitative research.

Nisbet and Watt (1984) also acknowledge that case studies may be prone to observer bias as the researcher’s reflexivity cannot always be counter-balanced by the research strategies. The research is not easy to cross check which implies that it could suffer from bias, selectiveness and subjectivity. It is important that the researcher be aware of the tendency to bias when reporting the information and take appropriate measures to ensure that the reader can see how the researcher came to certain conclusions. The data must be transparent and give opportunity to the reader to cross check the content.
3.4 Research Instruments
This section describes in detail the research instruments used to conduct this study, namely, an online web-based survey and unstructured interviews.

3.4.1 Online web-based survey
The research instrument used to collect all the quantitative data and some qualitative data was a web-based survey. According to Weisberg et al. (1996) (cited by Cohen et al. 2007, p. 207) ‘surveys are useful for gathering factual information, data on attitude and preferences, beliefs and predictions, behaviour and experiences’. Dillman (1999, p.400) proclaims the value of web-based surveys saying 'there is no other method of collecting survey data that offers so much potential for so little cost’.

A web-based survey tool called Survey Monkey was used to create the survey. This medium was selected as it held many advantages including: ease and speed of distribution to target audience, cost effectiveness as all correspondence was done via email, and ease of access as the target audience would all have internet access through their institution and so be able to volunteer for the survey. The respondents could answer the questions in their own time at home or at work and in stages if desired. Web-based surveys are becoming a common and familiar tool used to gather research data within the academic community. The survey was designed to suit the medium of the internet taking into consideration the many design principles for web-based surveys defined by Dillman (1999, p. 377). The survey was designed ‘with restraint in order to maximise the likelihood that recipients ..... respond’.

The branching of questions was avoided throughout the survey, as, according to Redline et al. (2002), branching can cause confusion and result in people skipping questions or getting confused and leaving the survey altogether. The survey comprised twenty seven questions in total and was divided into three categories namely: background, digital resource usage and incentives and barriers. The survey comprised a combination of four open questions, three closed questions, seven open-ended multiple choice questions, eight open-ended Likert scale and five open-ended dichotomous questions (see appendix G p. 201 for full questionnaire). The researcher’s use of open-ended questions was due to the exploratory nature of the survey and was included to capture additional information not accounted for in the closed questions. Cohen et al. (2007, p. 321) suggest that ‘open-ended questions are useful if the possible answers are unknown, or the questionnaire exploratory, or if there are so many possible categories of response that a closed question would contain an extremely long list of options’.
Oppenheim (1996, p. 81) further affirms the importance of open-ended questions within surveys as they allow the survey participants to expand on their responses and ‘to do so with greater richness and spontaneity’. The questions were designed in order to give an opportunity to the participants to expand on their answers if they so wished.

The survey was created and first piloted with a sample group of five, selected by the researcher. Following this initial phase edits were made to the online survey based on feedback received and the survey was then circulated to contacts within all seven HEA funded universities in Ireland for distribution within their local institutions.

A volunteer sampling approach was taken for the online survey, as described by Cohen et al. (2007, p. 116). The connections through the NDLR were used to help disseminate the survey and requested volunteers to participate. This was done through an email invitation and sent from a contact within the local institution generally from within the centres for teaching and learning. The request informed the participants of the purpose of the study and requested their time and assistance with completing the survey online. The email invitation was circulated across faculties in an effort to reduce disciplinary bias and was aimed at academic staff and also those involved in e-learning or providing support for learning technologies. The online survey remained open for a period of four weeks with gentle reminders circulated during this time to encourage more participation. At the end of the four weeks the total number of survey participants was 170. The total number of academics employed in Irish universities is 4,701, based on the latest figures released by the Higher Education Authority (2012). This case study is captures and reflects the opinions of 3.6% of the Irish academic community.

Cohen et al. (2007) caution that when using a volunteer sampling method it should be mentioned that people may have different reasons for wanting to volunteer in a study, for example, wanting to benefit society, help a friend or even revenge. Volunteers may be well intentioned but do not necessarily represent the wider population. Dillman (1999) however, suggests that due to the reliance on volunteers with online surveys, greater authenticity of responses can be obtained in the absence of persuasion. The voluntary and often anonymous nature of web-based surveys provides participants with the confidence to answer honestly without concerns of ramification or feelings of obligation to support or agree with the researcher’s point of view.
3.4.1.1 The setting
This study was conducted within the seven HEA funded Universities in Ireland namely; Trinity College Dublin, University College Dublin, Dublin City University, University of Limerick, University College Cork, National University of Ireland Galway and National University of Ireland Maynooth.

3.4.1.2 The participants
The research targeted all levels of academic staff from teaching assistants to professors and also included non-academic staff involved in providing digital learning support within their institution.

3.4.2 Unstructured Interviews
The second research method employed in this study focussed on gathering more qualitative data and this was achieved through unstructured interviews. Conducting face-to-face interviews was vital for the study as the research aims required reaching a level of understanding and insight that could better be achieved through this method than through surveys alone. Gillham (2000, p. 15) suggests that trust and confidence in the interviewer is a key factor in acquiring rich data during the interview process. He also goes on to advocate the benefits of conducting interviews if depth of meaning is central to the study. While some factual questions form an important part of this research relating to the types of digital resources being used and how in fact they are being used in a teaching context, other questions concerning inhibitors and motivators on a personal and institutional level required more probing and in-depth responses.

An unstructured interview approach was selected in favour of a structured or semi-structured approach, as unstructured interviews allow for more flexibility. According to Fontana and Frey (2005) interviews can be divided into three categories; structured interviews, semi-structured interviews and unstructured interviews. A structured interview is an interview that has a set of predefined questions which are asked in the same order for all respondents. Structured interviews are similar to surveys, except that they are administered orally rather than in writing. Semi-structured interviews are more flexible, usually including both closed-ended and open-ended questions which the interviewer can adjust based on the context of the participants’ responses (Zhang and Wildemuth 2009). Unstructured interviews are more free-flowing and follow the course of conversation between the interviewer and the interviewee. Patton (2002) described unstructured interviews as a natural extension of participant observation and argued that they rely entirely on the spontaneous generation of questions in the natural
flow of an interaction. Zhang and Wildemuth (2009) concluded in their study that unstructured interviews are most useful when the study needs to gain an in-depth understanding of a particular phenomenon within a particular cultural context. Unstructured interviews remove defined questioning constraints and provide opportunity for the informants to offer new perspectives or even new topics which may have not been considered prior to the interview. The aim of the unstructured interview is to ‘provide for a freer flow of information between the researcher and the subject’ (Hitchcock and Hughes 1995, p. 162).

While the overall approach to the interviews was unstructured, the conversations were conducted with a clear plan of the questions and topics to be discussed. The questions posed during the interviews (see appendix F p.198 for the sample interview questions), though unstructured in nature, were related to the questions from the online survey, giving the interviewees an opportunity to substantiate the data collected through the online survey. This facilitated the analysis of common themes throughout all the interviews, yet still enabled the introduction of new content through new themes or issues not predetermined or conceived before the interviews.

A purposive sampling technique as defined by Cohen et al. (2007, p. 114and 115) was used for the interview selection process where ‘the researcher handpicks the cases to be included in the study on the basis that they represent the typical characteristics being sought’. Cohen et al. go on to say that this sampling selection process is deliberately selective and that the point of this approach is to gather in-depth information from those who are in a position to share it. Denzin and Lincoln (1994) as referenced in Silverman (2000, p. 104) claim that ‘many qualitative researchers employ purposive sampling and not random sampling methods. They seek out groups, settings and individuals where....the processes being studied are most likely to occur.’ Patton (2002) also agrees that when conducting qualitative inquiry purposive sampling can be beneficial as people are selected for the study because they are’ information rich and illuminative, that is, they offer useful manifestations of the phenomenon, not empirical generalisation from a sample to a population’. A total of five interviews were conducted with academics from different academic positions, faculties and levels of digital resource use and one interview was conducted with a non-teaching academic responsible for supporting e-learning. The faculties of Arts, Business, Science and Education were represented and also a representative from a centre for teaching and learning who was responsible for providing e-learning and technologies support to academic staff.
The researcher purposively selected interviewees from different backgrounds, academic positions and institutions in order to reduce elements of bias and to help round out the data.

3.5 Triangulation
Cohen et al. (2007, p. 141) define triangulation as ‘the use of two or more methods of data collection or analysis in the study of some aspect of human behaviour’. They go on to say that triangular techniques in social sciences attempt to map out or explain more fully the richness and complexity of human behaviour by studying it from more than one standpoint. Patton (2002, p.248) maintains that studies that only use one method are ‘more vulnerable to errors linked to that particular method’. According to Patton, studies that employ a mixed-method approach improve reliability and validity and reduces opportunity for bias through cross-data checks.

While triangulation can indeed strengthen the reliability of data, Patton (2002) cautions that the goal of triangulation is not necessarily to arrive at consistency across data sources or approaches. In Patton’s view, inconsistencies should not be seen as weakening the evidence, but should be viewed as an opportunity to uncover deeper meaning in the data.


This research study benefitted from methodological triangulation, which Denzin (1978) defines as the use of multiple methods to study a single problem or program. This study used an online web-based survey which collected the quantitative data and some qualitative data through open-ended questions. Individual unstructured interviews were also conducted and recorded which provided rich qualitative data, substantiating the content received through the survey. Triangulation is used in this study to deepen the understanding of the issues surrounding the use and users of digital resources and to help validate the findings. Hitchcock and Hughes (1995, p. 180) are of the view that triangulation with respect to interview material can add some depth to analysis and potentially increase the validity of the data.
3.6 Data Analysis
The data analysis design and strategy underpinning this study is based on inductive analysis as discussed by Patton (2002, p. 56). Inductive analysis allows for ‘the important analysis dimensions to emerge from patterns found in the cases under study without presupposing in advance what the important dimension will be’. Hitchcock and Hughes (1995, p. 297) maintain that qualitative analysis is focussed more on ‘discovery’ than the verification of existing theories and hypotheses. Patton agrees with Hitchcock and Hughes and notes that unlike formal hypothesis and theory testing, the theories that are formed through inductive analysis are ‘grounded in and emerge from direct field experience rather than being imposed a priori’. Hitchcock and Hughes affirm that qualitative analysis develops in an inductive way and that it is the role of the researcher to examine each individual case and then find the relationships between them - if any exist. They stress the importance of the researcher’s role in the analysis process and in discovering the relationships and themes that exist between the cases. They also emphasise the significance of the researcher’s experience when it comes to formulating insights based on the themes or relationships observed. ‘The hunches and ideas are generated out of the interaction of the researcher’s own personal ... experience and the nature and content of the data.’ As mentioned earlier in chapter one, (section 1.2 p.8) I have worked for many years in the area of digital resource use and development and has been involved in the day to day issues experienced by those who participated in this study. This unique position has helped me to identify and recognise the important themes in the data and give them meaning. It is the intention of this study to present the attitudes and opinions of the academics involved based on their real-world experiences and potentially influence educational policy makers and advisors.

Glaser and Strauss (1967) as cited by Hitchcock and Hughes (1995, p. 57) talk about the importance of first summarising each individual case of interview before attempting to find any common patterns or themes. This approach helps to ‘ensure that emergent categories and discovered patterns are grounded in specific cases and their contexts’. Following the recommendations of Glaser and Strauss, all the interviews conducted were transcribed and summarised first before being analysed by the researcher to uncover any common themes that materialised from the content of the interviewees and the qualitative data of the survey respondents.
An open-source data analyses tool called Weft QDA was used to analyse and code the qualitative data from the interviews along with the qualitative data collected from the web-based survey. The data from the interviews was first organised by individuals and then by research question:

1. To what extent – and for what purposes, have Irish university academics adopted digital resources to support their teaching practice?
2. What types of digital resources do Irish university academics use to support their teaching practice?
3. What are the main incentives and barriers for using, reusing and/or developing digital resources?
4. What support or changes are needed to encourage more engagement with digital resources in higher education in Ireland?

Cohen et al. (2007) propose that organising the data by research question is a very useful way of analysing data as it brings together all the streams of content gathered through various research instruments and provide a collective answer to the research questions posed or raised in the early part of the inquiry.

The quantitative data from the web-based surveys was analysed using the reporting tools available within Survey Monkey. Cross-tabulation was also conducted between data sets such as academic position and the development of resources, age and the development of resources and faculty and the types of resources used, to help to uncover any interesting trends or themes within the data. The web-based survey was designed to allow only one survey per IP address. This feature greatly reduced the chance of multiple surveys being submitted by one person.

### 3.7 Ethical considerations

Burgess (1984 p. 17) states that ‘with respect to the public, researchers should pursue openness, sensitivity, accuracy, honesty and objectivity in their choice of topic, methods, analysis and dissemination’. Attempts were made by the researcher to live up to this concept. The ethical issue considered throughout this study centred around the anonymity of both the survey respondents and the interviewees. This study was first presented to the Research Ethics Committee at the University of Limerick where ethical sensitivities and issues were reviewed and the study was deemed to meet the legislative ethical requirements (Appendix B and C).
Creswell (2009, p. 87) asserts the need for researchers to protect their research participants and guard against any misconduct or offensive behaviour that would reflect poorly on their institutions.

Prior to circulating the survey the researcher approached each of her contacts within the seven targeted universities involved in this case study. An email (see appendix F) was sent to them explaining the purpose and goals of the study and requesting their assistance in the circulation of an email with a link to the survey. All seven contacts agreed to assist and a similar email was prepared, for the contacts to circulate within their local institution, outlining the researcher’s background and intention with regards to the study. The email also contained a short description of the survey, estimated time for completion and a direct link to the survey for ease of access. In addition the researcher offered to send on a summary of the findings if anyone was interested. All respondents who participated volunteered for the survey and were not coerced in any way. Respondents also had the option to back out of the survey at any time. The completed surveys are being stored within a password protected area online.

The interviewees were also contacted by the researcher via email explaining the purpose and intention of the study and requesting their participation in the study by way of interview. The interviewees were informed in advance that the interview sessions would be recorded for the purposes of data accuracy and that their anonymity was guaranteed. An information sheet and a consent form (Appendix D and F) were sent to each of the interviewees which they signed acknowledging their willingness to participate. The interviewees were also informed that they could withdraw at any time if they changed their minds. Oppenheim (1996, p. 84) emphasises that researchers should always respect the respondents’ right to privacy and right to refuse to answer certain questions and not be subjected to any excessive persuasion. A copy of the types of interview questions to be expected was also sent to each of the interviewees in advance to help them prepare to feel confident about participating. The researcher also offered to send them a summary of the findings if they were interested. The interview sessions were arranged at the convenience of the interviewees and most sessions were conducted at their workplace. The recorded interviews are stored on a password protected computer.
3.8 Limitations of the study
This study was designed as a case study and as such has a number of specific limitations pertaining not only to the type of study but also the subject matter in question. It is important that all limitations be considered and noted for future studies and in reviewing the findings of this study. Consequently, the following section highlights and explains the limitations that relate to this current work.

3.8.1 Sample size and characteristics
The study was limited to respondents from the seven HEA funded Irish universities and does not include the views and opinions of academics employed in the Institutes of Technologies (IOT’s) or those working in privately funded university institutions. This is a significant limitation as the author has experienced during her time with the NDLR, in general, a cultural difference between the practice of digital resource use and development in universities and IOT’s. Empirical evidence acquired through the outputs of the NDLR funding initiatives would suggest a greater interest in digital learning resources within the IOT’s than within Universities (Bruen et al. 2011a; 2011b, 2012a and 2012b). This could be a reflection of the different culture, norms and values of an IOT versus those of a university. This limitation must not be overlooked and could be viewed as an opportunity for further research.

The used a web-based survey to acquire the quantitative data and was reliant on voluntary participation, as is the case with most online surveys. As a result there was an uneven spread of respondents not only between the universities but also between the various faculties. The total number of survey respondents who participated in this study was 170 which is not statistically significant or representative of a national viewpoint. However, this was never the intention of the study. The intention of this study was to provide a potential basis and framework for a larger national study inclusive of the whole Irish higher education community.

3.8.2 Research Instruments
The research instruments used for the study combined a web-based survey and unstructured face to face interviews. The survey was designed to acquire the quantitative data with opportunity given to the participants to substantiate their answers with the inclusion of some open-ended questions. However, the limitations of survey instruments with respect to capturing the causes behind a particular phenomenon have been well documented (Healy 2000).
Some of the findings are limited in the extent to which the study was able to uncover the reasons behind some of the perceived barriers to digital learning resource use, such as ‘time’. The face to face interviews were conducted to help to reduce the impact of this limitation. The unstructured nature of the interviews allowed room to explore new themes as well as investigate further the common issues highlighted in the survey responses.

3.8.3 Disciplinary differences
Many studies have been conducted on the disciplinary differences that exist with respect to teaching and learning and research activities. However, the scope of this study was limited in size and not able to examine the impact of disciplinary differences with respect to the use of digital learning resources in any great detail. The importance of disciplinary differences on the type of digital resources used, attitudes towards use and the impact of using them for learning is an area worth exploring in future studies.

3.8.4 Researcher bias
Researcher bias inevitably affects how research is conducted and interpreted. This study may be perceived as limited due to the researcher’s direct involvement with the subject matter through time spent working with the NDLR, which may have resulted in subjectivity. Conversely the empirical evidence gained from this experience could be perceived as an advantage adding a richness to the study and enabling a certain insight into the interpretation of the findings and literature.

3.8.5 Changing landscape of education
The diffusion of digital resources and in particular OER is in its infancy. As a result new developments, programmes and initiatives are constantly coming on stream. Education institutions, systems and approaches are attempting to adapt to a changing technology reliant landscape. At the time of writing the European Commission, the Commonwealth of Learning in conjunction with UNESCO and other global organisations were forming policy documents on the use of digital resources for education. The continuous publication of international reports from the OECD, the EC and other global authorities on the use of digital technologies for education has been challenging in terms of keeping abreast of current literature.

Also due to the contemporary and changing nature of the subject area there was limited contextually relevant published research available on the use of digital learning resources within Irish universities.
Instead the study draws from internationally relevant publications and reports which do not in all cases reflect the socio-cultural, institutional or educational perspectives unique to Ireland.

3.9 Summary
This chapter discusses the methodological approach and rationale supporting this study. Issues relating to the researchers direct involvement in the subject of the study were also examined. In addition, this chapter outlined the approach adopted for the data analysis, addressed the ethical considerations of the study and noted the limitations surrounding the research. The next chapter presents the findings of this study organised according to the research questions.
Chapter 4: Findings

This chapter presents the findings of this study which are based upon data collected through an online survey and face-to-face interviews with teaching academics in Irish Universities.

The online survey and interview questions were designed to address the following primary research questions:

To what extent has the use of digital learning resources diffused amongst the teaching community in Irish universities and who is using them?

What types of digital learning resources have Irish university academics adopted to support their teaching practice?

What are the main incentives and barriers for using, reusing and/or developing digital resources?

What support or changes are needed to encourage more engagement with digital resources in higher education in Ireland?

The survey comprised 27 questions in total and was divided into three main sections, the first section focussed on the extent of digital resource use, profile of the user and the types of resources used, section two was concerned with the incentives and barriers around the use of digital resources and section three centred around the support or changes needed to encourage more engagement with digital resources.

As discussed in chapter three, five interviews were conducted using purposive sampling techniques to ensure representation from different academic positions and to include experienced digital resource users, learning technologists, as well as novice users.

4.1 Web-based survey findings
This section presents the findings of the data collected from the web-based survey.

4.1.1 The user profile and type of digital resource use
The first part of the web-based survey was designed to allow respondents to ease into the survey. A number of background questions were posed to help establish the general extent of digital learning resource usage and the profile the users. These questions were focussed on age, gender, academic position, university employer and associated faculty.
4.1.1.1 Respondent profile

According to the latest Higher Education Key Facts and Figures report (Higher Education Authority 2012) Irish universities currently employ 4,701 academic staff. This study invited voluntary participation through the web-based survey to all university academic and learning support staff. Following a period of four weeks the survey was closed with a total of 170 respondents. While requests for participation for the study were circulated within all the universities, the majority of survey respondents came from just three, namely NUIM, UL and DCU as presented in table 4.1.

<table>
<thead>
<tr>
<th>University</th>
<th>Response count</th>
<th>Response %</th>
</tr>
</thead>
<tbody>
<tr>
<td>National University of Ireland Maynooth</td>
<td>52</td>
<td>32%</td>
</tr>
<tr>
<td>Dublin City University</td>
<td>50</td>
<td>31%</td>
</tr>
<tr>
<td>University of Limerick</td>
<td>44</td>
<td>27%</td>
</tr>
<tr>
<td>National University of Ireland Galway</td>
<td>9</td>
<td>5%</td>
</tr>
<tr>
<td>University College Dublin</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>University College Cork</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>Trinity College Dublin</td>
<td>3</td>
<td>1%</td>
</tr>
</tbody>
</table>

Table 4.1 University representation (N=166)

A significant factor which may have influenced the differing levels of participation amongst the universities was the differing approaches taken by the contacts within the universities. The top three participating universities took a very active approach and sent requests to participate via email to all academic staff and then followed up with reminder emails. The other four universities adopted a more passive approach, uploading a link to the survey on their website with an invitation to participate.

The gender ratio of the respondents who took part in the survey was 50.3% male to 49.7% female giving an even balance and representation of both genders.

This gender balance corresponds closely with the latest HEA key facts and figures report (Higher Education Authority 2012) which states that currently 57.4% of academic staff employed in universities in Ireland are male and 42.6% are female.

The survey respondents were also asked to state their academic positions by selecting an option from a pre-defined list. A total of 115 people answered the question with the majority selecting ‘lecturer above the bar’; this is a university grade for which
academics must hold a doctoral degree or equivalent professional qualification. Over 75% of the survey respondents comprised professors, senior lecturers and lecturers above the bar demonstrating a high level of interest in the subject of this study amongst the more senior university academics.

<table>
<thead>
<tr>
<th>Academic Position</th>
<th>Response count</th>
<th>Response %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Assistant</td>
<td>8</td>
<td>7.0%</td>
</tr>
<tr>
<td>Lecturer below the bar</td>
<td>20</td>
<td>17.4%</td>
</tr>
<tr>
<td>Lecturer above the bar</td>
<td>59</td>
<td>51.3%</td>
</tr>
<tr>
<td>Senior Lecturer</td>
<td>13</td>
<td>11.3%</td>
</tr>
<tr>
<td>Professor</td>
<td>15</td>
<td>13.0%</td>
</tr>
</tbody>
</table>

*Table 4.2 Academic positions of survey respondents*

The age demographics of the survey respondents, similar to the academic positions, also lean in favour of the more senior age groups, with just 5.5% of respondents in the 20-30 age group. There was a fairly even spread between the 31-40 age group and the 41-50 age group as can be seen in table 4.3. While the question of age as an influencing factor in the use of digital resources is an interesting one, it was not explored in any detail within this study.

<table>
<thead>
<tr>
<th>Age</th>
<th>Response count</th>
<th>Response %</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>9</td>
<td>5.5%</td>
</tr>
<tr>
<td>31-40</td>
<td>57</td>
<td>34.8%</td>
</tr>
<tr>
<td>41-50</td>
<td>54</td>
<td>32.9%</td>
</tr>
<tr>
<td>51+</td>
<td>44</td>
<td>26.8%</td>
</tr>
</tbody>
</table>

*Table 4.3 Age demographic of survey respondents*

Other research studies, such as Harley *et al.* (2006) and Kemp and Jones (2007), have noted disciplinary differences amongst digital resource use in general, the extent of use, the types of resources favoured and how these are used in the teaching of the subject.

While many university faculties are categorised in different ways, this study presents six different discipline categories for the purposes of analysis. Of the 170 respondents who answered the online survey, 155 provided data in relation to the faculty or discipline to which they were affiliated. The majority of respondents (35%) were associated with the faculty of Arts, Humanities and Social Science. Education was the discipline least represented in the survey.
<table>
<thead>
<tr>
<th>Faculty/Discipline</th>
<th>Response count</th>
<th>Response %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts, Humanities and Social Sciences</td>
<td>55</td>
<td>35%</td>
</tr>
<tr>
<td>Science and Engineering</td>
<td>37</td>
<td>24%</td>
</tr>
<tr>
<td>Business</td>
<td>21</td>
<td>13.5%</td>
</tr>
<tr>
<td>Health Science</td>
<td>15</td>
<td>10%</td>
</tr>
<tr>
<td>Education</td>
<td>4</td>
<td>2.5%</td>
</tr>
<tr>
<td>Learning Support</td>
<td>23</td>
<td>15%</td>
</tr>
</tbody>
</table>

Table 4.4 Faculty representation of survey respondents

4.1.1.2 Types of digital resources used

This part of the survey focussed on the types of resources used and the sources from where the respondents accessed resources for their teaching and learning. As discussed in the literature review (section 2.3.1, p. 17), McGreal (2007) defined learning resources as electronic text, simulations, websites, .gif graphic images, Quicktime movies, Java applets or any other digital resource that can be used in learning. It is this description of a digital resource that we refer to for the purposes of this study.

The respondents were asked whether they use digital resources in their teaching and learning practice and 97% answered ‘yes’ to this question. This result could be indicative of how embedded the use of digital resources has become within higher education in Ireland. One could argue though, that the self-selecting approach to this survey would, by its digital nature, increase the likelihood of a high percentage answering positively to using digital learning resources. The most commonly used types of digital resources according to the survey respondents were websites (81%) and video (74%). These results are in line with other recent studies (Masterman and Wild 2011; White and Manton 2011), which show a trend towards reusing resources that the majority of academics can find time-consuming to produce, or which they may lack the relevant media production skills to create themselves, such as diagrams, videos and multimedia.

Digital audio learning resources rated highly with 50% of respondents selecting it as a type of resource they use. A significant number (42%) selected a ‘combination of the
above’ as the type of digital resources they use for their teaching. The least used type of digital resource were Screencasts (25.5%).

As the list of resource types was not a complete list of all types of digital learning resources, the question was open-ended, allowing respondents to add further types of resources not included in the list of options. A sizeable 13.5% selected ‘other’ as an option and the types of resources suggested were varied. The most common types proposed were: Learning Management Systems such as Moodle and Sulis, PowerPoint, PDF’s, Images and blogs or Wikis. Other resources listed to a lesser extent included: Ebooks, animations, interactive quizzes and online laboratories.

![Fig 4.1 Types of digital learning resources used](image)

Cross tabulation of the data collected through the web-based survey, between the faculties and types of resources used, helps us to gain an insight into the types of resources favoured within certain disciplines. The results show a consistently strong preference for both video and websites throughout all the disciplines. Screencasts rate as one of the lowest preferred type of digital resource to use particularly within the faculty of Arts Humanities and Social Sciences.

---

10 A Screencast is a digital video recording that captures actions taking place on a computer desktop
The survey respondents were also asked to rate from a selection of resource types which ones they believed to be most effective on a scale of 1-5 with 1 being most effective and 5 the least effective. The results illustrate that a combination of resources used together for teaching and learning was deemed the most effective ‘type’ of resource. However, video was rated the most effective singular type of resource. In 2005, MIT wrote an evaluation report on the use of their Open Courseware website to determine the types of resources that were most in demand and video materials rated in the top three of the ‘most useful to accomplishing their education goals’ behind lecture notes and full text readings.

**Fig 4.3 Most effective types of digital resources**
4.1.1.3 Sources of resources
The top three sources that academics use to acquire digital resources according to this study, are trusted websites, You Tube and their peers. With endless amounts of content freely available online, most people begin their search for material online through a general search engine like Google. One of the many quotes indicative of the respondents supporting this point of view is; “*When looking for resources, Google will probably remain my first port-of-call*”. Masterman and Wild (2011) also affirm the value of the wider web over specialised repositories or portals as the sheer volume of information available via Google and other search engines makes them the best starting point for many academics.

![Fig 4.4 Sources of resources](image)

Responses to the ‘other’ option consist predominantly of customised resources developed by the academics themselves, social networking media and specific virtual learning environment material.

The majority of respondents (51%) have never used a repository to access digital learning resources. Table 4.5 lists the repositories that respondents had used comprising the NDLR, MIT, Jorum, Merlot, and Connexions. The NDLR repository is the only Irish higher education learning resource repository with contextually relevant material available and this may have been a factor in the high percentage score amongst the survey respondents who are employed in Irish universities.
Survey respondents were asked if they were in favour of the open sharing of digital resources; the majority (96%) answered yes. This resounding vote of confidence in the ethos of open sharing indicates a cultural shift amongst the Irish academic community, not yet mirrored by most university governing authorities, from a self-contained ‘walled garden’ approach to a more outward facing progressive approach. This is a global trend, with more and more institutions and individuals sharing their digital learning resources over the Internet openly and at no cost, as open educational resources, even though learning resources are often considered key intellectual property in a competitive higher education environment (OECD 2007a).

To further explore the question around sharing, survey respondents were asked to rate in order of preference (1 being the highest and 5 the lowest) the main incentives of contributing a digital resource to a repository. ‘Community spirit’ rated as the main incentive with ‘peer recognition’ also rating high. Institutional recognition and improving professional profile both rated as the lowest incentives for contributing to a digital repository.

<table>
<thead>
<tr>
<th>Repository</th>
<th>Response %</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>51.1%</td>
<td>68</td>
</tr>
<tr>
<td>NDLR</td>
<td>26.3%</td>
<td>35</td>
</tr>
<tr>
<td>MIT</td>
<td>15.8%</td>
<td>21</td>
</tr>
<tr>
<td>JORUM</td>
<td>6.8%</td>
<td>9</td>
</tr>
<tr>
<td>MERLOT</td>
<td>5.3%</td>
<td>7</td>
</tr>
<tr>
<td>Connexions</td>
<td>3.8%</td>
<td>5</td>
</tr>
</tbody>
</table>

*Table 4.5 Digital repositories used*
Fig 4.5 Incentives for contributing to a repository

Although support is growing for the trend towards openness and sharing, the majority (76%) of the survey respondents said they had never contributed to a digital learning repository. Clearly there is still much work to be done in generating awareness amongst the academic communities in Ireland of the availability of these repositories and in encouraging contributions for sustainability into the future.

This was an open-ended question allowing respondents to provide additional incentives for contributing to a repository. Seven respondents provided ‘other’ incentives of which five were positively disposed to the concept of sharing. The reasons they provided were:

- To save others time in developing material;
- To provide necessary teaching materials to the world;
- It’s good the share;
- To enhance the learning experience for a wider group of students; and
- A belief in the value of digital learning resources

Two responses were opposed the concept of contributing resources to a repository. With one respondent stating: ‘This is a completely different and irrelevant culture to me – ‘I feel like I have landed on a strange planet now! This is just a completely different and irrelevant culture to me.’
The other respondent added; ‘I try to customize, adapt and carefully sequence my LO’s to each particular group so I don’t feel much incentive to share them. They would not be as valuable out of context’.

4.1.1.4 Development of resources
The survey also aimed to identify digital resource users who have now become developers themselves. Of the 97% of survey respondents who said that they use digital resources, 61% of respondents said that they have developed their own digital learning resources while 39% have not.

When asked to list the types of resources they have developed, the following list of the top five answers illustrates the diversity of resources and digital media in use and is also a reflection of the level of technical expertise of this 61% of academics who develop their own digital resources;

1. Screencasts
2. Video
3. Quizzes
4. Podcasts
5. Websites

While the results of an earlier question showed that screencasts are the least used type of digital learning resource, it seems to be the most commonly developed. This may be an indication of the ease with which they can be created using increasingly available software packages.

Table 4.6 shows that development of digital resources is taking place throughout all levels of academic responsibility. Teaching assistants report the least amount of development which is understandable as they are not fully responsible or in control of the teaching approach but instead probably follow direction from their course leaders.

<table>
<thead>
<tr>
<th>Academic Position</th>
<th>Response % yes</th>
<th>Response % no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Assistant</td>
<td>(29%)</td>
<td>(71%)</td>
</tr>
<tr>
<td>Lecturer below the bar</td>
<td>(63%)</td>
<td>(37%)</td>
</tr>
<tr>
<td>Lecturer above the bar</td>
<td>(60%)</td>
<td>(40%)</td>
</tr>
<tr>
<td>Senior lecturer</td>
<td>(73%)</td>
<td>(27%)</td>
</tr>
<tr>
<td>Professor</td>
<td>(67%)</td>
<td>(33%)</td>
</tr>
</tbody>
</table>

Table 4.6 Development of resources by academic position
While there is not a direct correlation between age and academic position, we see in Table 4.7 that the junior age group is less active in the development of digital resources and that the highest level of development is prevalent amongst the 51 plus age group. Harley et al. (2007) believe that individual opinions and attitudes have a greater effect on a person’s total level of digital resource use than do institutions disciplinary or demographic characteristics.

<table>
<thead>
<tr>
<th>Age</th>
<th>Response % yes</th>
<th>Response % no</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>31-40</td>
<td>57%</td>
<td>43%</td>
</tr>
<tr>
<td>41-50</td>
<td>61%</td>
<td>39%</td>
</tr>
<tr>
<td>51+</td>
<td>72%</td>
<td>28%</td>
</tr>
</tbody>
</table>

*Table 4.7 Development of resources by age group*

4.1.2 The incentives and barriers for using, reusing and developing resources
This section explores the attitudes of the academics towards using and developing resources, highlighting the perceived incentives for using and developing resources and we also uncover some of the challenges they face.

4.1.2.1 Incentives for using digital resources
The survey respondents were first asked to rate their attitude to the following statement, from strongly agree to strongly disagree: *Do your students react positively to the use of digital resources?*

88% of academics believe that their students react positively to the use of digital resources with 53% agreeing with this statement and 35% strongly agreeing (as shown in Table 4.8). Only 3% disagreed with the statement and nobody strongly disagreed. Masterman and Wild (2011) concur with these results and claims their evidence suggest that students see the use of online resources as a normal part of their experience of study, and especially value the curatorship provided by their tutors in the form of recommending and linking to resources.
<table>
<thead>
<tr>
<th>Scale</th>
<th>Response %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>35.1%</td>
</tr>
<tr>
<td>Agree</td>
<td>53.0%</td>
</tr>
<tr>
<td>Don't Know</td>
<td>9.0%</td>
</tr>
<tr>
<td>Disagree</td>
<td>3.0%</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

*Table 4.8 Do students react positively to the use of digital resources?*

It is clear from the results that academics believe that their students enjoy and gain benefit from the integration of digital resources into teaching practice. There remains, however, more opportunity to encourage adoption which is discussed in more detail in the following sections.

**4.1.2.2 What are the influencing factors that would encourage you to use digital resources?**

Survey respondents were asked to list in order of preference (with 1 being the highest), the main influencing factors that would encourage them to use digital learning resources in their teaching. This question was aimed more at the novice or non-user to help understand what factors might influence or increase the use of digital learning resources in their teaching practice.

The results show that training in how to integrate digital resources into teaching practice rated as the highest single factor for encouraging more use of digital resources for teaching and learning. This finding corresponds with the qualitative interview findings as summarised later in this chapter.
Fig 4.6 Incentives to use digital resources in teaching practice

However, when the first two preferences were combined, the results in Table 4.9 show that peer recommendations rate as the strongest incentive or encouragement for people to use a digital resource. This finding demonstrates the significance of peer influence when introducing new approaches or changes in practice. Academics will be more influenced to use a digital resource if it is recommended by a peer than for any other reason. The external pressure from students rated as the second highest combined influencing factor or incentive to use digital resources. This result suggests that if students requested the use of a certain type of resource, responded positively or were more engaged in the subject area as a result of using digital resources, lectures might be more likely to use them. Looking at the combined totals of the two highest incentives, there was a relatively even spread across all of the options with only eight counts between peer recommendations, which scored the highest combined total, and professional development which scored the lowest combined total.
<table>
<thead>
<tr>
<th>Incentive</th>
<th>Preference 1 response count</th>
<th>Preference 2 response count</th>
<th>Combined total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer recommendations</td>
<td>30</td>
<td>43</td>
<td>73</td>
</tr>
<tr>
<td>Student expectations</td>
<td>32</td>
<td>35</td>
<td>67</td>
</tr>
<tr>
<td>Assistance with finding relevant resources</td>
<td>28</td>
<td>38</td>
<td>66</td>
</tr>
<tr>
<td>Training in how to integrate digital resources into teaching practice</td>
<td>37</td>
<td>29</td>
<td>66</td>
</tr>
<tr>
<td>Professional development</td>
<td>29</td>
<td>36</td>
<td>65</td>
</tr>
</tbody>
</table>

*Table 4.9 Top two combined incentives to use digital resources*

4.1.2.3 What are the key factors influencing your decision to choose a particular digital learning resource to use in your teaching?

Survey respondents were asked to list in order of preference (with 1 being the highest), the key influencing factors in selecting a particular digital resource to use. While the previous question focussed on the external factors that may influence novice users to engage with digital resources, this question focussed on the resource itself and the factors that may influence the academic to use it or not.

According to the survey respondents, subject relevance is the main influencing factor with 82% rating it as the key influencing factor and pedagogic fit ranking as the second key influencer (76%) as illustrated in Table 4.10. These findings correspond with the qualitative responses also taken from the survey where people emphasised the importance of relevance and pedagogic fit:

“*Digital learning resources are only of use if they are relevant to the learning experience for students. There is no point in using them for the sake of it. They should bring some value for the learners.*”

Masterman and Wild (2011), document the attitudes and opinions of university lecturers towards the use of open education resources in the UK, they found similar results when trying to determine the factors operational in the selection or rejection of resources. They suggested influencing factors such as subject matter, pedagogic fit, provenance, granularity and media and the results (table 5.10, p. 38) show that pedagogic aspects rated as the highest factor and relevance rated as a close second.
The quality of the resources also rated high (52%). Media format and licensing were not seen as significant factors when selecting a resource to use, according to the survey respondents.

<table>
<thead>
<tr>
<th>Influencing factor in choosing a resource to use</th>
<th>Response %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject relevance</td>
<td>82.4%</td>
</tr>
<tr>
<td>Pedagogic fit</td>
<td>76.0%</td>
</tr>
<tr>
<td>Quality</td>
<td>52.0%</td>
</tr>
<tr>
<td>Media format</td>
<td>19.2%</td>
</tr>
<tr>
<td>Licensing</td>
<td>10.4%</td>
</tr>
</tbody>
</table>

*Table 4.10 Key factors in choosing to use a particular resource*

4.1.2.4 What are the main intrinsic incentives for using digital resources in your teaching practice?

The question posed in section 4.1.2.2 was designed to identify the extrinsic factors which may influence a novice user to engage more with digital resources. This question is concerned with the potential intrinsic incentives for using digital resources. Respondents were asked to rate in order of preference (with 1 being the highest), their main incentives for using digital resources.

The primary intrinsic incentive for people to use digital resources, according to the results of this study, is to enrich the student learning experience with an overwhelming majority (106, N=128) selecting this as their number one incentive. Table 4.11 presents the detailed results of the question. The second highest incentive, according to the survey respondents, is to innovate their teaching practice (40). The personal desire to meet students’ expectations of digital resource use was the third highest intrinsic incentive with a significantly lower first preference count (12).

The two potential incentives to receive the lowest preference were: to save time (7) and to keep up with peers (3). This result demonstrates that academics are more motivated by the satisfaction of improving their students’ learning and the teaching process in general than by the more direct benefits of saving time or improving status amongst their peers.
4.1.2.5 What are the key influencing factors which would encourage you to develop digital resources for your teaching?
A five point Likert scale (with 1 being the highest) was used for this question to gauge survey respondent’s opinions towards the key influencing factors that would encourage them to develop digital learning resources for their teaching practice. This question is a progression from the use of digital resources to the development of resources.

The key influencing factor which would encourage digital resources users to develop their own resources, according to this study, is time granted for resource development (57, N=124) scoring the highest first preference results (see Table 4.12). The provision of funding (38), access to e-learning development tools (37) and the provision of training on e-learning tools and pedagogy (36) all scored similar results. The least influencing factors are access to an e-learning developer (29) and institutional recognition (25). The findings indicate that people would rather be given the time and training to learn how to use and develop resources for themselves rather than have someone else do it for them.

Fig 4.7 Main incentives for using digital resources
4.1.2.6 The main barriers in using digital resources

This question was designed to reveal the main barriers to using digital learning resources and uncover the challenges academics face. The question asked the respondents to list in order of preference (with 1 being the highest) what they believed to be the main barriers to using digital learning resources. As illustrated in Fig 4.9 and Table 4.12, lack of time and lack of knowledge rated as the two main barriers (N=125). The perceived lack of time is referenced frequently in this study as a barrier to engaging more with digital resources and comes through as a strong theme in the qualitative interview data.

The lack of institutional recognition and lack of clarity around the benefits of using digital resources are also noteworthy barriers. In order to overcome the barrier of time poverty, people need to be convinced that using digital resources can add value and enhance learning. The main incentive, according to this study, for using digital resources is to enhance the learning experience, yet for those who have not experienced this benefit the lack of evidence and research in this area is perceived as a barrier to use. The primary challenge, it seems, is in convincing those who do not use digital resources frequently, to invest time in learning more about digital resources so that they may see a return on their time investment in the future through the enhancement of the learning experience.
Concerns about copyright licensing were found to be the least significant inhibitor to digital resource use for the survey respondents. These issues were more of a barrier ten years ago before the emergence of the open education resources movement. The availability of Creative Commons licensing and more open learning repositories, is improving confidence around copyright issues. This factor may have contributed to the perception of copyright as a low level barrier or concern to use.

![Barriers to using digital resources](image)

**Fig. 4.9 Barriers to using digital resources**

A number of other barriers were outlined by the respondents in their response to the open-ended question of: *please list any other perceived barriers to the use of digital learning resources in teaching practice.*
These included: difficulty in finding relevant and appropriate resources, shortage of discipline specific resources, and lack of professional training on how best to integrate digital resources into pedagogy. Knowing where to look and how to look for resources is a shared barrier to digital resource use amongst the academic community in general and there is not yet a critical mass of resources available for every discipline, which is perceived as limiting.

4.1.3 Support measures for encouraging use of digital resources
This section of the survey focussed on gathering data on current support structures in place for digital resource use and development within universities and supports academics would like to see in place in the future.

The first question of this section was posed to determine whether or not the survey respondents were aware of any support structure in place within their universities. Respondents were asked if their institution currently provides support for the development of digital learning resources. The majority (47%) of survey respondents answered that they do not know whether or not their institution provides support. 45% answered positively, that their institution did offer support to assist the use and development of digital resources and 8% answered negatively. It would appear from the results that if in fact universities are providing support in this area, a considerable percentage of the academic population is unaware of it.

The survey respondents were also asked whether they believed that higher education institutions should provide support for digital resource development. A majority (83%) answered positively to this question; a small percentage (14%) was undecided and 3% answered ‘no’.

4.1.3.1 Types of support institutions should consider to assist with digital resource use and development
One of the main aims of this study was to identify some measures which higher education institutions could put in place to help encourage more engagement with digital resources. The survey asked respondents to select the support measures that they would like to see in place within their institutions and they were also given the opportunity to provide additional suggestions. The majority (83.6%) would like to be granted time to develop resources and this support preference was followed closely by a desire for access to training courses (78.1%). These findings correspond with the results from an earlier question relating to incentives to use or develop digital resources. The key issue, and also both the most influencing barrier and incentive, is time.
The following quotations, provided in the qualitative feedback of the web-based survey, help to substantiate time as a key theme with respect to the use and development of digital learning resources.

“At the moment the whole effort is left up to the individual lecturer. I undertake the work in my own time at my own expense. I purchase all the software myself and pay for training resources myself……..I would like to see individual schools/faculty allow workload credits/time and recognition for any such contribution made when we put time/effort into such work.”

“Time allocation to lecturers would be a great benefit in improving lecturer participation in production of digital resources”

“Time and skill are vital for good resources to be developed…..in-house training should be provided as part of continuing professional development”

<table>
<thead>
<tr>
<th>Institutional support preferences</th>
<th>Response %</th>
<th>Response count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time allowed to develop resources</td>
<td>83.6%</td>
<td>107</td>
</tr>
<tr>
<td>Access to training courses</td>
<td>78.1%</td>
<td>100</td>
</tr>
<tr>
<td>Access to software development tools</td>
<td>65.6%</td>
<td>84</td>
</tr>
<tr>
<td>Central e-learning coordinator</td>
<td>55.5%</td>
<td>71</td>
</tr>
<tr>
<td>Recognition of e-learning contributions for tenure</td>
<td>50.8%</td>
<td>65</td>
</tr>
<tr>
<td>Recommendation of quality assured resources</td>
<td>39.8%</td>
<td>51</td>
</tr>
<tr>
<td>Institutional awards</td>
<td>35.9%</td>
<td>46</td>
</tr>
<tr>
<td>Financial recognition</td>
<td>28.9%</td>
<td>37</td>
</tr>
</tbody>
</table>

Table 4.12 Institutional support preferences (N=128)

Survey respondents were given an opportunity to provide additional suggestions for institutional support and one respondent made reference to the lack of parity between teaching and research support and recognition in universities:

“I would like recognition for the creation of digital learning resources, recognizing esp. the amount of time and effort involved. Very often as it is not a ‘research paper’ or other academic publication it receives no recognition at all.”
Another respondent believed that the use of digital resources should not garner any special support and that it should be considered just part of the job description.

“...not recognition of contributions for tenure, or financial recognition, it should be what we do as default”

A number of respondents mentioned the need for more evidence-based research on the benefits of using digital resources:

“I think this is just a buzz word – with no empirical evidence that it enhances teaching”

“Digital learning can, in certain instances, make a significant beneficial contribution to the student learning experience. However, I am sceptical about its relevance across the board. The current tendency seems to me for universities to throw money at the development of technology-assisted learning, without really stopping to consider whether or not this of benefit to the students.”

Survey respondents were also asked to rate their agreement with the following statement ‘I would use and/or develop more digital learning resources for my teaching if there was more institutional support and recognition’.

A significant majority (74%) of the respondents agreed with this statement while only 8% disagreed. The results indicate that people are positively inclined to use digital resources in their teaching practice. However, in order to continue to motivate use and development and encourage new users to engage with digital resources, institutions need to provide more support in the way of time and training through Continuous Professional Development. Full details are presented in Table 4.13.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Response %</th>
<th>Response count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>31.2%</td>
<td>39</td>
</tr>
<tr>
<td>Agree</td>
<td>43.2%</td>
<td>54</td>
</tr>
<tr>
<td>Don't Know</td>
<td>17.6%</td>
<td>22</td>
</tr>
<tr>
<td>Disagree</td>
<td>6.4%</td>
<td>8</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1.6%</td>
<td>2</td>
</tr>
</tbody>
</table>

*Table 4.13 People would use more digital resources if there was more institutional support*
4.1.3.2 Final comments and or suggestions for this study

The final question in the survey was open-ended and was designed to gather qualitative data to help consolidate and substantiate the data collected through the previous survey questions. Respondents were asked to share final comments that they would like to be considered as part of the study. The main themes that emerged from the comments related to issues around time, training, pedagogy evidence and sharing. This section presents a selection of the comments logged by the survey respondents which corresponded with the themes. In order to protect the authenticity of the message and fully represent the voices of the academic, all comments are presented verbatim. An analysis and discussion of these comments is included in the following chapter.

**Time**

“The trouble is, with all the other work for which there is not enough time, developing and maintaining resources would become a whole new vocation. So this work does need to be given recognition.”

“The main issue as far as I am concerned is that the institution needs to allow time for the development of digital learning resources and for these to be recognized as a proper part of an individual’s workload. The amount of work involved in the creation of DLRs can be considerable, but very often this is not recognized. Occasionally a 'Head of School' may give some 'token' recognition for the workload but usually it will be on a par with work that does not involve as much time and effort. This can be very frustrating. The creation of an online resource can require the implementation of a variety of hardware and software applications, which first have to be learnt, then applied. This can take quite an amount of time, but it is this time allocation that is just not available. Pressure is on individual lecturers to think more in terms of publishing papers and presenting research documentation and so there is little time to plan and produce DLRs.”

“I am convinced of the enormous potential of digital resources for student learning and find it an exciting prospect from a teaching perspective. Yet, in practical terms, I find the challenge of upskilling, materials design and inducting students to new methods to be overwhelming at times. I look forward to a much more day-to-day, sustained and pragmatic lead being given in these matters at institutional level.”

“Recognise the time and effort required to produce quality pedagogically sound e-learning resources.”
Training

“CPD on the creation of digital resources would be very much appreciated and very useful in promoting the use of digital resources among the student teacher population.”

“There is a major issue that must be overcome and that relates to how staff feel about creating digital resources. Most feel it’s not within their capabilities and hence don’t see it as an option for them.”

“If we cannot have hands-on help developing resources then advice on and access to training would really help.”

“There is a need for an entirely new philosophical debate about teaching and learning at 3rd level that nobody has yet grasped, with huge ramifications for existing staff and trade union engagement. Having worked as an Instructional Designer I feel most 3rd level institutions really don’t understand the true complexity involved in trying to create quality engaging e-learning resources. As long as 3rd level institutions continue to recruit 'lecturers' with a requirement that you have a track record of being research active with peer reviewed publications (and I say this as someone who is very research active) we are unlikely to succeed in transforming our courses into truly valuable e-learning resources.”

“I think that e-learning modules should be a part of any teaching degree, or should be available as CPD modules for university/college staff.”

Pedagogy

“We need to be careful that we do not see digital learning resources as a panacea for all our teaching woes. There are times and places where they work and others where they are not the best way to engage students.”

“I get the feeling that digital resources or new technology in teaching is threatening to become a bit of a bandwagon, but the development of pedagogically sound resources takes proper training and commitment.”

“The reason for making these resources should always be a sound pedagogical one and more research needs to be done on the ways that students use digital resources and on how effective these resources are.”
Evidence

“It is also questionable as to how much added value these resources really offer especially if the lecturer has to invest considerable time in identifying, adapting, receiving training in, using and constantly updating these kinds of resources - often for little reward.”

“To the best of my knowledge, there has never been a considered debate in the Irish university system about what such resources might be good for (never mind which ones for what purpose), nor is there even much data to show that students perform better "supported" by such resources than they would in more "traditional" environments. Such data would, in any case, be pretty subject/discipline specific.”

Sharing

“It would be of benefit of all departments created a platform where those who have developed resources could share with colleagues. I’m always curious about new methods of teaching.”

“Developing modes of collective, effective collaboration and open and free digital resources will be a crucial issue in creating valuable networks of learning and teaching in the future.”
4.2 Interview Findings

This study involved interviewing five people (Appendix H) purposively selected to capture data about the attitudes and opinions of academics on the use of digital resources in teaching and learning. The format of the interviews was unstructured, yet followed the same question path as the web-based survey. The unstructured approach to the interviews allowed for the introduction of new themes and content and helped to give a more conversational feel to the interviews. The profile of the interviewees, presented in Table 4.14, covers four different age groups and four different disciplines in an effort to balance representation as much as possible. Full summaries of the interviews are presented in section 4.2.1.

<table>
<thead>
<tr>
<th>Interviewee alias</th>
<th>Gender</th>
<th>Academic position</th>
<th>Academic qualification</th>
<th>Discipline</th>
<th>Age group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joan</td>
<td>Female</td>
<td>Senior Lecturer</td>
<td>PhD</td>
<td>Arts, Humanities and Social Science</td>
<td>51+</td>
</tr>
<tr>
<td>Susan</td>
<td>Female</td>
<td>e-learning coordinator</td>
<td>PhD</td>
<td>Centre for teaching and Learning</td>
<td>30-40</td>
</tr>
<tr>
<td>Melanie</td>
<td>Female</td>
<td>Lecturer</td>
<td>PhD</td>
<td>Business</td>
<td>30-40</td>
</tr>
<tr>
<td>Peter</td>
<td>Male</td>
<td>e-learning project manager</td>
<td>MA</td>
<td>Centre for Teaching and Learning</td>
<td>20-30</td>
</tr>
<tr>
<td>Robert</td>
<td>Male</td>
<td>Senior lecturer</td>
<td>PhD</td>
<td>Science and Engineering</td>
<td>41-50</td>
</tr>
</tbody>
</table>

*Table 4.14 Profile of interviewees*

4.2.1 Interview summaries

In accordance with the ethical code of conduct for this research study, all interviewees’ identities are protected and each person has been given an alias for the purpose of reporting.

4.2.1.1 Joan’s Profile

‘Joan’, aged 51+, is a senior lecturer within the faculty of arts, humanities and social sciences, teaching mostly undergraduates but also some postgraduates and adult and
distance learners for an evening diploma course. Joan is also directly involved with the teaching and learning centre within her institution.

Joan was selected for this study because her active role in the use of digital resources for her own teaching practice gives her an understanding first hand of the issues around using and developing digital resources. In addition, her involvement with a teaching and learning centre provides a different perspective on the teaching and learning needs and challenges of the academic community in general.

The types of digital resources used by Joan include video, podcasts, websites and presentations which are used within the classroom and also provided to the students via their Virtual Learning Environment (VLE).

Joan spoke about the many benefits of using digital resources. In particular she mentioned the benefit of using video which enabled the students to see and gain a clearer understanding of how professional equipment is used in fieldwork. Video demonstrations of fieldwork provided a certain level of accessibility to this expensive equipment within a classroom setting.

Her key motivation is doing something new and different while improving the learning experience. She also mentioned that some staff believe that ‘using digital resources is the way forward’ and that they have an obligation to know and learn more about how digital resources are being used for teaching and learning.

Her institution provides some ad hoc limited support but they have very limited capacity to help only a small number of people. There is no e-learning strategy in operation. Joan believes from her own experience and working and speaking with others on the subject, that academics would be motivated by three things: money, recognition and demand (from the institution and/or the students). The possibility of ‘backfill’ she said, has also been discussed; where academics would be allowed time to develop resources while someone else taught their class.

In terms of institutional support, Joan thinks that offering ‘How to’ workshops on different technologies and also pedagogy with follow-up support could encourage more engagement with digital resources. More scholarly research is needed however to convince people that the effort is worthwhile.
4.2.1.2 Susan

‘Susan’ aged 30-40, is a non-lecturing academic working in the centre for teaching and learning in her institution. ‘Susan’ was selected for this study as she has been an advocate for the use of digital resources for many years in an institution with a very traditional approach to teaching. She has, over the years, listened to the concerns of those who are not in favour of using digital resources. Susan had a previous position as a lecturer within her institution in the faculty of education, which affords her a strong insight into the attitudes and challenges around using digital resources for teaching practice.

The types of digital resources most commonly used by Susan are web-based resources, simulations and presentations that she sourced online using web searches. ‘Susan’ spoke about the change in attitudes to technologies within the past ten years.

Years ago accessibility was a major issue – finding a video camera was one issue but then broadband constraints limited accessibility. Today most people have cameras on their phones and high speed broadband is widely available.

Susan also spoke about the normalising of sharing learning material and mentioned how MIT and the Open University have done a lot to contribute to the new phenomenon of open sharing. The culture within her institution is quite traditional and the concept of sharing has not come naturally. ‘Susan’ believes the main motivating factor which has driven the increased uptake of digital resource development and sharing, in her institution, has been the introduction of a grant scheme through the NDLR - “Nothing gets them going like a competition for money!”

She said that there is no designated person responsible for providing support for academics on the use and development of digital learning resources. Some help, advice and direction can be offered but they do not have the capacity for any hands-on support.

The main barriers according to ‘Susan’ include a fear factor with respect to technology, a concern about disciplinary relevance, not knowing where to go for help and cultural attitudes to teaching. Her institution values face-to-face teaching and sees e-learning as a threat that could potentially result in fewer students attending class if more material was made available online.

She also notes that there is a great need for people to see relevant resources that can enhance the teaching of a particular subject and not just ‘vanilla’ examples. Currently
their teaching and learning unit does not have the capacity to go out to each department which is, Susan believes, necessary to encourage more use.

Susan also thinks that recognition is key and if it is tied into accreditation through a professional development framework that would help people. But institutions should shy away from any compulsory approach as this would only create resistance. A change in thinking takes time and perhaps academics need to be ‘scaffolded’ a little as learners would be.

4.2.1.3 Melanie

‘Melanie’, aged 41-50, is a member of the Business Faculty. Melanie was selected to participate in this study as she admits herself to be a novice user of digital resources. It was important to hear the voice of a non or novice user of digital resources to provide an appreciation for this perspective.

Melanie described herself as ‘non techie’ and does not have a particular interest in technology yet despite this fact she sometimes uses video clips and PowerPoint presentations in the class and will also provide web links to the students for further reading. Melanie said she will use web searches to find what she is looking for and has never used a repository to source a learning resource.

She spoke about the value in the medium of video in communicating difficult concepts and how the students really connected with the videos and that they helped to enliven the class.

Melanie has never developed a digital resource and doesn’t feel the inclination as she has always managed to find something she could use online or from a colleague. She mentioned that lack of time was one of the main barriers related to using or developing resources. She just felt that she didn’t have enough time to learn about the technology as she was already overstretched with her teaching hours and administrative duties on top of her home life obligations. “People just want the quickest most efficient way of working”, she said. She also made reference to the lack of evidence demonstrating the positive impact of digital resources and that more research is needed before this practice becomes mainstreamed in universities.

Melanie supported the concept of sharing learning material and that the practice of open sharing was becoming more common with many lecturers uploading videos and
screenshots of their lectures. She noticed that some people are using it to raise their profile and promote themselves.

With regards to encouraging more use and engagement with digital resources, ‘Melanie’ believed people needed to be shown first of all where to find resources and then secondly how to use them. She mentioned the importance of training and availability of continuous support once the training courses have ended. She also spoke about recognition from the institution for the amount of time and effort required to develop resources. As a self-confessed novice user of digital resources ‘Melanie’ concluded that people who have been using and developing resources to date have done so out of their own personal interest and that to mainstream this activity and attract new users would require government directives or policy for institutions. Finally, she emphasised the importance of funding in terms of motivating people.

She suggested that the funding scheme put in place by the NDLR has helped to raise the profile of digital resources within her university and that anything with a “money value attached attracts the attention of senior management”.

4.2.1.4 Peter
‘Peter’ aged 20-30, is a technology-enabled-learning project manager and was selected to participate in this study as he is directly involved in developing digital resources for academics and advising on the policies, procedures and processes for creating resources and online courses.

The types of resources most commonly used according to Peter are just documents uploaded to the VLE and copyright is a real concern. He went on to say that people just don’t know how to manipulate a resource for reuse or don’t think creatively about how resources can be used for teaching. Peter added that some academics used screencasts of their lectures and that these are used mostly as accessibility tools or for revision.

The motivating factors related to using and developing resources in Peter’s view rely heavily on appealing to an individual’s self-interest rather than their higher moral code. He emphasised the importance of making things easy to do and providing assurance of follow up support if they need it.

In order to further engage the academic community in the use and/or development of digital resources Peter expressed the importance of ease of use and access, but that even more importantly was buy in from senior management level within the institution. E-
learning should be resourced adequately and ideally a team of learning technologists should be employed and regular training sessions provided on content creation and development processes such as ADDIE.

He spoke about how universities and higher-education institutions needed to incentivise and prioritise digital literacy skills as a strategic priority. Peter voiced his frustration at how the management in his institution has not demonstrated any commitment to e-learning to date and how he and one other person are solely responsible for delivering all e-learning requirements which he believes is grossly undervalued and under resourced.

He talked about how, in his opinion, management see e-learning potential simply as a money generating activity – by putting more courses online and attracting more distant learners to the institution.

The problem concerning Peter is the lack of understanding by management of what is involved in transitioning a course online and he feels there needs to be some central guidance in order to protect the reputation of the institution and provide a certain standard of excellence.

4.2.1.5 Robert
‘Robert’ 41-50, is a senior lecturer in computer science. Robert has used digital resources for teaching mainly simulations, sometimes screencasts and specific applications designed to teach computer concepts. Most of the time, Robert will find resources online by simply doing a web search and other times he will hear of something through a colleague. His main motivation for using digital resources in his teaching comes from the students and whether or not he feels they will benefit from additional resources. He expressed how some digital resources can help to convey difficult mathematical concepts that can otherwise be hard for some students to grasp.

Relevance of material is also an important factor in deciding to use a digital resource or not and Robert asserted that more people would use digital resources if they were aware of where they could find subject specific material without spending longs hours searching through different websites. He believed that more work needs to be done to showcase the success stories of digital resources in education. He said that we are on the cusp of change as educators and that people knew that they should be engaging more but were not sure how or where to start.
Robert raised an issue in relation to the time investment required by the lecturer when introducing something new into the course material, he said that they may not see the return on this time investment as they are moved to different courses quite frequently in his department. This could be a real deterrent for people.

With regards to institutional support, Robert’s university provides limited support in the teaching and learning centre but mostly in the form of advice or licensing. There wasn’t any hands-on support available through the institution most of his support came from his colleagues. Robert thought training and follow up support was very important factor in encouraging more use and engagement with digital resources. He also mentioned the possibility of a grant scheme for the development of new resources or even getting the students involved in the development of resources as part of their final year project.

4.2.2 Type and extent of digital use
All of the interviewees had used digital resources to varying degrees. When asked what types of resources they use two out of the five use video regularly in their teaching.

Joan: “What we have also started doing for the 4\textsuperscript{th} years is recording videos of expensive geological equipment being used. It’s a way of bringing context into the classroom.”

Melanie: “Well I have to admit I’m not that techie but I do use video clips and give the students weblinks for relevant reading, I use PowerPoint slides and sometimes will show a Ted Talks clip in class if appropriate. I find video in particular an excellent medium to help communicate certain concepts or theory and the students really like them especially if they are funny.”

Susan recounted how attitudes towards using video and other technologies for teaching have changed over the years but how improvements in broadband are making it easier to mainstream the use of video resources.

PowerPoint slides, podcasts and web links also featured strongly as types of digital resources used. Robert was the only person to mention the use of screencasts which may relate to his subject discipline of computer science.

Most of the interviewees source their resources through internet searches.

Melanie said: “...normally just a Google search will help me find what I’m looking for” and Robert finds resources through “Different websites mostly. I have used the
NDLR repository and I also used some material from MIT a few times but generally I will start with a web search and see what comes up.”

4.2.3 Incentives to use
Interviewees were asked what incentives would encourage them to use or develop digital learning resources. The most common incentives included the expectation that their use enriches the learning experience, peer recommendations, the provision of funding and access to content. One interviewee emphasised the importance, in his opinion, of discovering which incentives are appropriate and appealing to the academic community:

“The key in getting more academics to engage with us is incentivising the initiative. I’m not an economist but I do realise that if you appeal to someone’s cold hearted self-interest you get a better response than if you appeal to their higher moral code.” Peter

4.2.3.1 Enrich the students learning experience
The incentives mentioned during the interview sessions were varied but a common theme was enhancing the students learning experience, which incidentally was also the highest rating incentive found from the web-based survey.

Joan: “Satisfaction can be gained from doing something new and different. Improving the student learning is key, it can be a bit limited and dry teaching certain techniques just by talking about them so watching a field trip is better than no field trip at all. Students are looking for more dynamic and interesting ways of learning and not just lectures.........we are the type that we put in those extra hours at the weekend for something that really grabs us.”

Melanie: “I think people need to see evidence that using digital resources......make a difference and have a positive impact on the students’ learning. We need more research in this area to make digital resource use more mainstream in universities.

Robert: “I can see that using particular resources are making a difference in class and the students that are using them are benefitting from them.”

4.2.3.2 Peer recommendations
Similar to the quantitative web-based survey results, peer recommendations, as a key factor in influencing the use of digital resources, also came through as a shared theme in the interviews.
Melanie: “Another factor that would encourage me to use more resources would be if a colleague of mine had used something and found it to be of use or interesting.”

Robert: “I wouldn’t classify myself as an experienced user of digital resources but if I hear of something relevant I will take a look and see if it could work for me.”

Joan: “...staff know that this is the way things are moving and that they should know about digital resources.”

4.2.3.3 Funding
Financial support granted, through funding, was also a common incentive which the interviewees referred to in their interviews. None of the interviewees mentioned personal financial reward as an incentive, rather support through the funding of resource development.

Susan: “I’d have to be honest in terms of our experience here, the thing which really drove things forward more speedily and more effectively was the competition for grants. I mean nothing gets them going like a competition for money in my experience.”

Joan: ”Certainly I think there are three things (incentives) that come to mind - one I think is money, two is if they get recognition for doing it(using digital resources) and three is if their students are demanding it. Sometimes the government drives the institutions motivations and financial direction but certainly money is a big motivation.”

Melanie: “Funding would also be a big motivator. Anything that has a money value attached to it gets the attention of senior management!”

Robert: “Maybe if the government provided some funding in this space it might encourage more interest – money is always a good motivator.”

4.2.3.4 Access to content
Improving access to digital resources and educating people on where and how to look, according to Melanie and Robert, would also encourage more use.

Melanie: “Well availability of content first of all so that people knew where to look and how to use the material once they found them.”

Peter: “It comes down to ease – ease of use ease of access.”
4.2.3.5 Reward
Both Susan and Melanie were of the opinion that the people who are using and engaging with digital resources do so without any expectation of extrinsic reward.

Susan: “it’s human nature isn’t it to devote time to the things that provide you with the most reward whether its recognition, a promotion or personal satisfaction. And I think the people who have been engaging and developing digital resources to date have done so out of a personal interest and drive without any expectation of external reward.

Melanie: “the people who have been creating resources and participating in NDLR and other digital resource related activities are doing so out of their own interest and will continue to do so irrespective of any support or changes.”

4.2.4 Barriers to use
This section examines the key barriers to digital resource use uncovered during the interview sessions.

4.2.4.1 Time
The findings from the web-based survey showed the main barrier to digital resource use as lack of time. Time also featured as a strong barrier to use according to the interviewees.

Melanie: “Well there’s the Fear Factor – people think it would take too much time to learn about the technologies and most people have too much to cover already in their teaching they just focus on getting through all the content to meet the learning objectives. It’s human nature people just want the quickest most efficient way of working.”

“At the moment people are working at their limits so unless it’s worth their while they won’t spend the time learning about the technology.”

Robert: “It can be a bit of extra work initially and the problem is that people get moved around each year in this department and what you teach this year may be different next year. This is a real problem as you wouldn’t be as inclined to spend extra hours developing something if you aren’t going to be using and benefitting from it the following year.”

Joan: “People might see it and think aah more time and work”
4.2.4.2 Lack of institutional support
The lack of institutional support is perceived by three of the interviewees as a significant barrier to digital resource use within their institutions.

Robert: “I think the university administration thinks mostly about bottom line and reputation so they would have to see value in promoting the use of digital resources in relation to these two things before they would be willing to invest any resources behind it. This is the biggest obstacle because without the institutions support things will remain the same.

Peter: “There isn’t a commitment from management in any shape or form to e-learning. I am the project manager for e-learning here and have been tasked with getting 14 new online courses ready for Jan 2014 without being given any additional staff or resources.”

Melanie: “I think if there was a reward system that helped to progress their (academics) careers or gave them some kind of recognition for the extra work then I’m quite sure more people would engage with either using or even developing their own resources.”

4.2.4.3 Change resistant
A general resistance to change within the academic community was also mentioned by three of the interviewees.

Susan: “In a university context they can be extremely successful and good at resisting change...we are very much a face to face institution here and e-learning is very much seen as a support. The main concern would be that students would stop coming to class if everything was made available to them online. So they are very oriented towards face to face teaching.”

“......we’re an institution that wouldn’t naturally share probably because there are quite a number of traditional people. They don’t function like that here they are very much independent republics and they are happy to work away by themselves.”

Robert: “People just think of the time and effort shy away from getting involved especially if what they are doing is working for them – if it’s not broken don’t fix it!”

Melanie: “..... if more students were asking for certain types of resources or access to materials this would make a difference but so far apart from liking the videos I use occasionally my students have never approached me about this.”
4.2.4.4 Access to relevant resources
Susan and Robert both voiced concern that difficulty in sourcing relevant digital learning resources can act as a barrier to use particularly for some disciplines where a critical mass of material may not be available.

Susan: “Well I do think the disciplinary issue is one thing or finding a resource that is relevant and tailored to their course. I think those barriers around the culture of the place and the culture of the discipline is very important. They (staff) would often have said to me ......“well this is how we do things here and those resources are not relevant to my teaching. I don’t care if I’m reinventing the wheel I like to do things from my perspective”.

Robert: “I think people need to see more success stories and not just general ones but examples that relate to their subjects. I’m sure a lot of people are thinking about experimenting with different things like video but they need to see how it will help their teaching or enhance the students learning.”

4.2.5 Support measures for encouraging use
The interviewees were all asked to provide suggestions for how universities could support digital resource use and development into the future. They were also asked whether their universities currently had support available and in what form. Two of the interviewees (Joan and Peter) said their universities had some limited hands-on support available and occasionally offered training courses. The other three interviewees believed that their universities only provided support in the form of general advice and direction. The majority of the support structures in place were thought to be ad hoc and not capable of meeting demands. None of the universities were implementing any comprehensive e-learning strategy that the interviewees were aware of. The use and development of digital resources occurs on an ad-hoc basis and is dependent on the interest, ability and personal motivation of the academic.

4.2.5.1 Training
In line with the results of the web-based survey, the provision of training with follow-up support is one of the most desired forms of support which the interviewees would like to receive and have available within their universities.

Joan: “I think what we need to offer are a series of practical ‘How to do’ workshops, we need a structured repeatable workshop series that people can come along to and
that people are supported and can come back when they come across little obstacles when putting things into practice.”

Melanie: “training is also an important factor. If you want people to use certain technologies then the universities need to adequately train people on how to use them but not just a once off two hour workshop because often it will be weeks after the course before you have a chance to put to use what you learned at which point half of what you learned has been forgotten. We need access to someone who can advise and direct you after the training and really show you how you can use the technologies in the classroom with real examples.”

Robert: “We would also need training and follow up support for when people ran into difficulty. Once off training sessions are only helpful to a certain point you really need to be able to phone someone up while you are actually working on something and be able to get advice then as well. .......ideally more training and more people supporting the training would be great.”

Susan: “I think anything that recognises effort would be a great thing especially now at the moment it’s a big ask to get people to do anything extra on top of what they are already doing. I think recognition is really key and if that’s tied into accreditation through a professional development framework that would help people a lot.”

Peter: “they (academics) need the support but they also need the ongoing training and continued professional development to help them develop their digital literacy skills. Ideally we would have a bank of learning technologists as many as required, and continuous training provided on content creation.”

4.2.5.2 Time
More time given to the academics to develop resources rated as the most desired form of support institutions could provide by the survey respondents but was a lesser theme throughout the interviews.

Joan: “For some courses it has been suggested that people get backfill which is time out to develop while someone else teaches the class.”

Robert: “If you want to get people to develop more resources then some compensation would have to be considered either with teaching hours being bought out or grants or even students available to help out with the development.”
4.2.5.3 Evidence of benefit and value to the student
There is a lack of empirical research on the impact of using digital resources for teaching and learning both from the students’ and lectures’ perspectives across the disciplines. At the same time there is a strong cohort of academics who still need to be convinced of the value digital resources before they think about engaging. More work is needed in this area to understand how best digital resources can be used to enhance learning.

Joan: *We need more scholarly research on what’s happening with digital resources. I think people at the cold face would think they need more evidence but senior management would like us to get on with it and see it as a potential for making money.*

Melanie: “*We need more research in this area to make digital resource use more mainstream in universities.*”

Susan: There’s also the argument around whether they would save you any time but I do think it’s much more likely now than a few years ago for people to see the benefits through others who may have received some grant funding to develop a resource or someone in the UK who did a JISC project. So people are now seeing the benefits.

4.2.5.4 Assistance in sourcing relevant resources
As time is in short supply in the academic working day, Susan and Robert believe that help in finding subject relevant material would contribute greatly to the use of digital resources.

Susan: “*I’m a great believer in that authentic or real life practice where you’re not just showing vanilla examples of tools or features people get play time to see how they can use and benefit from them in their own course.*”

Robert: “*It would also be useful for people to be able to contact someone to help them find subject specific resources......people would probably use more resources if they could find things that were relevant without spending too much extra time looking for them.*”

4.2.5.5 Recognition
Melanie: “*The difficulty lies in getting new people involved and for this I think there needs to be some kind of directive or policy from government to institutions. But challenges relate to this as well as the needs of different faculties vary so the policy would have to take this into consideration.*”
Robert: *Well licences to use certain applications and software packages would be a start, the cost of some licenses are prohibitive.*

### 4.3 Chapter summary

This chapter presents the findings of both the quantitative and qualitative research conducted with the aim of understanding more about the types of digital resources that are being used, the attitudes and perceptions of the academic community towards the use of digital resources within teaching practice and the support measures they would like to have available to them within their institutions in the future.

The next chapter analyses and discusses the data presented in the findings with respect to other national and international research. Comparative studies are reviewed and correlations and disparities between this study and others are examined in detail.
Chapter 5: Discussion

This study provides an insight into the behaviours and attitudes of academics with respect to the adoption of digital learning resources within Irish Universities. Rogers’ (1995) Innovation Diffusion Theory was used to frame the study and this chapter discusses the findings in relation to this theory. While the scale of the study is not statistically relevant it does help to uncover some of the common issues shared by the academic community surrounding the use of digital resources. It is hoped that the key findings revealed will help to draw attention to the support measures needed in order to promote and encourage the use and development of digital resources for teaching and learning.

This chapter begins by discussing the findings, reflecting on the implications of the results and their relevance with respect to the study’s research questions. Section 5.2 reflects on the findings in the context of Rogers’ Innovation Diffusion Theory. The chapter concludes with suggestions for further research which are proposed in section 5.3.

5.1 Discussion of Findings

The study was conducted as a descriptive case study on the behaviours and attitudes of academics, in the seven HEA funded universities in Ireland, in relation to the adoption of digital learning resources for teaching and learning. The aim of the study was to discover how and why academics adopt or reject the use of digital resources for their teaching practice; uncover the incentives and barriers to use; and ascertain the support and changes needed to encourage more use within Irish universities.

This section discusses the significance of the key findings of the study and the implications of the results in relation to the research aims and objectives.

5.1.1 Research Question 1: To what extent has the use of digital learning resources diffused amongst the teaching community in Irish universities and who is using them?

5.1.1.1 Who uses digital resources?

The study focused on teachers as users as opposed to learners as users which is an important consideration as the needs and expectations of the two user types can differ significantly. The results of this study show that the use and development of digital
learning resources is not limited to the younger generation of Digital Natives (Prensky 2001) but is evident in all ages, academic positions and disciplines to greater and lesser degrees. This is consistent with the results of a quantitative study by Less (2003), and cited by Sahin (2006), of faculty adoption of computer technology for instruction, which found no significant difference between the users and non-users in relation to their demographic characteristics of age, gender, race or teaching experience. The adoption of digital learning resources for teaching and learning has been found to be influenced more by personal attitudes, perceptions and social environments than demographics (Harley et al. 2007).

While the use of digital resources was prevalent in all age groups, disciplines and academic levels, the response ratio to the web-based survey showed varying levels of participation between HE institutions, faculties, age groups and academic positions. It is difficult to determine the reasons for this as the web-based survey was conducted on a voluntary basis and therefore relied on the interest and willingness of the individuals to participate. However, a significant factor which may have influenced the varying levels of participation amongst the universities was the different methods of inviting participation taken by the contacts within the universities.

Similarly, the differing levels of participation between faculties is noteworthy with the majority (55, N=155) coming from the Arts Humanities and Social Sciences faculty and only 4 representing the faculty of Education. This may be more of a reflection on how and by whom the survey invitation was distributed rather than a reflection on the level of interest within the faculty itself.

It is also interesting to note that over 75% of the survey respondents comprised professors, senior lecturers and lecturers above the bar demonstrating a high level of interest in the subject of this study amongst the more experienced university academics.

5.1.1.2 Disciplinary differences
Disciplinary differences in relation to the types of resources favoured were not significant in this study. However, the study of disciplinary differences was not the primary focus of the study and therefore not explored in great detail. Each of the faculties rated websites and video as the two most commonly used resources. Audio was the next most popular type of resource used across the disciplines with the exception of Science and Engineering in which Screencasts were used more frequently than audio files.
These findings are in contrast to the Kemp and Jones (2007) study that found hard subject areas, such as physics and engineering, display a distinctly different relationship to digital resources than soft subject areas such as languages, politics and applied social sciences. Kemp and Jones report that hard subjects use resources such as simulations, Screencasts and images which are based on the need for mathematical skills and understanding of difficult concepts and that the predominant type of digital resource used by teachers within soft subject areas such as politics, languages and applied social sciences are web based materials.

Attitudes towards digital resources, the types of resources that might be used or in fact whether they are used at all can be largely influenced by the perceived social norms, personal goals and professional position within the faculty or department (Medlin 2001). One interviewee suggested that:

“There are different stages of use within disciplines and different disciplines use different technology. It boils down in a lot of cases to whether a particular discipline has access to a video camera or software package.” (Peter)

The use and type of digital learning resources varies in the same way as the pedagogic approach to teaching differs from one discipline to the next. Not only do different disciplines require different types of resources, they use them in different ways and for different reasons (Harley et al. 2006). Teachers will use the tools best suited to help impart the desired learning outcomes of their subject.

5.1.1.3 Development
In addition to discovering some of the respondents’ practices in relation to digital resource use, the study also aimed to identify the users who have become developers of digital learning resources.

Out of the 97% of survey respondents who said that they use digital resources, 61% of respondents said that they have developed their own digital learning resources. The most common types of resources developed were identified as: Screencasts, Video, Quizzes, Podcasts and Websites.

Video and websites have consistently proven to be popular digital resource types in this study. Conversely, screencasts have been found to be the least used and the least effective type of digital learning resource according to the survey, yet they were identified as the most commonly developed.
This may be an indication of the ease with which they can be created or the increased availability of institution wide software licensing for software packages such as Camtasia and Screencast.

Development of digital resources is taking place throughout all levels of academic responsibility, although this study showed that the highest level of development is prevalent amongst the 51 plus age group. The teaching assistants reported the least amount of development which is understandable as perhaps they are not fully responsible or in control of the teaching approach but most likely follow direction from their course leaders.

5.1.2 Research Question 2: What types of digital learning resources have Irish university academics adopted to support their teaching practice?

5.1.2.1 Types of resources being used
This study attempted to push beyond the use of text based digital resources such as email, MSWord, PDF and PowerPoint files which at present are the most commonly used forms of digital learning resources (Wiley 2006a; McMartin et al. 2008; Davis et al. 2009). Instead the study wished to identify the other forms of digital learning material being used by the teaching community. As such, PowerPoint, PDF and Word files were not included in the predefined web-based survey list of preferred types of digital learning resources. Although, respondents did include reference to them in the open-ended section of the question which facilitated the inclusion of other forms of digital learning resources not included in the predefined list.

The predefined list of digital resource types consisted of: Screencasts, Websites, Video, Audio or Combination of different types. Clearly this is not an exhaustive list, but merely a starting point for discussion. The open-ended section of the question and the interviews helped to identify additional types of digital learning resources also being used. The results of this question showed that websites (81%) were the most common type of digital resource used followed closely by Video (74%).

Students can often be overwhelmed by the sheer volume of content available online and need help navigating through the countless websites to find the relevant and verified content. Four out of the five interviewees mentioned how they often provide a list of recommended websites to their students on the institution’s virtual learning environment for further reference and investigation.
Websites provide easy access to current information which can be critical for some disciplines. White and Manton (2011) found that the topicality of content is key for certain disciplines and the use of websites facilitates ease of access to live issues and developments as they unfold or are published online. The use of websites as digital learning resources also overcomes any issues surrounding copyright as the lecturers are directing the students to the websites and not downloading or embedding the content to their own material. Using existing websites is quick, easy and effective which may be the reasons why they rated as the most commonly used type of digital resource.

The use of video as a learning resource has grown exponentially in the last decade so it is not surprising to note that video rated as the second most commonly used type of digital resource. White and Manton (2011) report that the types of digital learning resources growing in popularity and reuse seem to centre around resources that the majority of users find time-consuming to produce or for which they may not have the relevant skills to produce, such as videos. The NDLR’s dedicated Vimeo channel\textsuperscript{11} containing over 400 self-created videos is testimony to the growing popularity of video amongst the academics community in Irish HE institutions.

The use of video amongst the interviewees was also evident, with two out of the five saying they use video regularly in their teaching. Improvements to technology infrastructure within universities and in Ireland as a whole, is advancing the use of video files as teaching resources. One of the interviewees remarked on how far we have already progressed:

"If I go back to 2004 when I first started teaching on this course the mere mention of video would strike fear into the hearts of people – they thought I’ll need a camera, I’ll have these enormous files nobody will be able to upload or open or download them. But a lot of that has changed now with Flip cameras and they have cameras on their phones now so it’s not the only thing but it certainly has helped the general acceptance of technology in education." (Susan)

Video lectures were reported to be the third most valuable resource, after lecture notes and full text reading, on the MIT OCW site (Carson 2006) with increasing numbers of courses offering video lectures online. Video helps to enliven and enrich the teaching and learning experience and according to another interviewee:

"....... recording videos of expensive geological equipment being used.......[is] a way of bringing context into the classroom." (Joan)

\textsuperscript{11} \url{http://vimeo.com/channels/ndlr}
Screencasts were the least common type of digital resource used by the survey respondents, however it was the most common type of resource developed. While the web-based survey respondents were not great users of Screencasts, two out of the five interviewees regularly use them to support their teaching.

‘At the moment we use a lot of screencasts for lecture capture in the classrooms. I think they act mostly as an accessibility tool or a revision tool.’ (Peter)

5.1.2.2 Effective resources
The findings in relation to the respondents’ perception of the most effective type of digital resource to support their teaching, corresponds with the results of the most commonly used resources. Overall, the respondents reported that a combination of resources proved to be the most effective ‘type’ of resource. The strong preference for a combination of digital resources may reflect the need to use different types of resources to meet the diverse needs of the students and the disciplines. The digital resource is merely a tool to support and enhance the teaching and learning experience and its effectiveness or pedagogical value is equally, if not more, dependent on how it’s being used than its file format. It is not surprising that teachers find a combination of resource types to be the most effective as they use the type of resource which will be most applicable in a particular context.

However, video was rated the most effective singular type of resource. The perception of video as an effective type of digital resource is consistent with the view that student preferences for how they receive information and learn are different to previous generations. Studies show that students favour more graphics, rapid pace, and immediate responses which video delivers (Oblinger and Oblinger 2005).

Websites followed closely behind video as an effective type of digital resource which is consistent with the earlier results showing a current preference for the use of video and websites to support teaching and learning.

5.1.2.3 Discovery
The most common way of sourcing digital learning resources was found to be through using search engines such as Google. Google has become for many the first port of call for online searches to such a degree that McMartin et al. 2008) suggest that Google itself has become a trusted source of information retrieval. This finding corresponds with other research which shows that the most common way of beginning a search for digital learning resources is through a search engine, the most common being Google
(Hanson and Carlson 2005; Davis et al. 2009; Richter and Ehlers 2010; Masterman and Wild 2011). However, using search engines is not always the most efficient way of searching, unless you are searching for something in particular, as the results can often require a lot of filtering before relevant content is retrieved (Masterman and Wild 2011). Melanie said: “....normally just a Google search will help me find what I’m looking for” and Robert finds resources through “Different websites mostly. I have used the NDLR repository and I also used some material from MIT a few times but generally I will start with a web search and see what comes up.”

The respondents of this study also named You Tube as a primary source of digital resource content. Considering that video rated as one of the most commonly used and most effective type of resource in this study it is not surprising that a video–sharing website like You Tube would prove to be a popular search tool. You Tube currently has over 6,000 educational channels (May 2014) available, aimed at primary level through to tertiary level covering a multitude of subject areas. The Khan Academy12 alone, which is a science based educational channel, has over one million subscribers and is growing every day.

Peer recommendations were found to be the third most popular source of discovering digital learning resources. Rogers’ Innovation Diffusion Theory (1995) emphasises the importance of social networks in the diffusion and adoption process. Rogers (1995 p.169) states that ‘inter-personal communication from a near-peer who is a satisfied adopter often pushes a potential adopter over the edge of decision into adoption’. Word of mouth is not to be underestimated within the education social system. Masterman and Wild (2011, p. 19) report that teachers try to locate resources they can trust through peer or community recommendations. Some act as a gateway for others through circulating useful information on where to find digital learning resources to their colleagues.

The majority of respondents had never used a purpose built educational digital repository to source digital resources. Despite the fact that provenance is a key influencing factor for lecturers especially when searching and selecting digital resources, many lecturers will still prefer to use a search engine than an educational repository. Having worked with the NDLR, which was a dedicated educational resources repository, I understand some of the reasons for the low number of repository users: the voluntary nature of the digital resource contributions to repositories, such as the NDLR, Connexions, Merlot, means that many do not contain a critical mass of

12 www.khanacademy.com
quality resources in all disciplines. This can be frustrating for the user and act as a deterrent:

“There is not a huge amount of ready-made material in my area: I would love to be better able to develop resources myself.” (Survey respondent)

Other challenges around the use of repositories according to Masterman and Wild (2011) include: lack of awareness, poorly indexed material, inadequate search engines on the repository, the requirement to register with a site or download an application in order to retrieve or run a resource, and unreliable hardware or software on the hosting site.

Two of the five interviewees have used repositories such as MIT and the NDLR to source digital learning resources. However, it is important to note that all interviewees had previous knowledge of the NDLR service which may have influenced their likelihood of using the repository.

5.1.3 Research Question 3: What are the main incentives and barriers for using, reusing and/or developing digital resources?

This section discusses what has been identified in the study as the key incentives and barriers to the diffusion of digital resources within Irish universities.

5.1.3.1 Extrinsic motivations for using digital resources

There are many types of incentives which motivate individuals to take action. A basic distinction between types of motivation is the difference between intrinsic and extrinsic motivation. This section reports the key extrinsic incentives as identified by the survey respondents and interviewees. The extrinsic incentives in relation to the use of digital resources are influenced by external factors such as: the provision of training, student expectations, peer recommendations, assistance with finding relevant resources and recognition of professional development.

Survey respondents were asked to list in order of preference, the main influencing factors that would encourage them to use digital learning resources in their teaching. The provision of training was the highest singular extrinsic incentives for using digital learning resources and the lowest singular incentive was to gain assistance with finding relevant resources. Interestingly, when the first two preferences were combined the results show that peer recommendations rated as the strongest incentive for people to use a digital resource. This result demonstrates the significance of peer influence when introducing new innovations, approaches or changes in practice.
The external pressure of student expectations rated as the second highest combined influencing factor or motivation to use digital resources. Education institutions cannot ignore the new cohort of Digital Natives for whom peer-to-peer file sharing, Google searches, Facebook, Twitter, and wireless instant messaging are part of their daily lives (Oblinger and Oblinger, 2005). Recent studies have shown that the ‘net-generation’ students usually prefer watching videos, animations and presentations to reading text and that studying from many sources rather than a single textbook is now considered a pedagogically correct practice today. Academics are increasingly aware of the importance of preparing students for employment in today’s knowledge society and the current political and educational emphasis on the need to improve digital literacy skills for both the students and the teachers. It is unsurprising that the desire to meet these expectations is a key incentive for using digital learning resources.

One of the interviewees, however, said that her students are not asking her to include more digital resources in her teaching “..... if more students were asking for certain types of resources or access to materials this would make a difference but so far apart from liking the videos I use occasionally my students have never approached me about this.” (Melanie) Melanie recognises the importance of student expectations and seems willing to respond but has not had the need as the students seem to be content with the current approach to teaching and have not expressed the desire for change.

The diffusion of any innovation such as the use of digital learning resources will be adopted by individuals at varying rates. Rogers’ Diffusion Theory (1995) proposes five classifications of innovation adopters: innovators, early adopters, early majority, late majority and laggards. The innovators will forge the way and teach themselves as they go along, inspiring the early adopter to follow suit. However, the early and late majority adopters need more persuasion and support in the form of training and peer recommendations before innovations are trialled and adopted. Carr (1999) says that training, in its technical aspects and application to real needs, is crucial if educational technologies are to be integrated beyond the innovators and early adopters. Rogers (1995, p. 355) states, that potential adopters are aided in evaluating an innovation if they are able to observe it in use under conditions similar to their own.

This sentiment is echoed by one of the interviewees:
“I’m a great believer in that authentic or real life practice where you’re not just showing vanilla examples of tools or features - people get play time to see how they can use and benefit from them in their own course. “ (Susan)

Due to the optional innovation diffusion process (Rogers 1995) linked to the diffusion of digital learning resources in our higher education institutions, teachers decide themselves as individuals whether they wish to adopt or reject the use of digital resources. To assist teachers in their decision process, first they need to be educated on how to use the technology appropriately. Citing the results of another study by Surendra (2001), Medlin (2001) states that access in general and training in particular were found to be the best predictors in the diffusion process of Web technology-based educational innovation. This need for training also came through in the interviews and in the comments section of the web-based survey where the following commentary was provided:

“CPD on the creation of digital resources would be very much appreciated and very useful in promoting the use of digital resources among the student teacher population” (Survey respondent)

“If we cannot have hands-on help developing resources then advice on and access to training would really help.” (Survey respondent)

“If you want people to use certain technologies then the universities need to adequately train people on how to use them but not just a once off two hour workshop because often it will be weeks after the course before you have a chance to put to use what you learned at which point half of what you learned has been forgotten.” (Melanie)

Institutions should value the importance of continuous professional training for their staff and invest in faculty development at the same rate as investing in any new hardware (Straumsheim 2013).

In addition to the provision of training on the use of the technology tools, training is also needed on the reasons why the technology is of use and the benefits that can be gained (Sahin 2006). It is important to recognise the need for training on the effective use of digital learning technologies taking into consideration the disciplinary differences and how to integrate these resources effectively into the practice of teaching.

“I think people need to see evidence that using digital resources, whatever they may be whether videos or online quizzes and the like, make a difference and have a positive impact on the students learning.” (Melanie)

Similar comments were made by some of the survey respondents:
“I get the feeling that digital resources or new technology in teaching is threatening to become a bit of a bandwagon, but the development of pedagogically sound resources takes proper training and commitment.” (Survey respondent)

“The reason for making these resources should always be a sound pedagogical one and more research needs to be done on the ways that students use digital resources and on how effective these resources are.” (Survey respondent)

Peer recommendations were also found to be a significant incentive for using digital learning resources. Social learning theory states that individuals learn from others whom they observe and then imitate by following a similar behaviour (Bandura 1977). Rogers (1995) believes that diffusion is a very social process that relies upon the subjective evaluation of an innovation that is conveyed by other individuals like themselves who have previously adopted an innovation. Peer-to-peer recommendations or horizontal networking within a social system is key to the diffusion of digital learning resources within higher education institutions. Communication has been found to be more effective when the source and receiver share the same social network (Rogers 1995).

“Another factor that would encourage me to use more resources would be if a colleague of mine had used something and found it to be of use or interesting.” (Melanie)

To help diffuse the use of digital learning resources, institutions could engage more with opinion leaders within their social networks, who have the ability to influence other’s opinions about innovations. It is this type of interpersonal communication that drives the diffusion process. Browne et al. (2008) found that having committed local champions within an institution was the most important factor in encouraging the use of digital learning resources. One interviewee sums up the importance of peer recommendations in the following statement:

“......it’s about encouraging disciplinary champions within each school they act as a mouth piece so to speak in promoting the use of technology for teaching and learning because there is a tendency to think that it’s a lot of work – and it is initially but there is payback down the road.” (Peter)

Additional extrinsic incentives which emerged from the unstructured approach to the interviews included the incentive of money granted for the development of digital resources.
The availability of internal and external funding is a key influencing factor in encouraging and promoting the use of digital learning resources (Browne et al. 2008). Four of the five interviewees mentioned the importance of funding as an incentive to encourage more digital resource use. Two of the interviewees made particular reference to the introduction of the annual Call for funding by the NDLR.

“Funding would also be a big motivator. When the NDLR started funding the development of projects it created an element of prestige within the university for those who were successful in their proposals. Anything that has a money value attached to it gets the attention of senior management!” (Melanie)

“And in the case of the NDLR it has helped that there has been an incentive there to bid for a project and get the funding and the ones that have done that have shown that it can be done and it’s not that difficult to do it and that you get a certain amount of kudos and your name in lights on websites and so on.” (Susan)

It would appear from the comments above that the NDLR service, through its funding initiatives, was helping not only to facilitate the development of quality digital learning resources, but through the award of funding, was increasing the profile of the academics within their institutions while at the same time promoting evidence of the positive use of digital resources. Harley et al. (2006) share this view and state that high-quality projects often bring advantages not only to their institution’s students and faculty, but also bring some level of prestige to the institution. This recognition of value by the sponsoring institution provides a potential route to long-term support and funding. The provision of funding can also help overcome some of the barriers to digital resource use, such as lack of time, lack of training, lack of recognition and the cost of accessing software tools and licenses.

“Certainly I think there are three things [incentives] that come to mind - one I think is money, two is if they get recognition for doing it and three is if their students are demanding it. Sometimes the government drives the institutions motivations and financial direction but certainly money is a big motivation.” (Joan)

“Maybe if the government provided some funding in this space it might encourage more interest – money is always a good motivator.” (Robert)

One interviewee believes that the provision of extrinsic incentives are central to the diffusion process:

“The key in getting more academics to engage with us is incentivising the initiative. I’m not an economist but I do realise that if you appeal
to someone’s cold hearted self-interest you get a better response than if you appeal to their higher moral code.” (Peter)

In summary, the key extrinsic incentives for using digital learning resources identified in this study are the provision of training, peer recommendations and the availability of funding.

5.1.3.2 Intrinsic incentives for using digital resources
The intrinsic incentives for using digital resources are centred around the potential feelings of personal reward and satisfaction to be realised as a result of using digital resources for teaching and learning.

The primary intrinsic incentive for people to use digital resources, according to the results of this study, was found to be the enrichment of the student learning experience with an overwhelming majority selecting this as their number one incentive. The second highest incentive, according to the survey respondents, was to innovate their teaching practice.

These findings are supported by extensive literature (Medlin 2001; Harley et al. 2006; Browne et al. 2008; Browne et al. 2010; White and Manton 2011; Hylén et al. 2012) which affirm that using digital learning resources to improve students’ learning and to improve teaching practice are the key personal incentives for use. Teachers gain personal satisfaction in imparting knowledge to their students and in turn are motivated to use digital learning resources when they feel they will help to improve this knowledge transfer and benefit their students learning. According to Ferguson and Morris (1993), and cited in Medlin (2001), successful instructional technology adoption has allowed teachers who take pride in their work to improve their teaching, and in return to become the recipients of student gratitude.

The cycle seems to be self-perpetuating, more teachers become motivated to use digital learning resources when they see how they improve the learning experience, and this creates a positive impact on the net-generation of students who appreciate the use of digital resources which in turn provides positive feedback for the teacher and encourages them to continue to innovate their teaching and enhance the learning experience for their students. This is reflected in a comment made by Joan:

“Satisfaction can be gained from doing something new and different. Improving the student learning is key, it can be a bit limited and dry teaching certain techniques just by talking about them so watching a
“field trip is better than no field trip at all. Students are looking for more dynamic and interesting ways of learning and not just lectures”

The two potential incentives to receive the lowest preference were: to save time and to keep up with peers. This result demonstrates that academics are more motivated by the satisfaction of improving their students learning and the teaching process in general than by the more direct benefits of saving time or improving status amongst their peers. White and Manton (2011) also suggest that from the lecturers’ perspective, the value of digital resources may lie more in enabling them to enrich their students’ learning experience than in saving time. McMartin et al. (2008) found similar results in their study where the instructors were so invested in helping their students visualize a concept that required a digital learning resource that they would spend hours looking through page after page of Google hits in search of the “right” image or item that they needed. They propose that the intrinsic motivational force of helping students to learn, may in fact surpass all other types of motivators. This sentiment is summed up by one of the interviewees:

“It’s human nature isn’t it to devote time to the things that provide you with the most reward whether its recognition, a promotion or personal satisfaction. And I think the people who have been engaging and developing digital resources to date have done so out of a personal interest and drive without any expectation of external reward.” (Susan)

5.1.3.3 Key influencing factors when choosing resources

The key discerning factor which helps teachers decide whether to use a particular digital resource for their teaching was found to be subject relevance. Kemp and Jones (2007) believe that the way in which academics use, or in fact whether they use digital resources at all, is influenced to a degree by the subject areas they teach. The availability of content is not evenly dispersed between all subject areas and this will often determine the level of digital resource use within a particular discipline. In addition to the availability of content, academics may need help to see the practical application of a digital resource relevant to their subject and understand how its use may enhance their teaching.

“Well I do think the disciplinary issue is one thing or finding a resource that is relevant and tailored to their course” (Susan)

“People would probably use more resources if they could find things that were relevant without spending too much extra time looking for them.” (Robert)
Pedagogic fit ranked as the second key influencing factor according to the respondents of the web-based survey. Harley et al. (2006) found in their study that the foremost reason for using digital resources was whether or not they supported the faculty’s current teaching approaches. Bennett and Bennett (2003) go as far as saying that the acceptance of an innovation in instructional technology, hinges on the degree to which faculty members feel it is consistent with his/her values and philosophy of teaching. Teachers in higher education control and decide the pedagogy that best suits them and their subject. As a result of the subjective nature of this decision, what one person determines as a good pedagogic fit for a subject, may not be for another. Therefore, pedagogic fit may be more defined by the personal attitudes, beliefs and experiences of the teacher than the resource itself. Nevertheless, it plays a significant role in the discerning process and according to the recent Masterman and Wild (2011) it ranked as the most important factor in selecting to use a digital resource from a lecturers’ perspective. The idea that the use of digital resources must be relevant and fit the pedagogic values of the teacher, is conveyed by the following survey respondent:

“Digital learning resources are only of use if they are relevant to the learning experience for students. There is no point in using them for the sake of it. They should bring some value for the learners.” (Survey respondent)

The quality of the resources, ranking third, also rated as a significant influencing factor. A consequence of the openness of the internet and many online repositories, is the varying levels of quality found in the digital learning resources. Some studies have shown that people are more inclined to use digital learning repositories if they trust them to be a source of reliable and objective information (Ardichvili et al. 2003). Masterman and Wild (2011) also found that educational resources produced by higher education institutions and other academic bodies are perceived to have a stamp of quality and therefore teachers are potentially more likely to trust these over other sources.

Quality did not come through either as an incentive or a barrier in any of the interviews. And only one survey respondent added commentary on the subject of quality with respect to improving the quality control of resources available in repositories:

“The potential for greater quality control of resources (and inter alia of academic qualifications) as well as individualisation of learning deserves further investigation.” (Survey respondent)
Media format and licensing were not seen as significant factors when selecting a resource to use, according to the survey respondents. This result is consistent with the findings of Masterman and Wild (2011) where they also rated as the lowest factors influencing the decision to use a resource.

While this study found that barriers relating to copyright and licensing were perceived as the least significant by the survey respondents, many academics would benefit from institutional copyright guidelines and procedures particularly when creating high quality resources for open sharing. Teachers who develop and contribute digital resources for educational repositories need to be aware of copyright permissions when integrating resources into their own work. However the increasing popularity of Creative Commons licensing (Commons 2009) could be one of the reasons why it is less of a concern when choosing to use a digital resource. Creative Commons licensing grants copyright permissions to copy, distribute, edit, repurpose and build upon digital resources, all within the boundaries of copyright law thus removing the risk for the user. There has also been a shift in attitude towards sharing in the past decade in particular with more and more institutions and individuals openly and freely sharing their digital resources over the Internet (Hylén 2006b). The normalisation of digital resource sharing could be causing individuals to have more of a relaxed attitude towards digital copyright in general with the view that all content available on the Internet is free to use without consequence. One interviewee believes that:

“Copyright is a real problem or violation of rather – but that’s just the nature of the game at the moment” (Peter)

Media format was also found to be of minor consequence when choosing to use a digital resource. This may be a result of the improved technology infrastructure available within our institutions in conjunction with the availability of a wide range of media players accommodating the different media formats.

“If I go back to 2004 when I first started teaching on this course the mere mention of video would strike fear into the hearts of people – they thought I’ll need a camera, I’ll have these enormous files nobody will be able to upload or open or download them. But a lot of that has changed now ...most people can get their hands on some kind of decent kit and will have access to broadband now.”(Susan)

While this question asked the respondents to select the key factors that influence their selection of digital learning resources, it did not explore in any detail the reasons behind their responses. This is a question worth considering for future research.
5.1.3.4 Key influencing factors encouraging digital resource development

The purpose of this question was to distinguish the factors that would encourage those who are using digital resources to take the next step to develop their own resources.

The results show that the key influencing factor is time granted for resource development. It would suggest that academics are interested in developing their own resources but feel they don’t have enough time available to upskill or perhaps feel they should be investing what spare time they may have in more gainful activities. The provision of funding, access to e-learning development tools and the provision of training on e-learning tools and pedagogy all scored similar results and were respectively the next most influencing factors.

Funding has been identified in many other investigations as a key factor in the use of digital learning resources (OECD 2005b; Harley et al. 2006; Laurillard 2007; Browne et al. 2010; Sharma 2011). And we have seen in previous sections how funding is a key motivating factor encouraging both the use and development of digital resources. Laurillard (2007) asserts that funding is a powerful driver in our education system today and that key drivers such as funding, determine the ways in which teachers and learners orient their energies and are judged by others. National governments play a significant role in the strategic direction and funding of higher education and therefore need to take a more active role in enabling the diffusion of digital resource use and development by means of strategic funding or policy (OECD 2005b).

Financial support granted, through funding, was a common incentive which the interviewees referred to in their interviews. None of the interviewees mentioned personal financial reward as an incentive rather support through the funding of resource development.

Susan: “I’d have to be honest in terms of our experience here, the thing which really drove things forward more speedily and more effectively was the competition for grants. I mean nothing gets them going like a competition for money in my experience.”

Ease of access to e-learning development tools was also found to be an influencing factor in the development of digital resources.

Unless individual teachers are personally motivated to develop a digital resource they are unlikely to go out of their way to find and access development tools. Spotts (1999) claims, that most faculty members will not use equipment or materials unless they are readily available and easy to use. If a teacher has to spend an excessive amount of time
setting up equipment or organising support, then they are less likely to use the technology. Harley et al. (2006) also found this to be the case and report in their study that the availability, reliability and expense of the technology were the most cited obstacles for use and development. One of the interviewees believes that ease of access to development tools and support is key to encouraging development of resources.

“It comes down to ease – ease of use ease of access. If it’s easy they’ll do it – if you want them to make video you have to make it as simple as possible for the academic to do it” (Peter)

The least influencing factors were access to an e-learning developer and institutional recognition. The findings from the web-based survey indicate that people would rather be given the time and training to learn how to use and develop resources for themselves rather than have someone else do it for them. Only one survey respondent mentioned the value of having access to a developer:

“ideally one would take on a teaching assistant to assist in developing the material, and have access to technical experts in using advanced tools” (Survey respondent)

The comments from the interviews appeared to value to a larger degree the prospect of a dedicated support person who would be available more to advise and direct rather than develop:

“We need access to someone who can advise and direct you after the training and really show you how you can use the technologies in the classroom with real examples.” (Melanie)

“Once off training sessions are only helpful to a certain point you really need to be able to phone someone up while you are actually working on something and be able to get advice then as well. ......ideally more training and more people supporting the training would be great......It would also be useful for people to be able to contact someone to help them find subject specific resources.” (Robert)

“Ideally we would have a bank of learning technologists as many as required” (Peter)

“At one time I thought it would be better to have each school have their own technical support person I think that would be a fabulous thing but I don’t think we would be able to decree this” (Susan)

According to the web-based survey respondents, institutional recognition was found to be the lowest influencing factor in encouraging digital resource development. This is an interesting result as literature suggests that institutional recognition is a strong
influencing factor in the diffusion and adoption of educational technology (Medlin 2001; Lynch 2002; Browne et al. 2010; Johnson et al. 2014). Lynch (2002) asserts that lack of institutional support and organisational commitment is a significant barrier to technology adoption and Johnson et al. (2014, p.24) discuss the ‘relative lack of rewards for teaching’ as a ‘significant challenge impeding higher education technology adoption’. This infers that the presence of institutional support and recognition should have a positive impact on technology adoption yet the survey respondents rated it as the lowest influencing factor.

While institutional recognition ranked as the lowest influencing factor from the predefined list of factors provided in the question, a later question showed that the significant majority of respondents strongly agreed or agreed with the statement that they would use and/or develop more digital learning resources for their teaching if there was more institutional support and recognition.

“At the moment the whole effort is left up to the individual lecturer. I undertake the work in my own time at my own expense. I purchase all the software myself and pay for training resources myself. …..I would like to see individual schools/faculty allow workload credits/time and recognition for any such contribution made when we put time/effort into such work.” (Survey respondent)

“I would like recognition for the creation of digital learning resources, recognizing esp. the amount of time and effort involved. Very often as it is not a 'research paper' or other academic publication it receives no recognition at all.” (Survey respondent)

“The main issue as far as I am concerned is that the institution needs to allow time for the development of digital learning resources and for these to be recognized as a proper part of an individual's workload. The amount of work involved in the creation of DLRs can be considerable, but very often this is not recognized. Occasionally a 'Head of School' may give some 'token' recognition for the workload but usually it will be on a par with work that does not involve as much time and effort. This can be very frustrating” (Survey respondent)
5.1.3.5 Attitudes towards sharing

The overwhelming majority of survey respondents (96%) said they were in favour of the open sharing of digital resources. This resounding vote of confidence in the ethos of open sharing indicates a cultural shift amongst the Irish academic community, from a self-contained ‘walled garden’ approach to a more outward facing progressive approach. This is a global trend, according to an OECD report (2007a) entitled ‘Giving Knowledge for Free’, which states that although learning resources are often considered key intellectual property in a competitive higher education environment, more and more institutions and individuals are sharing their digital learning resources over the Internet openly and at no cost, as open educational resources.

The main incentive for contributing a digital resource to a repository was reported as community spirit with peer recognition also rating high. Institutional recognition and improving professional profile both rated as the lowest incentives for contributing to a digital repository.

Community spirit has been identified in other studies as one of the main motives for sharing digital learning resources (Arendt and Shelton, 2009) and the OECD (2007a) state that knowledge sharing is an academic value. Teachers in particular are intrinsically motivated to share their knowledge and material because of the intangible benefits they receive in return, such as, the enjoyment of helping others.

“It would be of benefit of all departments created a platform where those who have developed resources could share with colleagues. I’m always curious about new methods of teaching.” (Survey respondent)

“Developing modes of collective, effective collaboration and open and free digital resources will be a crucial issue in creating valuable networks of learning and teaching in the future.” (Survey respondent)

Although support is growing for the trend towards openness and sharing, the majority of respondents said they had never contributed to a digital learning repository. Other studies found similar results indicating more of an interest in using rather than contributing digital resources (McMartin et al. 2008). Clearly there is still much work to be done in generating awareness amongst the academic communities in Ireland of the availability of these repositories and in encouraging contributions for sustainability into the future.
Peer recognition was also a significant incentive for contributing resources to a digital repository. Other research concurs and indicates that people are more likely to share their knowledge if they believe it will help to enhance their reputation and status (McLure Wasko and Faraj 2000; Chiu 2010; Van Acker et al. 2013). Van Acker et al. (2013) reference several scholars who believe that teachers share digital resources as a way of showing their competencies to their peers and thus improve their reputations. However, while research shows that teachers enjoy the indirect benefit of peer recognition through their resource contributions, Van Acker (2013) discovered that a direct connection between sharing resources and peer recognition decreases the likelihood of sharing. Institutions interested in encouraging the diffusion of digital resources need to be cognisant of the fact that linking direct extrinsic rewards such as peer recognition with digital resource sharing can have a negative impact and deter people from sharing resources (Deci and Ryan 1985).

Institutional recognition and the desire to improve their professional profile were found to be less of an incentive to encourage the sharing of digital resources. Teachers who share their resources freely and without receiving any tangible benefits do so because they are intrinsically motivated to participate. As Melanie states: “the people who have been creating resources and participating in the NDLR and other digital resource related activities are doing so out of their own interest and will continue to do so irrespective of any support or changes.” Therefore, according to social research, these teachers would be less motivated by extrinsic rewards such as institutional recognition and improving their professional profile. The study differentiates between peer recognition and enhancing their professional profile, as peer recognition is the satisfaction gained from helping individuals within a shared social network who experience similar challenges and teach within the same discipline. As opposed, to receiving acknowledgement from outside of the social network for the purposes of self-promotion.

5.1.3.6 Barriers impeding the diffusion of digital resources
Barriers can be classified in two categories, in the same way as motivations: intrinsic and extrinsic. Ertmer (1999) referred to extrinsic barriers as first order barriers citing as examples: lack of time, support, resources and training. Intrinsic barriers were referred to as second order barriers, citing as examples: attitudes, beliefs, practices and resistance to change.
The most significant barrier to digital resource use, identified by this study, was found to be the lack of time available to academics. The academic community feel pulled between the need to publish and the desire to teach and struggle to find enough time to dedicate to both strands of their academic obligations. One survey respondent added:

“As long as 3rd level institutions continue to recruit 'lecturers' with a requirement that you have a track record of being research active with peer reviewed publications (and I say this as someone who is very research active) we are unlikely to succeed in transforming our courses into truly valuable e-learning resources.” (Survey respondent)

Rogers (1995) proposes that the innovation diffusion process consists of five key stages: Knowledge, Persuasion, Decision, Implementation, and Confirmation. Academics first need time to learn about digital resources in general and then to see how to use them effectively in their subject discipline. Once they have had time to learn about and observe the benefits of using digital resources they may be persuaded, time permitting, to trial the use of digital resources in their own teaching. This knowledge will enable them to then decide whether they wish to invest more time in integrating them into their course material or even develop resource of their own. This process alone is time consuming without considering the effort it takes to create new resources tailored specifically to suit a subject or pedagogy, as reflected in some of the comments made by the web-based survey respondents:

“The trouble is, with all the other work for which there is no enough time, developing and maintaining resources would become a whole new vocation (if a lot of fun). So this work does need to be given recognition.” (Survey respondent)

“I am convinced of the enormous potential of digital resources for student learning and find it an exciting prospect from a teaching perspective. Yet, in practical terms, I find the challenge of upskilling, materials design and inducting students to new methods to be overwhelming at times.” (Survey respondent)

Time pressures are often expressed as a proxy for a raft of other inhibiting factors; however an overwhelming concern evident from the comments and findings is that academics who are interested in adopting the use of digital resources are finding the scarcity of time available to them a significant barrier.

Lack of knowledge was also found to be a noteworthy barrier in this study. Rogers (1995) asserts that individuals with relatively low self-efficacy could be inhibited by their lack of confidence to adopt an innovation.
This link between feelings of self-efficacy, which can be acquired through knowledge sharing and training, and the intention to use and share digital resources, has been identified extensively in other research (Spotts 1999; Ryan and Deci 2001; Koppi et al. 2004; Cabrera et al. 2005; Hanson and Carlson 2005; Becta 2008; Van Acker et al. 2013). Van Acker et al. (2013) found that teachers need to feel sufficiently self-confident and believe that their contributions will provide an added value in order to have the intention to share. Lack of knowledge can be twofold, on the one hand academics need to know where to find resources and how to use or develop them, and on the other hand they need to know that what they are using or have developed is good enough to share.

“There is a major issue that must be overcome and that relates to how staff feel about creating digital resources. Most feel it’s not within their capabilities and hence don’t see it as an option for them.”
(Survey respondent)

Joan adds that lack of knowledge on the part of the institutions, as well as the academics, is resulting in ineffective digital resources being offered as part of online learning course material:

“Some faculties have been given directives to make their courses available online but without the necessary support or training. Somehow they are expected to do this and oftentimes due to lack of time or knowledge people just upload their documents and presentations to the VLE.”

The lack of institutional support or recognition ranked as the third highest barrier for academics in relation to digital resource use validating other literature which identifies it as a significant barrier (Carr 1999; Spotts 1999; Lynch 2002; Bennett and Bennett 2003; Johnson et al. 2014). Two of the survey respondents made particular reference to the importance of institutional support and said that

“Institutions need to embrace the digital age and keep up with trends but this can only happen with funding and support. This is currently lacking.” and that “[Institutions should] recognise the time and effort required to produce quality pedagogically sound e-learning resources.”

Yet, the use of digital learning resources for some academics and particularly within certain disciplines is not normal practice. One survey respondent felt so removed from the application of digital learning resources they stated:
“I feel like I have landed on a strange planet now! This is just a completely different and irrelevant culture to me.” While one of the interviewees added, “In a university context they can be extremely successful and good at resisting change...” (Susan.) Cultural barriers impede the adoption of any new technology and are influenced by many factors such as, social pressures, inadequate information about the innovation, inherent complexity, political inertia and poor timing (Perkins 2011). ‘Diffusion is a kind of social change, defined as the process by which alteration occurs in the structure and function of a social system’ (Rogers 1995, p. 6). Higher education social systems are embedded in traditional values and beliefs which will take time to change. According the Rogers’ adopter category characteristics, early majority and laggards are particularly change resistant. Change management approaches need to consider this when implementing a strategy for diffusion. Surry (2002) asserts that resistance to change among faculty, staff and students make the educational technology diffusion process a challenging one.

Higher education institutions are being challenged to change their way of thinking and their traditional priorities and their modus operandi. Institutions have, to date, placed more emphasis on research than on teaching, as Universities in the EU compete for funding which is based upon outstanding rankings in research. Johnson et al. (2014, p.24) discuss in the recently published NMC Horizon Report the ‘relative lack of rewards for teaching’ as a ‘significant challenge impeding higher education technology adoption’. Faculty members possess little incentive to provide quality instruction and those that are interested in developing their skills in this area, work on their own initiative without promise of reward or institutional recognition. Indeed some academics feel it is a significant burden and perceive the effort involved in innovating their teaching material as thankless work (Dundon et al. 2012). This sentiment is echoed by two of the survey respondents:

“Lack of support from the institution is a major factor when it comes to creating resources. All the digital resources I have created have been using my own personal equipment. However I do believe that the institution is now seeing the benefits and looking at investing.”

And

“Pressure is on individual lecturers to think more in terms of publishing papers and presenting research documentation and so there is little time to plan and produce DLRs.”
Carr (1999) points out that integrating a technology, like digital learning resources, into teaching material is time consuming and effort intensive, usurping time and energy that otherwise could be devoted to more traditional and more rewarded endeavours. One survey respondent commented:

“The main issue as far as I am concerned is that the institution needs to allow time for the development of digital learning resources and for these to be recognized as a proper part of an individual's workload. The amount of work involved in the creation of DLRs can be considerable, but very often this is not recognized.”

If teachers in higher education are expected to use instructional technologies, they need support in the form of time allowed for implementing what they have learned, and recognition by the academic community and tenure processes that their effort expended toward instructional technology use is important (Spotts 1999).

Lack of clarity around the benefits of using digital resources, copyright concerns and lack of professional incentives all had similar results and ranked respectively as the next most important barriers to digital resource use in the study. Bennett and Bennett (2003) support these findings and assert that the lack of clarity on the benefits of using digital resources and the lack of professional incentives serve as major barriers. The importance of clarifying the benefits of using innovations such as digital resources is particularly pertinent for Rogers (1995) definition of the ‘early majority’ technology adopters. People in this category of adopters are less enamoured with technology, risk averse and need assurances that the benefits of integrating technology outweigh the costs. As one survey respondent added:

“It is questionable as to how much added value these resources really offer especially if the lecturer has to invest considerable time in identifying, adapting, receiving training in, using and constantly updating these kinds of resources - often for little reward.”

Another respondent was more emphatic about the need for more evidence voicing the concerns of the typical ‘early majority’ adopter:

“I think this [digital resources] is just a buzz word - with no empirical evidence that it enhances teaching.......I am a psychologist and educator and do not believe there is a critical effect of digital technology on learning and in some cases it may even undermine it. Evidence should come FIRST - use second.”

Rogers ‘early majority’ academics, who are in the process of deciding whether or not to use digital resources would benefit greatly from the dissemination of evidence on the
positive impact of using digital resources for teaching and learning. Masterman and Wild (2011) assert that the principal prerequisite to engagement with digital resources is a belief in the value and validity of sharing and reuse of resources among teachers. According to one survey respondent:

“The reason for making these resources should always be a sound pedagogical one and more research needs to be done on the ways that students use digital resources and on how effective these resources are.”

Another survey respondent questions the value in using digital resources at all:

“To the best of my knowledge, there has never been a considered debate in the Irish university system about what such resources might be good for (never mind which ones for what purpose), nor is there even much data to show that students perform better "supported" by such resources than they would in more "traditional" environments. Such data would, in any case, be pretty subject/discipline specific.”

In order to overcome the barrier of time, people need to be convinced that using digital resources can add value and enhance learning. The main incentive, according to this study, for using digital resources is to enhance the learning experience, yet for those who have not experienced this benefit the lack of evidence and research in this area is perceived as a barrier to use. The primary challenge, it seems, is in convincing those who do not use digital resources frequently, to invest time in learning more about digital resources so that they may see a return on their time investment in the future through the enhancement of the learning experience.

Lack of professional incentives rated as the least significant barrier to digital resource use. Medlin (2001) found, in her study of the factors that may influence a faculty member’s decision to adopt educational technologies, that faculty motivation can be influenced by the institutional culture, its values, norms and reward structure. Interestingly, out of all the organisational factor variables surveyed in her study, the presence of an institutional reward scheme rated as the least significant.

A number of other barriers were outlined by the respondents in their comments. These included: difficulty in finding relevant and appropriate resources, shortage of discipline specific resources, and lack of professional training on how best to integrate digital resources into pedagogy.
Knowing where to look and how to look for resources is a shared barrier to digital resource use amongst the academic community in general and there is not yet a critical mass of resources available for every discipline, which is a limiting factor.

In summary, this study revealed that the primary barriers to using and developing resources are lack of time, knowledge, and institutional recognition and to a lesser degree lack of evidence of the benefits of using digital resources, uncertainty around copyright clearance and lack of professional incentives.

5.1.4 Research Question 4: What support or changes are needed to encourage more engagement with digital resources in higher education in Ireland?

The purpose of this question was to elicit from the respondents and interviewees the key support measures which they believe would encourage the diffusion of digital resource use and development.

Considering the two most significant barriers to digital resource use were found to be lack of time and knowledge, it is not surprising then that the two most important types of support which respondents expressed a need for were: time granted by their institutions to develop resources and access to training courses. The next most desired form of support was found to be access to software development tools. The median support measures were access to a central e-learning coordinator, recognition of e-learning contributions for tenure and recommendation of quality assured resources. The types of suggested support measures that were least significant to the respondents were institutional awards and financial recognition.

5.1.4.1 Time, Training and Access to Technology

This study revealed that above all else, time is the most influencing factor in the diffusion and adoption of digital resources use and development. It was found to be the most influential incentive in encouraging development, the most significant barrier to use and the most desired form of support. Higher education institutions which are interested in supporting the advancement of digital learning resources amongst their teaching community should note the importance of time and create support initiatives enabling the investigation and trialability of digital resources. The predominant theme of this study is the amount of time needed to find, use, integrate and develop digital learning resources.
“From my experience developing resources, the time required to produce resources is the limiting factor. Time allocation to lecturers would be a great benefit in improving lecturer participation in production of digital resources.” (Survey respondent)

If institutions in Ireland are serious about supporting the diffusion of innovative teaching approaches using digital resources to the greater majority of users, then the greatest influencing factor would be granting their academics time to investigate and trial new approaches.

Time alone however is not the only support measure needed. The respondents also articulated their need to learn more about using and developing digital resources through increased access to training courses. Other studies have shown that academics can be apprehensive about finding extra time for additional training (Spotts 1999; Rolfe et al. 2008). Institutions should consider the balance of workload and the added value of the training (Kopper 2010). The type of training required by academics is not just limited to learning about the technology itself but also includes training on the benefits that using the technology could afford. McMartin et al. (2008) found that the only institutional motivator respondents reported as being an important influence, was the availability of more or better training on how to use technology in their teaching practice. In order to encourage academics to spend precious time on learning about or developing digital resources they must be convinced that digital resources are beneficial for teaching and learning and ultimately will help them do a better job of what they define as important (Spotts 1999). Carr (1999) asserts in his study that when technology adoption begins from the grass roots, as is the case with digital learning resource use, the innovators and early adopters, as categorised by Rogers (1995), are more inclined to invest their own personal time and effort in experimenting with new innovations. While members of the early majority, tend to have no interest in the technology per se, but derive their motivation from problems related to their disciplines. Training programs therefore need to be designed to demonstrate how using digital resource can be an effective, efficient and easily applied solution to their focused needs.

Following on from the importance of time, and time to train, the respondents of this study also seek increased access to learning technology in order to apply what they learn during training. Research has shown that access to technology can be a significant barrier to adoption (Spotts 1999; Mumtaz 2000; Medlin 2001; Hanson and Carlson 2005; OECD 2005b; Rolfe et al. 2008; Harley et al. 2008; McMartin et al. 2008).
Despite the ubiquitous nature of technology usage, particularly in our social lives, limited access to hardware, software and adequate licensing within our education system still prevails. No amount of training or even motivation can overcome the lack of access to technology. Academics need to be supported both in the use of but also access to educational technologies within their institutions to facilitate the diffusion process.

5.1.4.2 E-learning coordinator, recognition for tenure and quality
Further support measures that the respondents rated included the availability of a central e-learning coordinator, institutional recognition of e-learning contributions for tenure and the availability of quality assured digital learning resources.

The majority of respondents preferred that institutions provide them with support in the form of time, training and access to technology, to enable them to control their own use and development of digital resources than any other form of support. The reassurance of having a central e-learning coordinator available to them for advice and assistance with digital resource use also rated as a significant support measure. This finding is supported by Browne et al.’s (2010) study which asserts that the staffing of educational technologists must be provided for support in order to create a sustainable model for digital resource development and sharing. Having access to a dedicated resource within the institution was a common theme apparent throughout the qualitative data with four out of the five interviewees expressing this type of support requirement as reflected in the following comments:

“We need access to someone who can advise and direct you after the training and really show you how you can use the technologies in the classroom with real examples.” (Melanie)

“Once off training sessions are only helpful to a certain point you really need to be able to phone someone up while you are actually working on something and be able to get advice then as well. (Robert)

“My institution provides support in the form of training courses, but no acknowledgement of the time required to develop the resources. I should be the expert in my field, supported by a team of experts in digital development” (Survey respondent)

“I need encouragement and incentive as I am unsure of my own knowledge and understanding and it is helpful to have someone in the know to guide me” (Survey respondent)
The institutional recognition of contributions for tenure also rated as a median support requirement. The respondents expressed the need for recognition on the part of their institutions in relation to the time and effort involved in the integration and development of digital learning resources. Institutional commitment is critical to the diffusion of educational technologies and without it, according to Carr (1999), the process is ‘doomed to stalemate if not to an early demise’. One interviewee commented about the importance of institutional support and commitment:

“They [teachers] need the ongoing training and continued professional development to help them develop their digital literacy skills. But that requires their willingness to engage with that and it also requires Universities and Higher education institutions to incentivise and prioritise these skills as a strategic priority.” (Peter)

Academic staff value recognition for their efforts and extrinsic rewards such as promotions, pay scale increments, titles or fellowships are appropriate awards for academics (Spotts 1999; Palmer and Collins 2006). Koppie et al. (2004) believe that teaching staff in general would like more reward that is tied to their prospects of self-promotion through channels such as recognition of their teaching that leads to career progression. Beggan (2010) also found that staff were very conscious of the fact that promotions were based upon traditional research and not on the publishing of quality digital resources. Johnson et al. (2014, p. 24) acknowledge the ‘relative lack of rewards for teaching’ as a ‘significant challenge impeding higher education technology adoption’ in the recently published NMC Horizon report. The report draws attention to the fact. Faculty members possess little incentive to provide quality instruction and those that are interested in developing their skills in this area, work on their own initiative without promise of reward or institutional recognition.

Frustration around this lack of institutional recognition was reflected in some of the qualitative comments:

“At the moment the whole effort is left up to the individual lecturer...... No time or equivalent balance on my workload is recognized. Hence, I would recommend a more formal approach with my institution recognizing and supporting such initiatives. I would like to see individual Schools/Faculty allow workload credits/time and recognition for any such contribution (not necessarily financial) made by myself or other lecturers when we put time/effort into such work. Institutions are more interested in research output than teaching or the creation of digital resources as this is where funding comes from” (Survey respondent)
“The main issue as far as I am concerned is that the institution needs to allow time for the development of digital learning resources and for these to be recognized as a proper part of an individual's workload. The amount of work involved in the creation of DLRs can be considerable, but very often this is not recognized. Occasionally a 'Head of School' may give some 'token' recognition for the workload but usually it will be on a par with work that does not involve as much time and effort. This can be very frustrating. The creation of an online resource can require the implementation of a variety of hardware and software applications, which first have to be learnt, then applied. This can take quite an amount of time, but it is this time allocation that is just not available. Pressure is on individual lecturers to think more in terms of publishing papers and presenting research documentation and so there is little time to plan and produce DLRs.” (Survey respondent)

Interestingly, the quantitative findings report the institutional recognition linked with career progression was the least influencing factor in relation to the development of digital learning resources. It appears as if academics wish to be recognised by their institutions for their efforts in using and developing digital resources, but not necessarily in the form of tenure or career progression.

Access to quality digital learning resources was another suggested support measure which the respondents believed would encourage more engagement with digital resources. Poor quality of digital resources has been identified in recent reports as a significant barrier to the diffusion of digital resources (Hylén 2012). The amount of digital content now available on the Internet can result in time spent sifting through content before finding an appropriate resource. Academics pressed for time would benefit from assistance with finding and accessing high quality resources. Richter and Ehlers (2010) discuss the difficulty teachers have in validating content on the Internet particularly user-generated content. They found that teachers often avoid using such content as they are afraid of giving wrong information to their learners. They would like to see a quality seal which would give them the confidence to use the content. Quality remains an ongoing concern with Andrade et al. (2011) listing ‘Lack of quality or fitness of OER’ as one of the main barriers to be overcome if educational institutions are to encourage the use of OER.

5.1.4.3 Institutional awards and financial recognition
Both the quantitative and qualitative data indicate that institutional awards and financial recognition are not key influencing factors for the diffusion of digital resource use. In fact, lack of professional incentives rated as the least influencing barrier overall.
These findings are supported by McMartin et al. (2008) who reported an ambivalence about institutional or external motivators such as institutional rewards for use or access to technology. Deci and Ryan (2001) state that tangible rewards are offered to people to encourage them to engage in activities in which they might not otherwise engage. The result of using tangible rewards as incentives is that they significantly undermine intrinsic motivation and can even be counterproductive.

Palmer and Collins (2006) discuss the difficulties associated with managing institutional awards such as teaching awards. They point out that criteria for determining and assessing excellence in teaching can sometimes be seen as tokenism and divisive with many promotional rewards for excellence in teaching paradoxically taking the recipients further away from teaching by ‘buying out’ their teaching time. However, the growing popularity of the well-established national teaching awards within the higher education institutions in Ireland, such as the national Jennifer Burke award and the NAIRTL award, do not indicate any dissatisfaction amongst the academic community. Perhaps these national awards are reducing the importance of institutional awards as incentives to support the use and development of digital resources as institutional awards ranked as one of the least favoured support measures by the respondents.

Overall it was personal financial reward that rated as the least important support measure in relation to encouraging the use and development of digital learning resources. While the importance of money in the form of grants and funding were recognised as significant motivational factors, personal financial reward did not figure in any of the qualitative commentary.

5.2 Discussion of Findings with respect to Rogers’ Innovation Diffusion Theory
Perkins (2011, p. 61) asserts that ‘formal attempts to integrate educational technologies into teaching and learning in the developing world have been made since the 1960s.’ Yet the reality is that educational technology, such as the use of digital learning resources, is not being applied to its full potential. Schneberger and Jost (1994) speculate that this is a result of at least three reasons: teacher resistance, bureaucratic inertia and lack of funding. Surry (2002) believes that resistance to change among faculty, staff and students have made the technology integration process in higher education a difficult one. It is difficult to pinpoint exactly all the reasons for adoption or failure to adopt as many factors influence such decisions (Perkins 2011).
Rogers’ (1995) innovation decision process theory comprises five distinct stages; Knowledge, Persuasion, Decision, Implementation, and Confirmation. As potential adopters move through the different stages they consider and assess the characteristics of an innovation as they decide whether to adopt or reject the innovation. Rogers identifies these characteristics as being: relative advantage; compatibility; complexity; trialability; and observability. The following section examines the findings of this study through Rogers’ (1995) framework, with particular reference to the five key elements of his innovation decision process and Rogers’ perceived attributes.

5.2.1 Knowledge
‘Without knowledge action is useless and knowledge without action is futile’ (Abu Bakr). The initial step of Rogers’ diffusion process centres around first becoming aware of and learning about an innovation. It is crucial for the successful diffusion of an innovation, to generate awareness of an innovation within a social network recognizing also the importance of the communication medium. With respect to this study, education institutions should engage with local champions within the different faculties and departments to leverage the work of the innovators and early adopters as a means of communicating the use of digital learning resources. Rogers (1995, p. 169) states that ‘inter-personal communication from a near-peer who is a satisfied adopter often pushes a potential adopter over the edge of decision into adoption’.

The complexity of an innovation is also a perceived attribute and an influencing factor in the diffusion process. The provision of training was identified in this study as the highest singular extrinsic incentive for using digital learning resources. Sahin (2006) states that knowing how to use educational technology effectively, increases the chances of its adoption. Teachers need to be afforded the time and opportunity to improve their digital literacy skills to help overcome any concerns about self-efficacy with respect to using and developing digital learning resources.

5.2.2 Persuasion
Rogers’ perceived attributes of observability and compatibility are key factors in the persuasion phase of the innovation decision process. Once teachers are aware of an innovation such as digital learning resources they must then be persuaded to investigate further into how it might be of use to them. Observing the use of an innovation in action is an effective approach to diffusion as teachers can see first-hand how their peers are using resources within the same context. Institutions interested in diffusing digital learning resources should employ a subject specific approach by providing opportunity
for teachers to observe how others within their professional peer group are using technologies to enhance their teaching and learning practice.

Lack of clarity around the benefits of using digital resources was found to be an important barrier to digital resource use in the study. Increased research attention is needed to assess the pedagogic impact of digital resource use and promote its positive results. Education institutions should focus on gathering and documenting evidence on the pedagogic value of digital resource use as this is a key element of persuasion.

5.2.3 Decision
Once potential adopters have reached the decision phase of the innovation decision process, they have had time to learn about the innovation and see it in action. This phase is where potential adopters assess the relative advantages and decide whether they believe it will add value to their day to day activities. The culture of an institution is of key importance in this phase as teachers need to weigh up the effort of learning about, using and developing digital learning resources in exchange for the rewards to be gained. According to the respondents of this study, increased institutional support and recognition would encourage them to use and/or develop more digital learning resources for their teaching.

5.2.4 Implementation
The implementation phase of Rogers’ innovation diffusion process is centred on the perceived attribute of trialability. Teachers need to be able to trial the use of digital learning resources before fully committing to adopting the innovation.

The practice of trial and experimentation requires a lot of time, which this study revealed above all else, is the most influencing factor in the diffusion and adoption of digital resources use and development. Higher education institutions should note the importance of granting time to enable the investigation and trialability of digital resources.

Access to technology is also an important factor in the implementation phase of the decision process. The diffusion of digital learning resources is reliant on teachers gaining access to the technology needed to implement digital resources within their teaching practice. This study revealed that time, training and access to technology, were the key support measures required
5.2.5 Confirmation
The confirmation phase of Rogers’ diffusion process is where the potential adopter has moved through the previous four phases and ultimately decides whether to adopt or reject an innovation. There are many influencing factors that encourage or inhibit the diffusion process, some can be controlled while others are less tangible such as personal attitudes and beliefs. Individuals look for supportive messages that confirm their decision thus attitudes become more crucial at the confirmation stage (Sahin 2006).

In summary, Rogers (1995) argues that innovations offering more relative advantage, compatibility, simplicity, trialability, and observability will be adopted faster than other innovations. Comprehensive adoption strategies should consider all the influencing factors, including both the incentives and barriers, in order to increase the chances of adoption. However, Rogers also cautions that getting a new idea adopted, even when it has obvious advantages, is still a difficult process.

5.3 Further research
The influencing factors relating to the diffusion of digital learning resource use for teaching and learning holds great potential for further research particularly within an Irish context. While this study may succeed in providing an indicative view of the behaviours, attitudes, motivations and barriers with respect to digital resource use in higher education, a larger nationally representative study is needed to further build on and substantiate the findings of this study. Further research should examine the different models for technology innovation diffusion within Irish higher education and identify the key factors impeding and facilitating the process.

New areas of research worth considering include examining the impact of the use of digital learning resources for teaching and learning. This is an area of high importance within the European Commission in particular as more evidence is required on the practice of using digital technology for the purposes of enhancing the learning process. Building on this theme is another opportunity for further research, which is the disciplinary differences that exist with respect to how, what and why certain disciplines use digital learning resources to support their teaching. A discipline specific research approach to the diffusion of digital resource use would help uncover the key factors inhibiting or promoting use within particular subject areas. The findings from this
research would then enable institutions to provide more discipline specific and relevant support measures encouraging the use of digital learning resources.

This thesis has focussed on the views and behaviours of digital resource users from a teacher’s perspective. To fully understand the challenges and opportunities surrounding the diffusion of digital learning resources in higher education, further research should investigate the needs, attitudes and challenges of all stakeholders involved in the diffusion process: Learners, education developers, governing authorities etc. An investigation into the issues specific to each of the stakeholders would help to provide a more cohesive perspective of the issues surrounding the diffusion of digital learning resources. Farquhar and Surry (1994) cited in Carr (1999) propose that considering the perspectives of both the users and the organisation leads to a plan for technology adoption that is rooted in organisational context while addressing the concerns of the user.

5.4 Summary

The chapter begins with a summation of the key findings of the study followed by a more detailed discussion of the implications of the findings in relation to the research questions. Recommendations are presented based on the findings and aimed primarily at university governing authorities. The findings are then considered and summarised with respect to Rogers’ (1995) innovation diffusion theory. The chapter concludes with a number of suggested areas to be considered for further research.

The key findings reveal evidence of digital resource use throughout all ages groups, academic positions and disciplines. Websites and video were found to be the most frequently used type of resources. Search engines such as Google are the preferred method of searching and retrieving digital content. Academic’s attitudes towards the use of digital learning resources for teaching and learning overall are positive.

The main influencing factor encouraging use according to this study is the provision of training and time allowed for experimentation and implementation of resources. The primary motivation to use digital resources in teaching practice is to enhance the student’s learning experience. The main barriers identified were lack of time and training support available to academics to assist them with using or developing digital resources for their teaching material.
Chapter 6: Recommendations and Conclusions

Based on the findings of this study and along with an in-depth review of other literature on the subject of digital resource use and development, this chapter outlines a number of recommendations to be considered in support of digital resource diffusion.

The majority of the survey respondents believe that higher education institutions have an obligation to provide support for the use and development of digital resources to their staff. The presence of institutional support and recognition would, according to the respondents, increase their likelihood of engaging with digital learning resources as part of their teaching practice.

Institutional advocacy has been cited time and again as a critical component in the diffusion of educational innovation (Spotts 1999; Carr 1999; Wiley 2006a; Laurillard 2007; Andrade et al. 2011). Without institutional support many of the other forms of assistance are ineffective. Therefore, the following recommendations are aimed at the leaders and policy makers within higher education institutions in Ireland.

6.1 Recommendations

This section proposes a number of recommendation which would enhance the diffusion of digital learning resources within Irish Higher Education.

6.1.1 Time Granted for Experimentation and Implementation

One of the greatest forms of encouragement and support institutions can provide to their academics, is time allowed for experimentation and observation of technology in action. The respondents of this study have cited time as the most significant barrier and incentive to use and develop digital resources. With respect to Rogers’ (1995) categories of adopters, we have reached a near saturation point amongst the innovators and early adopter categories. In order to continue and sustain the diffusion process through the early and late majority categories institutions need to incentivise and facilitate more engagement, and more time seems to be the number one priority amongst the academic community.
6.1.2 Continuous Professional Development Training
The Europe 2020 strategy includes programmes and directives, such as the Digital Agenda (COM(2010) 245 final/2), the New Skills New Job Agenda (COM(2010)682 final) and the Modernisation of Europe’s higher education programme (COM(2011)567 final), which focus attention on the importance of up-skilling Europe’s workforce and adapting our education systems to keep relevant in a changing world. Institutions need to provide adequate digital literacy training and support for their academics to enable them to prepare their students for employment in a technologically advanced society. The provision of training is a significant motivating factor, according to this and many other studies, which influences academics’ engagement with digital learning resources. Rogers (1995), also states that diffusion of an innovation is more successful if the innovation can be observed in action and also if the communication about the innovation is homophilous. Institutions could consider having subject specific training sessions which include champions from each discipline communicating their experiences in using digital resources. If higher education institutions are serious about change and technology integration then training and development support services are essential to succeed.

6.1.3 Increase Evidence Base
We are still in the early phase of the diffusion of digital learning resources within Irish universities. While the innovators and early adopters may have been using digital resources for years, others in the early and late majority categories are still waiting for more evidence that points to the positive teaching and learning impacts of using digital resources. Higher education institutions should focus more research attention and funding on monitoring the use and effectiveness of technology enhanced learning. Institutions could use this research, along with real life examples of technology use that are subject specific, to promote awareness and reinforce the potential benefits to be achieved through engagement with digital resources. With respect to imparting the evidence, Rogers (1995) reveals that the adoption of interactive communications depends largely on a critical mass of adopters who then in turn convince the "mainstream" users of the technology's efficacy. Institutions should consider identifying and supporting exceptional users of digital learning resources within each faculty or department. These power users act as champions or change agents within their social network inspiring and encouraging others to learn more about digital resources through evidence of the benefits they are experiencing.
6.1.4 Recognition
Academics who are focussed on developing their teaching skills rather than enlarging their research publications should not be penalised as a result. Both the High Level Report (2013) and the most recent NMC Horizon report (Johnson et al. 2014) emphasise the need to rebalance traditional reward and recognition systems. Academics who invest their personal time, energy and sometimes money in learning about and using advanced technology as part of their pedagogy, deserve the same recognition and rewards as those that are researching and publishing. More academics would be inclined to consider dividing their attention between teaching and research if institutions were to reward and recognise excellence in teaching and learning in the same way as they do with research currently. The values and attention which institutions place upon various academic activities plays a significant role in determining how academics divide their time.

6.1.5 Funding
The provision of funding to support the development of digital learning resources was found to be a dominant theme throughout the commentary of this study. Academics are often limited in their ability to develop digital resources based on a lack of funds. The motivation and skills may be present however without the funding, innovative ideas are thwarted. Governments and other funding bodies along with our educational institutions need to make more sources of funding available to ensure our educators have the means by which to take advantage of technological developments and integrate new practices into their pedagogy. The funding of collaborative inter-institutional developments are an excellent and efficient way of maximising the return of investment, as the benefit of the development is spread and shared amongst a wider group of academics.

6.1.6 Access to Technology
Without access to technology, no amount of time, training or recognition will assist the diffusion of digital learning resources within our higher education systems. The National Digital Strategy for Ireland (2013) outlines the governments’ commitment to improving the technology infrastructure for all levels of education. Building upon the experiences of the innovators and early adopters of digital resources, institutions could consult with their local champions to identify the most important technology hardware and software requirements. The cost of some software licenses can be prohibitive for
individuals or indeed departments, the scale of institutions however can help to secure institution wide software licensing deals providing access to all on campus.

6.1.7 A change in culture
This may be the most important and the most difficult of all the recommendations to put into practice. Traditional values and priorities have focussed primarily on the outputs of research as opposed to teaching. The importance of guarding personal intellectual property for the purposes of research, enforced the need to hoard information within the walls of the institution. Technology however, has changed the way in which information is accessed and shared. The concept of sharing and collaboration is counter-intuitive to traditional higher educational values yet is the basis upon which the knowledge society functions. Institutions must re-evaluate their role and position in today’s society, embrace technology and figure out how to harness it to their advantage.

It is critical for institutions to put in place strategies, policies and career progression initiatives linked to innovative teaching practice, as well as research, in recognition of the time and effort required by their academics to up-skill, use and develop technologies in their teaching such as digital learning resources.

6.2 Conclusion
On reflection, Rogers’ Innovation Diffusion Theory has been an excellent lens through which to examine the findings of this study as the theory integrates the many different variables influencing innovation adoption. Rogers’ holistic approach to diffusion emphasises the importance of considering not only the features and functions of an innovation but also the social factors such as peer networks, social norms and personal attitudes when deciding to adopt an innovation. Higher education institutions interested in supporting the diffusion of digital learning resources should become familiar with the different phases of Rogers’ innovation decision process which looks beyond the technology to the underlying factors that influence the behaviours and attitudes of adopters. Further research is needed to identify and examine these key influences in greater detail to form a better understanding of how best to encourage the adoption of technology-enhanced educational innovations within our institutions.

The diffusion of digital learning resources amongst academics teaching in Irish universities has to-date, been a grass-roots process. The successful adoption has been largely dependent on the lateral influence of innovators and early adopters within their
departments and faculties. Academics that are using and developing digital learning resources are doing so without specific reward or recognition for the time and efforts required to up-skill and adapt their teaching material. The impetus for adopting digital learning resources stems not from personal aspirations to secure tenure or further their career but from their desire to enhance the students learning experience.

This bottom-up diffusion of digital learning resources is happening ad hoc within Irish universities at varying levels of adoption. This unplanned change to teaching practices needs at the very least to be recognised as a new phenomenon within our education system. Digital technology is advancing at a fast pace and support measures need to be put in place to provide educators with the knowledge, skills and resources they need in order to educate the next generation of Digital Natives (Prensky 2001) both for teaching and learning. Contemporary digital technology and its further development will provide a growing spectrum of opportunities for enhancing teaching and learning to satisfy the lifestyles needs, talents and abilities particularly of learners. The impetus for adopting a more integrative, cohesive approach to technology enhanced learning within our higher education institutions, in my view, now needs to be driven by national policy a matter not dealt with in this study. The ‘innovators’, ‘early adopters’ and ‘early majority’ groups, described in Rogers’ Innovation Diffusion Theory, have supported the diffusion process to the point where the practice of technology enhanced learning is no longer a marginalised activity on the periphery of pedagogy. The use of digital learning resources in its many forms such as websites, images, audio or video has become the norm for many lecturers in their teaching practice. However, national and institutional support and recognition is now needed in order to further the diffusion of digital learning resource use by what Rogers classifies as the ‘late majority’ and ‘laggards’ user groups.

International university ranking systems, which are largely based around research performance, need to place more emphasis on the quality of the teaching and learning environment of institutions, to give a more balanced perspective. Many potential academic staff, students and perhaps even more so parents, are influenced by these ranking systems. Initiatives that are not directly aligned to promoting the profile or ranking of a university are generally recognised to be of lesser importance. If teaching performance is to be considered of equal value in the ranking systems of the future (High Level Report 2013, Johnson et al. 2014) then increased recognition and support at
institutional level for improving the practices of teaching and learning should be, and hopefully will be included.

The previous section 6.1, lists a number of suggested support initiatives that institutions could consider to encourage digital learning resource diffusion. In summary, these recommendations include the provision of time for and access to training and technology, the need for increased evidence of the positive impact of digital resource use in addition to the cultural changes required to engage new adopters. Based on the qualitative findings of this study and supported by the empirical evidence acquired through the NDLR (National Digital Learning Resources (2012d), the most effective type of training should take the form of subject specific workshops that are hands-on opportunities for the design and development of teaching and learning resources, seminars where current examples and case studies are presented or courses that introduce the technology and application of digital enhancements and the pedagogical issues. To increase their effectiveness the training sessions should be hosted by ‘champions’ or as Rogers (1995) terms ‘change agents’ within that discipline.

This type of training not only facilitates training on the tools and delivery methods but more importantly training on the benefits of using digital learning resources which are communicated by peers within a discipline specific community in a targeted and relevant way. The NDLR facilitated this very well through their communities of practice seminars and online discussion groups and also through the funding of resource development within specific subject areas. Subject specific communities of practice could provide higher education institutions with effective, efficient and sustainable models for encouraging and supporting the diffusion of digital learning resources. Once the cultural divide between research and teaching is bridged by national policy and funding programmes the senior administrators and governing authorities within higher education may have the confidence to support more technology enhanced learning initiatives such as the diffusion of digital learning resources. A future study should identify and examine the barriers and motivational factors for innovation diffusion from the perspective of higher education senior administrators and policy makers. The findings from that study could then contribute to and inform national programmes and policies which in turn would help to increase the profile of teaching initiatives.
Reference List


Arendt, A. M. and Shelton, B. E. (2009) Incentives and Disincentives for the Use of OpenCourseWare. The International Review of Research in Open and Distance Learning, 10(5).


171


European Commission Brussels (2006) COM 208 final Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions *Delivering on the Modernisation Agenda for Universities: Education, Research and Innovation*


Hylén, J. (2006b) ‘Open educational resources: Opportunities and challenges’, *Proceedings of Open Education.*


Kroes, N. (2012) *The Digital Agenda two years on: is Europe well-placed?*  


Less, K. H. (2003) *Faculty Adoption of Computer Technology for Instruction in the North Carolina Community College System*


Meier zu Verl, C., and Horstmann, W. (2011) ‘Subject-Specific Requirements for Open Access Infrastructure-Attempt at a Synthesis’, Studies on Subject-Specific Requirements for Open Access Infrastructure.


National Digital Learning Resources (2012d) *NDLR Impact Report Vol. 1*


Appendices

Appendix A: Summary of Key Findings
The study was conducted as a descriptive case study on the behaviours and attitudes of academics, in the seven HEA funded universities in Ireland, in relation to the adoption of digital learning resources for teaching and learning. The aim of the study was to discover how and why academics adopt or reject the use of digital resources for their teaching practice; uncover the incentives and barriers to use; and ascertain the support and changes needed to encourage more use within Irish universities.

This section summarises the key findings which are described in detail in chapter 4.

Digital Resource users
This section outlines the profile of the academics who participated in the study, the types of digital learning resources they use and the way in which they source them.

Who uses and develops digital resources?
The majority of the 170 respondents who took part in the voluntary web-based survey came largely from three of the seven universities, namely, NUI Maynooth, Dublin City University and the University of Limerick. The greatest percentage of respondents (51%) were employed by their institutions as lecturers above the bar and 24% of respondents held senior lecturer or professorship posts. There was an even representation from both genders and the significant majority were aged over 31 years old. The faculty of Arts Humanities and Social Science and the faculty of Science and Engineering were the most represented while the faculty of Education was the least represented in the web-based survey. Other disciplines represented included Business, Health Science and those engaged in Learning Support roles.

The interviewees comprised two males and three females. Two of the interviewees were aged between 30-40, one was between 20-30, one was between 41-50 and the other was in the 51+ age group. The disciplines represented by the interviewees included, Business, Science and Engineering, Arts Humanities and Social Sciences and two came from Centres of Teaching and Learning.

The findings show that development of digital resources is taking place throughout all levels of academic responsibility and age groups with the highest level of development, in this study, prevalent amongst the 51 plus age group. The junior age group (20-30)
and the teaching assistants both report the least amount of development. This may be related to internal institutional pressures for junior lecturers to publish or their lack of control over the teaching approach or course material used in their teaching as they work under the direction of the lecturer.

**What types of resources are being used and developed?**

A considerable percentage (97%) of the web-based respondents claimed to use digital learning resources of some type in their teaching and learning practice.

The most popular types of digital resources, according to the web-based survey, were websites (81%) and video (74%). This was followed closely by audio (50%) and a combination of digital resources (42%). The type of resource least used by the survey respondents were screencasts (25.5%). The web-based survey also provided an option for respondents to list additional types of digital resources not included on the predefined survey list. The ‘other’ types of resources most commonly listed by the respondents were: Learning Management Systems, such as Moodle and Sulis, PowerPoint, PDF’s, Images and blogs or Wikis. Other resources listed to a lesser extent included: Ebooks, animations, interactive quizzes and online laboratories.

The findings from the web-based survey showed that the types of digital resources used did not vary significantly between disciplines. Video and websites remained as the most used throughout all the disciplines. Screencasts were the least used type of resource for the majority of disciplines with the exception of Science and Engineering, where audio rated as the lowest type of resource used.

Respondents of the survey were also asked to rate their perception of the effectiveness of resources based on their type. It was found that the type of resource that rated as the most effective was a combination of resources, which may indicate the varying levels of effectiveness of any one resource depending on the subject matter of the learning involved. Video rated as the most effective singular type of resource followed by the use of digital images and online quizzes.

The type of resource found to be the least effective by a small margin was screencasts. Yet, when the results between the ‘least effective’ and the ‘not very effective’ were combined, audio rated as the least effective type of resource overall.

The data collected from the interviews varied between each interviewee. In general, the most popular types of resources used by the interviewees were PowerPoint
presentations and websites. One interviewee rated Screencasts as the most used and most effective type of resource which was in contrast to some of the general findings. The interviewee who favours Screencasts is from the discipline of Science and Engineering which was the only discipline not to rate Screencasts as the least type of resource used.

From the 61% of respondents who develop resources themselves, the most commonly developed resources were: Screencasts, Video, Quizzes, Podcasts and Websites. While Screencasts were reported as the least used and the least effective type of digital learning resource, it seems to be the most commonly developed. This may be an indication of the ease with which they can be created or the accessibility of the software tools.

Sources of resources
Both the findings from the web-based survey and the interviews concluded that Internet searches such as Google are the first port of call for many academics searching for digital learning resources. The web-based survey found that websites (84%) were the most common source for accessing digital learning resources followed by You Tube (74%). Another common form of sourcing digital learning resources was found to be through peer recommendations (66%).

A significant 51% of the respondents never use the purpose built digital learning resource repositories to source their digital material. This could be as a result of a number of factors including: quality issues, lack of awareness, lack of critical mass in certain disciplines or the desire for academics to create their own resources rather than use someone else’s.

Attitudes towards Openness and Sharing
The majority of respondents (96%) are in favour of the open sharing of digital learning resources yet only 24% had ever contributed resources to a shared repository. When asked to rate the main incentives for contributing a digital resource to a repository, ‘Community spirit’ rated as the main incentive showing the altruistic or intrinsic motivation of the respondents. Conversely, the extrinsic motivations such as institutional recognition and peer recognition both rated as the lowest incentives for contributing to a digital repository.

While the attitudes around open access appear to be in support of the ethos of knowledge sharing, the practice of sharing is somewhat lagging behind. The issues
surrounding this are discussed further in section 3.3 in relation to academic’s motivations and barriers to using and developing digital learning resources.

**Motivations and Barriers**
This section highlights the key motivating factors encouraging the use and development of digital learning resources and also the key barriers deterring use and development.

**Motivations**
The key motivating factors which encourage the use of digital learning resources were reported to be: the provision of training (37, N=125), peer recommendations (32) and student expectations (30). While the provision of training received the most first preference counts, it was peer recommendations that received the most first and second preference combined counts (73), the provision of training combined count was 66. The least motivating factors were reported as, assistance with finding relevant resources (28) and professional development (29).

According to the survey respondents, the most important factor influencing the selection of a digital learning resource to use was subject relevance (103, N=125) and pedagogic fit ranking as the second key influencer (95). Quality also rated as significant (65) while media format (24) and licensing (13) were perceived as the least influencing factors in digital resource selection.

The primary incentive for using digital learning resources in teaching practice according to the results of this study, was to enrich the student learning experience with an overwhelming majority (106, N=128) selecting this as their number one incentive. The second highest incentive, according to the survey respondents, was to innovate their teaching practice (40). The two potential incentives to receive the lowest preference were: to save time (7) and to keep up with peers (3).

The key influencing factor which would encourage digital resource users to develop their own resources, according to this study, was time granted for resource development (57, N=124). The provision of funding (38), access to e-learning development tools (37) and the provision of training on e-learning tools and pedagogy (36) all scored similar results. The least influencing factors were found to be access to an e-learning developer (29) and institutional recognition (25).

**Barriers**
The main barrier perceived by the academics who participated in the study was lack of time (45, N=125) with a clear majority of first preference counts. Lack of knowledge
was also seen as a significant barrier to digital learning resource use followed by
the lack of institutional support (15) and being unsure of the benefits of using digital
resources for teaching (12). Concerns about licensing (11) and the lack of professional
incentives (10) were the two lowest perceived barriers to use.

A number of other barriers were suggested by the respondents, these included: difficulty
in finding relevant and appropriate resources, shortage of discipline specific resources,
and lack of professional training on how best to integrate digital resources into
pedagogy. Knowing where to look and how to look for resources is a shared barrier to
digital resource use amongst the academic community in general. There is not yet a
critical mass of digital resources available online for every discipline and this is
perceived as a limitation.

**Institutional support for digital learning resources**
This section outlines the respondents’ awareness of and attitudes towards HE
institutional support of digital learning resource use and development.

**Does you institution provide support?**
There was a fairly even response between those who were aware of the support
available to them for the use and development of digital learning resources within their
institution (45%) and those who were not aware (47%). Only 8% believed there to be no
support available to them at all.

The majority (83%) believe that HE institutions have an obligation to provide a level of
support to teaching staff, 14% were undecided and just 3% believe that support for
digital learning resources are not a concern for HE institutions.

**Types of institutional support**
The type of institutional support that the majority of the respondents (83%) would like
to have available to them was, time allowed to develop their resources. The next most
popular form of support favoured by the respondents was access to training courses
(78%). The other forms of support which were favoured to a lesser extent included,
access to software development tools (65%), the appointment of a central e-learning
coordinator (55%), and recognition of e-learning contributions for tenure (51%). The
respondents were least interested in the following proposed support measures: the
recommendation of quality assured resources (40%), institutional awards (36%) or
financial recognition (29%).
The results indicate that academics are interested in learning how to use and develop digital learning resources themselves for their teaching but need to be allowed the time and tools to up-skill and apply their knowledge within their own subject areas.

**Summary of Qualitative Findings**

In summary, all the interviewees had used digital resources to varying degrees. The types of resources most commonly used included: PowerPoint slides, Websites, Video and Podcasts. Apart from the near ubiquitous use of PowerPoint in lecturing today, websites were the most common type of digital learning resource. Two out of the five regularly use video resources to support their teaching. One out of the five interviewees used Screencasts as a digital resource which may have been influenced by his subject discipline of Computer Science as the quantitative findings showed a slight preference for the use of Screencasts in the faculty of Science and Engineering than in the other faculties.

The key themes which emerged from the five unstructured interviews in relation to the motivations to use digital resources were: to enhance the learning experience, peer recommendations, funding, access to content and reward.

The common barriers to digital resource use shared by the interviewees were: lack of time, lack of institutional support, lack of evidence, access to relevant resources.

The suggested support measures which the interviewees would like their institutions to consider included: the provision of training, time allowed for the development of digital resources, promotion of the benefits and evidence of the positive impact of using digital resources in teaching, assistance with sourcing and accessing appropriate resources and technologies and institutional recognition.

The common themes found in the commentary provided by the respondents of the web-based survey were similar to those of the interviews. The perception of time was a significant theme with comments relating to the lack of time available to learn about effective use of digital resources, the pressure of having to divide their time between publishing and teaching and the amount of time needed to develop good quality digital resources. Training and evidence of positive impact were other common themes with many respondents expressing the desire for more training on the use and the benefits of using digital resources. The importance of pedagogy also came through with some respondents cautioning on the use of digital resources without proper consideration of the relevance and pedagogic fit for the subject. Finally, the desire for increased
opportunity to share digital resources with their peers both within and outside of the institutions was also a shared ideal.
Appendix B: Ethics Checklist

FACULTY OF ARTS, HUMANITIES AND SOCIAL SCIENCES

RESEARCH ETHICS COMMITTEE

CHECKLIST

All applicants must fill in this checklist. If you answer “Yes” to any of these questions, you must proceed to fill in the ULREG Form which is specifically designed with social research methodologies in mind. If you answer “No” to all the questions, please continue with the rest of this form.

1. Does this application involve research with:
   a. People under the age of 18  No
   b. People with psychological impairments  No
   c. People under the control or influence of others (eg, people in care, prisoners)  No
   d. People with learning difficulties  No
   e. Relatives or parents of sick people  No
   f. People who only have a basic knowledge of English  No
   g. Students with whom the researcher has a supervisory relationship  No

2. Does this application deal with:
   a. Personally sensitive issues, such as suicide, bereavement, gender identity, sexuality, fertility, abortion, gambling, financial arrangements  No
   b. Illegal activities, illicit drug taking, substance abuse, engaging in criminal behaviour  No
   c. Any act that might diminish self-respect or cause shame, embarrassment or regret?  No
   d. Research into politically sensitive and/or racially/ethically and/or commercially sensitive areas?  No
e. Issues which might otherwise give rise to a risk of loss of employment for the participant? No

3. Does the proposed research procedures involve:
   a. Use of personal records without consent No
   b. Deception of participants or use of placebos No
   c. The offer of inducements to participate No
   d. Audio or visual recording without consent No
   e. Invasive physical interventions or treatment No
   f. Research that might put researchers or participants at substantial risk? No
   g. Storage of data for less than 7 years? No
   h. Revealing the identity of participants? No
   i. Dealing with topics, using methodologies, or reporting of findings in a way that is likely to cause pain, discomfort, embarrassment, or changes of lifestyle for the participant? No
APPENDIX C: ETHICS APPLICATION FORM

FACULTY OF ARTS, HUMANITIES AND SOCIAL SCIENCES

RESEARCH ETHICS COMMITTEE

APPLICATION FORM

Applicant Details:
Name: Aisling Arthur
ID Number: 8900361
E-mail Address: aisling.dundon@ul.ie
Department/Programme of Study: Centre for Teaching and Learning – E-Learning
Type of Project (FYP/MA/PhD/Faculty): MA
Project: Use and Users of Digital Resources in Higher Education in Ireland
Supervisor/Other Investigators: Yvonne Cleary School of Languages Literature Culture and Communication
Professor Eamonn McQuade, NDLR Chairman.

Signature of Applicant ____________________________  Date
Signature of Supervisor/HoD _______________________ Date

Project Details:
This ethics application is for the approval of the study of the use and users of digital resources in higher education in Ireland. The study will include a pilot phase which I propose to conduct in March, where a select number of lecturers will complete the online survey and be interviewed. A full study will then be conducted in May. In absence of any significant changes made to the study following the pilot, this application covers both the pilot and full study.

1. Research Plan: (100-200 words)

Stage one will review current literature relating to the use of digital resources in higher education not only in an Irish context but also internationally. The literature review will discuss current research on the use of digital resources, the attitudes of third level lecturers towards the
use and development of digital resources, use of digital repositories and the Open Education Resources movement.

**Stage two** will consist of data collection. I intend as part of this study to issue an online survey and conduct face to face interviews with third level lecturers.

**Stage three** comprises data collation and analysis. All responses received via the online survey will be collated and analysed and the findings then documented. All interview sessions will be recorded and the qualitative data then analysed and transcribed and extracts incorporated into the findings where appropriate.

2. Research Purpose (100-200 words)

This study intends to examine the users and use of digital resources within the Irish Higher Education academic community. The overall objective is to gain a better understanding of the users and use of digital resources and identify some of the influencing factors that inhibit or encourage the adoption of digital resources in the context of teaching and learning.

While a national e-learning policy is yet to be formalized and agreed, recommendations made in the recently published National Strategy for Higher Education outlined the importance of ‘state-of-the-art learning resource...and e-learning facilities’. The intended output of this study will result in a better understanding of the supports needed to encourage and nurture the development of digital learning resources in Ireland.

3. Research Methodology (100-200 words)

The methodology chosen for this study will use both a qualitative and quantitative approach including an online questionnaire and individual unstructured interview sessions with both academics who actively develop and/or use digital learning resources and those who do not. The survey will be created online using a specific websurvey application with invitations to participate circulated in emails to the academic community in Ireland. Each HE Institution in Ireland has an NDLR Institutional coordinator, who will be able to assist in the dissemination of emails and requests to participate in the study.

To complement the survey, a number of individual interview sessions with faculty within the 7 Universities in Ireland, will be conducted to acquire more qualitative information. The interviews will attempt to understand and document in more depth the various factors influencing willingness to engage in the use and development of digital learning resources.

A common set of questions will be used during all the interviews providing consistency of approach and measurability. Open-ended questions will allow the interviewees to expand on their responses facilitating a free flowing conversation. All interviews will be recorded for the purposes of analysis. The results of the interview sessions, it is hoped, will help to interpret and support the results received from the online survey.

**Ethical Considerations for the Proposed Research:**

1. **Who** will your informants be?

The study is aimed at faculty within the 7 Higher Education Universities in Ireland.

2. How do you plan to **gain access to/contact/approach** your potential informants?
The National Digital learning Resources service (NDLR) has representatives within each of the Universities with whom I work closely and who would be in a position to assist me in the circulation of the survey and invitations to participate in interview sessions.

I intend to contact potential survey informants via email, with the help of the local NDLR representatives, in which will include a copy of the information sheet and consent form as included in Appendix A and B of this form. The email will explain the purpose and intention of the study and a request for them to complete the online survey with link attached.

Potential Interviewees will be first contacted via email in which will include a copy of the information sheet and consent form as included in Appendix A and B of this form. The email will explain the purpose and intention of the study and a request for them to be interviewed as part of the study. As an incentive I will offer to email participants a summary of the research findings once the study is complete.

3. What arrangements have you made for anonymity or confidentiality (if appropriate)?

All surveys and interviews will remain anonymous. Names will not be requested within the survey and interviewees will be informed at the outset of the intention to keep all interviews anonymous. An information sheet and consent form as included in appendix A and B will also be presented to and signed by each interviewee. Any information or data provided by the participants will be stored securely on a password protected computer and/or locked cabinet. Any information collected will only be used within the context of this study.

4. What, if any, is the particular vulnerability of your informants?

One possible vulnerability is that the lecturing staff participating in this study may feel that their teaching abilities are being judged. This issue will be addressed through the anonymity of the online survey and interviews and by explaining the purpose of the study through the Information sheets and explaining that they can withdraw from the study at any time.

5. What arrangements are in place to ensure that informants know the purpose of the research and what their part in the research will be?

Informants for the survey will be contacted by email in which will include a description of the research study explaining the aims and objectives of the research and a link to an online survey will be included in the email.

Potential interviewees will be selected with the assistance of the local NDLR representative within the university. Each potential interviewee will be contacted via email. The email will explain the purpose and intention of the study and a request for them to be interviewed as part of the study. Potential interviewees will then be contacted by phone and given a full account of the purpose of the research, explaining that each interview will be audio recorded. An Information sheet and consent form (see appendix A and B) along with a list of guideline questions will then be sent to each consenting interviewee, in advance of the interview to allow them time to prepare.

Informants can contact the researcher at any time to ask questions in relation to the study prior, during or after their participation.

6. How will you ensure that informants are aware of their right to refuse to participate or withdraw at any time?
Each interviewee will receive an Information Sheet containing all relevant information as outlined in Appendix A. In addition, a copy of the Consent Form will also be presented to the interviewee in advance of the interview explaining their rights to refuse or withdraw from the interview at any time. Informants can contact the researcher at any time to withdraw any information they have volunteered through the online survey or interview sessions.

7. What are the psychological and/or physical safety issues for the researcher and/or the informant (if any) that arise from the research, and how will you deal with them?

The only safety issue arising from this research surrounds the travel the researcher must do to and from interviews which will take place within the consenting interviewees local Institution.

8. How do you propose to store the information, and for how long?

The surveys will remain within a secure password protected area of online survey tool. Survey and interview responses will be stored on password protected computers for a period of 7 years and/or locked cabinet and then disposed of in a secure manner (e.g. audio recording files deleted from password protected computer).
Appendix D: Consent Form

FACULTY OF ARTS, HUMANITIES AND SOCIAL SCIENCES

CONSENT FORM

Research Project: Use and Users of Digital Resources in Higher Education in Ireland

Consent Section:

I, the undersigned, declare that I am willing to take part in research for the project entitled “Use and Users of Digital Resources in Higher Education in Ireland”. By clicking on this link, you are agreeing to the following:

1. I declare that I have been fully briefed on the nature of this study and my role in it and have been given the opportunity to ask questions before agreeing to participate.
2. The nature of my participation has been explained to me and I have full knowledge of how the information collected will be used.
3. I fully understand that my participation is voluntary.
4. If I agree to a follow up interview I am aware that I may be recorded (audio) and I agree to this. However, should I feel uncomfortable at any time I can request that the recording equipment be switched off at any stage. I can request copies of all recordings made and am fully informed as to what will happen to these recordings once the study is completed.
5. I fully understand that I am free to withdraw my participation at any time without having to explain or give a reason.
6. I am also entitled to full confidentiality in terms of my participation and personal details.

____________________________________         __________________________
Signature of participant                                               Date
FACULTY OF ARTS, HUMANITIES AND SOCIAL SCIENCES

Sample Interview Questions

Research Project: Use and Users of Digital Resources in Higher Education in Ireland

Suggested Interview Questions:

1. Are you a lecturing academic?
2. In which faculty do you teach?
3. What levels do you teach?
4. Are you familiar with the term digital resources?
5. Do you use digital resources in your teaching?
6. What are the main motivators in using digital resources in your teaching?
7. What types of digital resources do you use?
8. In your opinion, is there a particular type of digital resource that is more effective than others?
9. Have you received any feedback from your students on the types of digital resources they find most interesting or helpful?
10. Do you recommend digital resources to your students?
11. In your opinion, is digital literacy an important attribute for your students?
12. What do you look for in a digital resource?
13. Why do you use digital resources?
14. Why do you not use digital resources?
15. What are the main inhibitors in using digital resources in your teaching?
16. Do you have any concerns about using digital resources?
17. Are digital resources widely used amongst your peers?
18. Are you aware of any Institutional support that would assist you with finding, using, modifying or creating digital resources?
19. Where do you look for digital resources?
20. Do you use resources you can adapt to fit in with the pedagogy of your course or do you prefer to use resources as they are?
21. Are you familiar with the term Open Educational Resources (OER)?
22. Do you know of any OER repositories?
23. Are you in favour of OER?
24. Would you or have you ever contributed to an OER repository or community?
25. In your opinion, should higher education Institutions support lecturing academics in the use and reuse of digital resources?
26. What kind of support could or should Institutions provide?
27. In your opinion, what would encourage more lecturers to use and reuse digital resources?
Appendix F: Contact Email

FACULTY OF ARTS, HUMANITIES AND SOCIAL SCIENCES

Contact Email (sent to faculty in all 7 higher education Institutions in Ireland)

University of Limerick

Dear XXX,
I am a research masters student at the University of Limerick researching in the area of digital resources. The title of my study is “Use and users of digital resources in higher education in Ireland”.

The primary goal of my study is to gain a better understanding of the users and use of digital resources and identify some of the influencing factors that inhibit or encourage the adoption of digital resources in the context of teaching and learning.

As a faculty member of a higher education Institution, I would be delighted if you would participate in this study by completing a brief survey which should take approximately 8-10 minutes to complete. If you are interested I would be happy to send you a summary of my findings once my research is completed.

I have attached an information sheet with further details on the study should you be interested in taking part.
Yours sincerely

Aisling Arthur
Research Project: Use and Users of Digital Resources in Higher Education in Ireland

1. The purpose of this study is to examine the users and use of digital resources within the Irish Higher Education academic community.
2. This study aims to gain a better understanding of the users and use of digital resources and identify some of the influencing factors that inhibit or encourage the adoption of digital resources in the context of teaching and learning.
3. Participants will be asked to complete a questionnaire to provide insights into attitudes towards and use of digital resources.
4. Participants are encouraged to participate in audio-recorded follow up interviews but are not obliged by signing this consent form (all audio-recordings will be handled in the strictest confidence, stored on a password protected computer and disposed of in a secure manner).
5. The anonymity of all participants is ensured and all findings shall be reported anonymously.
6. Your participation in this project is completely voluntary. You have the right to withdraw from it at any time.

If participants have any concerns regarding this project, you may contact the researchers below or the University of Limerick Research Ethics Committee.

**Researcher:** Aisling Dundon Arthur, Centre for Teaching and Learning University of Limerick. [Aisling.dundon@ul.ie](mailto:Aisling.dundon@ul.ie) Tel: 061 234930

**Supervisors:** Dr. Yvonne Cleary, School of Language, Literature, Culture and Communication, University of Limerick. [Yvonne.cleary@ul.ie](mailto:Yvonne.cleary@ul.ie)

Professor Eamonn McQuade, NDLR Chairman, University of Limerick. [Eamonn.mcquade@ul.ie](mailto:Eamonn.mcquade@ul.ie)

If you have any concerns about this study and wish to contact someone independent, you may contact

Anne O’Dwyer, University of Limerick, Plassey Technological Park Limerick. [Anne.odwyer@ul.ie](mailto:Anne.odwyer@ul.ie) Tel: 061 202672
Appendix H: Web-based Questionnaire

Web-based questionnaire

1. Are you a lecturing academic?
   a. YES
   b. No

2. What subject(s) do you teach?

3. In which faculty do you teach?
   a. Arts Humanities and Social Sciences
   b. Education
   c. Science
   d. Engineering
   e. Business

4. What age group are you in?
   a. 20-30
   b. 31-40
   c. 41-50
   d. 51+

5. What gender are you?
   a. Male
   b. Female

6. Are you a member of any of the following teaching and learning networks?
   a. NDLR
   b. EDIN
   c. NAIRTL
   d. ILTA

7. Have you ever participated in a Community of Practice relating to your subject area?
   a. Yes
   b. No
c. If yes, which community?

8. Are you in favour of the open sharing and exchange of teaching materials?
   a. Yes
   b. No

9. Have you ever shared teaching resources with an open educational resources repository?
   a. Yes
   b. No
   c. If yes which one?

10. Do you use digital learning resources (video, podcasts, screencasts etc) in your teaching practice?
    a. Yes
    b. No

11. If yes, what types of digital resources do you use?
    a. Video
    b. Screencasts
    c. Podcasts
    d. Websites
    e. SCORM compliant learning objects
    f. Text based resources
    g. Other

12. If no, please list in order of preference, with 1 being the highest and 5 the lowest, which of the following would influence you to use digital resources in your teaching in the future?
    a. Student expectations
    b. Peer recommendations – research papers
    c. Assistance with finding relevant resources
    d. Training in how to integrate digital resources in teaching
    e. Professional Development

13. Do you create your own digital resources?
    a. Yes
b. No

c. If yes, what type of resources have you developed?
   - Video
   - Screencasts
   - Podcasts
   - Websites
   - SCORM compliant learning objects
   - Text based resources
   - Other

14. If you answered no to question 16, please list in order of preference, with 1 being the highest and 5 the lowest, which of the following would influence you to develop digital resources for your teaching?
   a. Institutional recognition
   b. Funding
   c. Access to e-learning software development tools
   d. Training on e-learning development tools and pedagogy
   e. Access to an e-learning developer

15. Do you think certain types of resources are more effective than others?
   a. Yes
   b. No
   c. If yes, please explain

16. Have you ever used a digital repository to access educational resources?
   a. Yes
   b. No
   c. If Yes, please name the repository.

17. From where do you access the majority of your teaching resources?

18. Please list in order of preference, with 1 being the highest and 5 the lowest, the primary incentives in using digital educational resources in your teaching?
   a. To improve the student learning experience
   b. To save time
   c. To innovate your teaching process (professional development)
   d. To keep up with your peers
   e. To meet Student expectations
19. Please list in order of preference, with 1 being the highest and 5 the lowest, the primary incentives in contributing to an educational resource repository?
   a. Community spirit
   b. Peer recognition
   c. Institutional recognition
   d. Improve professional profile
   e. Other

20. Please list in order of preference, with 1 being the highest and 5 the lowest, the primary barriers towards using digital resources in your teaching?
   a. Lack of knowledge
   b. Unsure of benefits
   c. Lack of time
   d. Lack of professional incentives
   e. No Institutional support or recognition

21. Does your Institution provide support for the development of digital resources?
   a. Yes
   b. No
   c. If yes, what type of support does it provide?

22. In your opinion, should higher education Institutions employ a dedicated e-learning resource coordinator?
   a. Yes
   b. No
   c. Please explain

23. Would you be more inclined to use and develop digital resources for your teaching if your Institution provided support?
   a. Yes
   b. No

24. What type of support in the use and development of digital resources, if any, do you think your Institution should provide?
   a. Access to training courses
   b. E-learning coordinator
   c. Time to develop material
   d. Recognition of e-learning contributions for tenure
   e. Other
25. Would you be in favour of an e-learning policy for your Institution?
   a. Yes
   b. No
   c. Why?

26. Any other comments
Appendix I: Interview Transcriptions

Joan – Interviewee 1

Are you a lecturing academic?

I am a senior lecturer in geology. Lecturing all levels on campus including a small amount of postgraduates but mostly undergraduates.

Are all your classes taught on campus or do you also have distance learning courses?

All the undergraduates are taught on campus but I also teach in the centre for adults in continuing education teaching a diploma course in the evenings on campus but we also take distance learners for that.

Do you use digital resources in the teaching of your courses?

We probably use digital resources at a fairly basic level but probably throughout the teaching of geology as a whole.

What types of digital resources do you use?

We use Blackboard VLE and we put up information and presentations – things that the students request. I have also experimented with them submitting group work, presentations and digital research posters. I suppose all classes would be given hyperlinks to go out and do their own search to improve their own information literacy.

Would part of your teaching focus on information literacy?

Well one of the things I did in previous years and hope to do it again for the 1st years is to get the Library who has built up a collection of information literacy courses and workshops and get the students to take these 90 minute workshops.

How would you find the skill level of the students when it comes to information literacy?

What I’ve found over the years is that there is always a group who thinks they know it all when it comes to Excel and Word but in actual fact it’s more game playing and social networking skills that they have and not the skills they need for literature surveys or using Word and Excel in scientific ways – scientific writing and scientific spreadsheets.

Do the information literacy courses focus on the scientific uses of Word and Excel?

No, they are generic courses and slightly inflexible. They show the students how to use Google Scholar and perform basic searches for research purposes.

Is the responsibility on you as a lecturer to teach the students how to use technology for research purposes?
I don’t do a lot of that I have run Excel and database workshops but the curriculum becomes crowded and it’s not possible so sometimes these things fall by the wayside. Certainly in my own subject I think it’s important for them to be able to use databases because when they leave they will be using databases in the work. But if I was asked to re-prioritise my courses I think I would like to bring this back in. One year I got the 4th years to sit and ECDL course in Access but a lot of them didn’t complete the course as they felt it was too much work. It was a core module in my course and I thought it would be better for them to have an ECDL accreditation for this rather them just me teaching Access but I was surprised that they didn’t like this approach. I like to experiment and I bring in exercises where they have to use Access and they like to see the practical relevance of it when they have to complete the exercise anyway. That seems to work better.

**With the digital resources that you use – do the students ever give you any feedback?**

Students always want copies of what you have just done in the class eventhough I tell them my presentations are just bullet points they still like to have them.

Going back to the evening course which we also offer as a distance learning course our approach might be what you would call old fashioned or dated in that we provide course text material and the distance learners submit their assignments in the post or digitally. But what we have just introduced are Podcasts.

**Where do you see the value of the Podcasts?**

1) It helps the distance learners to get to know the tutors. It makes it more personal and makes them feel part of something.

2) Not everything is in the textbook so you might need to be reviewing something or putting a different angle or an Irish angle on something. The standard text books tend to be American and we like to contextualise it for Irish geology as well.

**So would you say then that the value in your classes is that you can talk around the course material and talk about the relevance within the Irish context and that the Podcasts of these lectures brings the classes and the benefits of the discussions to the distance learners?**

Yes.

What we have also started doing for the 4th years is recording videos of expensive geological equipment being used. It’s a way of bringing context into the classroom. Field trips can be an expensive business and when you come back things are forgotten. But if you take short videos of the field trips you can take that back and recreate the experience. I have been doing this for a number of years unsystematically and we are building a library of video field trips. When the NDLR call for funding came out it gave us a reason to approach other institutions about working together to create this library and they were all very eager the get involved.
Where has funding come from to date for the work you have already done?

I just guess people doing it on top of their everyday work.

Have you seen any benefit in using digital resources?

Yes the equipment I’m talking about such as a gravity meter can cost 100,000 euro and not many students would have access to this type of equipment. The videos of the equipment being used can be shown to the students in the classroom demonstrating visually how they are used. This brings the experience of a field trip to the students without costing very much. The videos are not only of benefit to geology students but also physics, engineering and archaeology.

What is your key motivation for developing and using digital resources?

Satisfaction can be gained from doing something new and different. Improving the student learning is key, it can be a bit limited and dry teaching certain techniques just by talking about them so watching a field trip is better than no field trip at all. There’s also the savings in time and cost for example say you bring something home from Cyprus you can’t get all the students to go to Cyprus but you can bring things back to them such as video which shows things at a certain angle. Then there is the benefit of mobility for students who cannot themselves go into the field the videos can give them some of the experience.

Also staff know that this is the way things are moving and that they should know about digital resources. Students are looking for more dynamic and interesting ways of learning and not just lectures.

Do staff have support in your institution if they want to develop or find out more about digital resources?

Well we have some support available in the centre for teaching and learning. We have some part-time temporary contracts running at the moment where the centre can provide some hands on development and guidance to lecturers interested in developing a learning resource. It might be quite a sizeable project or it could be small. We might do some video recording or show them how to do it. We have also run a few workshops and seminars on Podcasting but we have very limited capacity and often cannot meet the demands. But we need to have a focus where we can offer things more broadly.

Where does funding come from to support these temporary posts?

Well it’s a bit ad hoc really some has come through external funding and some funding came from the University. We do have a learning technologies unit which has one and a half posts attached to it for learning technologists but the support is mainly for the Learning Management System Blackboard which is used here. It’s not structured but we have made an attempt to hire a Director of Online Learning or elearning but the person who was hired declined the position. It is a fairly senior post and we have developed an elearning strategy document which has been agreed at high levels.
With regards to encouraging more use of digital resources what do you think academics need in order to engage more with digital learning?

Well we have had conversations about structural units and how best to do it and we thought that it was better for the learning technologies unit and the Centre for teaching and learning to be closer together and what we are aiming for it for the learning technologies unit will also report to the VP of teaching and learning rather than the computer centre. Both these units will work closely together under the Director of elearning we then could see situations where you might need some technical training but also pedagogical development but then there is the overlap in the middle developing more questions around appropriate use of technology.

Would you agree that sometime there is a misconception around elearning that is all about the technology and the tools when instead it should be about the learning and delivering the learning in a new way. Elearning should be all inclusive and not just about the tools.

I agreed totally with this. You know if it’s successful people aren’t talking about the technology. People should be enabled to develop their own elearning without having to come to us to check about using certain technology.

In the strategy we have included some new courses but we haven’t decided exactly what they will include yet.

We have also had various conversations about what is elearning? Should we be using the terms technology enabled learning or technology enhanced learning, online learning, blended learning, distance learning? There is still a lot of confusion about what elearning is or means.

More and more people are practicing blended learning and using a combination of material and technologies to teach.

Some faculties have been given directives to make their courses available online but without the necessary support or training. Somehow they are expected to do this and oftentimes due to lack of time or knowledge people just upload their documents and presentations to the to VLE. For some courses it has been suggested that people get backfill which is time out to develop while someone else teaches the class. But that requires finding the resources which I’m not sure we can to give some people time off.

Is there any policy around the development of teaching and learning resources?

There is in the elearning strategy but operationalising it is the difficulty. Getting those resources to actually carry out the strategy are still being negotiated. Things are being put in place to accommodate the development of digital resources. It’s about allowing innovation and allowing people to do things that they get excited about even when they don’t have resources we are the type that we put in those extra hours at the weekend for something that really grabs us. You don’t always need resources but if you want to do things properly in a structured was then you do.
Which reminds me that we also provide an online course in teaching with technology for anyone who wants to do it. We had 20 licenses for the epigeum courses and we offered it to a group of staff and ran some workshops and the feedback we received was positive in that the course itself modelled an online course which gave the people ideas about what they could use or do for their courses - Videos, questions, and quizzes. Then we got a little money and bought a site wide license and offered it everyone over the Summer – it was a free course and 80 people signed up. We have run a few tutorials as well and what we have learned is that is people feel they are part of a community they will engage more and get on a do the work. The groups of 20 were easier to manage and we asked them to hand in assignments but now that we have opened it up we don’t have the manpower to manage the size of the group and are not asking for assignments and we see that people are not spending the time online taking the course.

**What are the reasons why more people are not engaging with this free course?**

People might see it and think aah more time and work with assignments. We stress that people can do this in their own time but some people who have signed on haven’t gotten around to doing it yet.

**What motivations do you think academics need to find out more about digital resources and learning?**

Certainly I think there are three things that come to mind - one I think is money, two is if they get recognition for doing it and three is if their students are demanding it. Sometimes the government drives the institutions motivations and financial direction but certainly money is a big motivation.

**Is there an expectation from the students today who are so technology dependent that digital resources will be part of the learning experience?**

The students have been asked and yes they like the flexibility. They want things to be made available on Blackboard. They probably judge everyone by the best teacher they have and if one course is really good and then demand others to provide similar resources.

Initially the resources available on Blackboard were just for reading and sometimes viewing but as Diana Laurillard suggests students need a conversation and the technologies available today make this much easier to do now with blogs and discussion forums. You just reminded me of another area where we have gotten students to create their resources. For a couple of years I gave them Flip cameras where they were supposed to record discussions and show them to other groups. The idea was to capture their thought processes see how they would look at things and discuss things. If there is something that has two possibilities then their job was to try to persuade the other groups to agree with their approach based on the evidence. They enjoyed creating the digital resources.

**What is your opinion on Open sharing?**
I think it’s a fantastic idea in principal and practice. I wonder though, if people spend a lot of time and money developing something unique would they then want to make this available to others?

**Have you ever used OERs?**

I have. I tutor some courses with the Open University and probably received most of my professional development here. I have used their open resources and also contributed some in a small way. I have developed some e-tutorials and developed some content and questions around it which goes into the forum.

**What in your opinion would be the key institutional support would be best placed to support the change in education. Higher education and modes of delivery are changing and what do we need to do to support these changes?**

I think what we need to offer are a series of practical ‘How to do’ workshops, we need a structured repeatable workshop series that people can come along to and that people are supported and can come back when they come across little obstacles when putting things into practice. That may require more people being employed for us or a better organisation of skills.

**Would it be better to have a central Institution support unit or have people responsible in each faculty or school?**

At one time I thought it would be better to have each school have their own technical support person I think that would be a fabulous thing but I don’t think we would be able to decree this.

We need more scholarly research on what’s happening with digital resources. I think people at the cold face would think they need more evidence but senior management would like us to get on with it and see it as a potential for making money.

Before we can answer the How we need to know what it looks like in terms of the impact – how do we know if the students have benefitted from the digital resources?

One thing I thought of earlier was the idea of a having a national helpdesk where people could just ring up if they were having a problem with a blog or podcast. The Open University has a helpdesk so it could be something like this for questions that could be answered online. It could be a more efficient way of managing these types of queries.
Melanie – Interviewee 2

Are you a lecturing academic here?

Yes I lecture in the business faculty on organisation behaviour and reflective theory practice. I also teach on the specialist diploma in teaching and learning.

Do you use digital resources in your teaching practice?

Well I have to admit I’m not that techie but I do use video clips and give the students weblinks for relevant reading, I use powerpoint slides and sometimes will show a Ted Talks clip in class if appropriate.

Why do you use digital resources what do they add to the learning experience?

Well I find video in particular an excellent medium to help communicate certain concepts or theory and the students really like them especially if they are funny.

Where do you source your resources from?

Well normally just a Google search will help me find what I’m looking for.

Have you ever used a digital repository to find any resources?

No I wouldn’t know where to look and I haven’t needed to as I always find something either on the internet or a colleague will point me in a direction.

Have you ever thought of developing your own digital resources?

No I wouldn’t I just use what I find. I’m not really into technology and unless it’s something that would really add value or make a difference I wouldn’t. To be honest I wouldn’t have the time with all my teaching hours on top of other administrative activities, meetings and homelife I’m already struggling for time.

What do you think the main inhibitors are for academics when it comes to using or developing digital resources?

Well there’s the Fear Factor – people think it would take too much time to learn about the technologies and most people have too much to cover already in their teaching they just focus on getting through all the content to meet the learning objectives. It’s human nature people just want the quickest most efficient way of working.

Conversely then what do you think would be the main motivating factors that would encourage you others like you to use more digital resources in their teaching?

Well availability of content first of all so that people knew where to look and how to use the material once they found them. I think people need to see evidence that using digital resources, whatever they may be whether videos or online quizzes and the like, make a difference and have a positive impact on the students learning. We need more research in this area to make digital resource use more mainstream in universities. I think also if more students were asking for certain types of resources or access to materials this would make a difference but so far apart from liking the videos I use occasionally my students have never approached me about this.

Another factor that would encourage me to use more resources would be if a colleague of mine had used something and found it to be of use or interesting.
Is there much sharing of resources amongst the academic staff here in your opinion and experience?

Yes I would think most people would be happy to share what they use unless they’ve developed something that cost them a lot of time and money they might want to hold on to the IP themselves. But we have lecturers recording their lectures and putting them online, writing blogs etc people are not as cagey as before when it comes to sharing. Ten years ago things were a lot different and uploading a video of your lecture was unheard of but it’s a reflection of a changing society the internet and use of it has become a way of life now it’s gone full circle where it’s nearly expected now!

Do you think institutional support and recognition of digital resource use and development is an important factor?

Yes absolutely I think if there was a reward system that helped to progress their careers or gave them some kind of recognition for the extra work then I’m quite sure more people would engage with either using or even developing their own resources. At the moment people are working at their limits so unless it’s worth their while they won’t spend the time learning about the technology.

What about the idea of developing a resource between a group of academics involved in teaching the same subject?

I think that makes sense but you still need everyone to be able to contribute and it comes back to time. Academic life can be very isolating as well and much research has been published on the privacy of academic life so if you chose to you could quite easily create your own bubble and not interact with others outside your teaching circle. Unless you make it your business to socialise with your peers there’s no other way of knowing how they are teaching, if they are experiencing the same challenges as you or what new material or research they have found.

What support do you think could be put in place that would encourage more engagement?

Well I guess it would be different measures for different people. For example the people who have been creating resources and participating in NDLR and other digital resource related activities are doing so out of their own interest and will continue to do so irrespective of any support or changes. The difficulty lies in getting new people involved and for this I think there needs to be some kind of directive or policy from government to institutions. But challenges relate to this as well as the needs of different faculties vary so the policy would have to take this into consideration.

Funding would also be a big motivator. When the NDLR started funding the development of projects it created an element of prestige within the university for those who were successful in their proposals. Anything that has a money value attached to it gets the attention of senior management!

Finally training is also an important factor. If you want people to use certain technologies then the universities need to adequately train people on how to use them but not just a once off two hour workshop because often it will be weeks after the course before you have a chance to put to use what you learned at which point half of what you learned has been forgotten. We need access to someone who can advise and direct you after the training and really show you how you can use the technologies in the classroom with real examples.
Peter-Interviewee 3

What is your role here?

My official title is Project Manager for Technology Enabled Learning. I report directly to the VP of Teaching and Learning and work from the Centre for teaching and learning. My role would be diverse it would involve digital resource creation, I would also advise on the policies and procedures and more importantly the process for getting courses online. The appropriate use of technology is what I’m about and trying to find a software package that will meet the learning objectives of the academic and training them on how to use if and modify it thereafter. So it’s about encouraging disciplinary champions within each school they act as a mouth piece so to speak in promoting the use of technology for teaching and learning because there is a tendency to think that it’s a lot of work – and it is initially but there is payback down the road and this is where services like the NDLR come into play. I also work quite closely with the DSS and I see online learning as a vehicle to push accessibility challenges university wide. I have also set up an Open Education website targeted at the moment at first years but we will be broadening the audience as we grow. The content is mainly textual focussed on writing skills. The key in getting more academics to engage with us is incentivising the initiative. I’m not an economist but I do realise that if you appeal to someone’s cold hearted self interest you get a better response than if you appeal to their higher moral code.

I hope that this website will help drive up the standards of this institution in the area of accessibility and open education. At the moment we use a lot of screencasts for lecture capture in the classrooms. I think they act mostly as an accessibility tool or a revision tool. And the screencasts should be disposed of at the end of that year. The following year the academic should be updating their research material and injecting that into the following years lectures and screencasts.

With regards to your Institution what in your experience would be the attitudes and perception of the academics in using digital resources like video, podcasts or any digital material?

There’s different stages of use within disciplines and different disciplines use different technology. It boils down in a lot of cases to whether a particular discipline has access to a video camera or software package.

Where does the motivation come from to engage or develop digital resources?

To develop the resources? They might have seen other courses use something and want to use something similar themselves. A deterrent in using video isn’t so much the recording it’s the editing of it afterwards that takes time and effort. Services in this Institution tend to charge for this kind of support. Currently there is just me a full time resource and one other guy for two days a week and that’s it for support for online learning. We have over 45 projects on the go at the moment so I don’t have any spare time to help others outside of the projects. But say with a video lecture who’s to say it couldn’t be uploaded and used as part of a discussion forum or build a collaboration
around. I think all Universities should be using Google+ to organise a video discussion happen around video resource. It’s a question of how you use the resource creatively afterwards and I think people haven’t quite gotten there yet. They don’t know the manipulability of a resource or how it can be reused for other learning purposes also people have a basic knowledge of their VLE’s and just upload documents and this is the most prevalent type of resources on Blackboard at the moment. Copyright is a real problem or violation of rather – but that’s just the nature of the game at the moment nobody drills down and everyones volume is a blackhole mercifully and long may it stay so!

If it’s easy they’ll do it – if you want them to make video you have to make it as simple as possible for the academic to do it. And once they are quietly confident that there is a little support available then they will engage.

What kind of Institutional support do you think academics want or need to encourage them to further engage with digital resources?

It’s already been established they need learning technologists – the only guarantee you have when using technology in the classroom is that it will fail at one point and it’s a question of how you manage the failure. Most of the academic staff at the moment do not have the digital resilience to develop a work around themselves. So if something goes wrong they don’t have the support at the moment to fix it and it could tear the guts out of the class - a live class will suddenly not have the visuals or video that was going to be key for that lecture. So they need the support but they also need the ongoing training and continued professional development to help them develop their digital literacy skills. But that requires their willingness to engage with that and it also requires Universities and Higher education institutions to incentivise and prioritise these skills as a strategic priority.

Does your institution have a policy for elearning?

No they think they have but to my mind it’s a position paper and not a strategy document. A strategy document should be a short document like a call to arms if you will to the individual stakeholders of the University outlining the plan. Some of the strategy documents out of the UK are two pages long ours is thirty. A strategy document has a vision of where we want to be in 5 or 10 years time and then charts a series of achievable steps that people can take in order to achieve the goals but ours doesn’t do that either. Our document is a list of the projects that are on the go at the moment and that’s it. It is not a commitment from management in any shape or form to e-learning. I am the project manager for e-learning here and have been tasked with getting 14 new online courses ready for Jan 2014 without being given any additional staff or resources.

Where are the directives for these new online courses coming from?

From senior management -they want new courses to attract new students and more money for the Institution. There is a serious lack of understanding with senior management of what is involved. I believe the Institutions need to manage this type of
transition to online courses. I’m not draconian in my approach but if you devolve control too much to each department or faculty the potential to damage the institutions intellectual property and reputation is magnified. So there is a risk without some central guidance. We can’t be too prescriptive in how people put their courses online because there will be different requirements for science for engineering and for arts both regulatory and pedagogically but we need to provide some ‘how to’ advice. If you look at the likes of Coursera they are successfully delivering varied online learning, but it seems to me that everyone is ignoring the elephant in the room and that is Minerva is going to be rattling down the road shortly offering undergraduate education accredited at half the cost in the US of what it currently costs. So I look to 5 to 10 years students filling out their CAO forms it won’t be their only option.

What is your view on Open Education?

I am a firm believer in it. One of the issues with the NDLR is or was is that this wasn’t a fixed criteria day one but I appreciate that it was probably a bit ahead of its time and the culture of openness and sharing just wasn’t there.

What do you think motivates people now to share more and engage more with digital resources?

It comes down to ease – ease of use ease of access. There cannot be logins – the content needs to be made available in its finished form and work form so that people can actually delve into it and fix it or modify it for themselves. There needs to be a way to search it correctly by license, theme or keyword and if it was peer reviewed all the better still. Although the resources could be crowd sourced - just put it out to the community to comment on a new resource. That way not only do you develop a repository, but you develop an online community providing feedback. It’s almost like its own research project on it’s own and this is the beauty of online learning if it’s done openly it’s like a research project.

What’s your blue sky picture for your institution if money was not a constraint and your brief was to make online learning courses available to each school and to ensure that all academics had the opportunity to engage more with digital learning if they wished. What would the impetus be for this in your opinion?

Well firstly the institution needs to buy into the idea and there has to be commitment on the part of the institution as a whole without that your dead. Ideally we would have a bank of learning technologists as many as required, continuous training provided on content creation on processes such as ADDIE. The model I like is out of Falmouth university in the UK where they have an interdisciplinary team consisting of a web developer learning technologist user interface designer and between them they storyboard the course material provided by the academic and operationalise it as an online course. The starting point and the end point is the content and the student learning experience so as a result every course they put out is different as it is determined by the content and not their VLE system.
So blue skies thinking I guess everyone would recognise that e-learning has a lot to offer but typically it’s a 4 4 2 situation where 20% of the staff will always engage because they are early adopters, 40% will wait in the wings to see how the 20% get on before they decide and the other 40% I’m afraid we’ll have to wait until retirement enters the equation. The hope is that you provide enough support for the first 20% which will then encourage the other 40% to come on board. The university as an institution has to move toward online learning we have plenty of examples of online learning in the university but they are all drastically different as they have come up with their own approach due to the lack of support and direction from the university.

**Robert– Interviewee 4**

Are you a lecturing academic?

I am lecturer in computer science, teaching first year programming mostly.

Are all your classes taught on campus or do you also have distance learning courses?

All my classes are taught on campus.

Do you use digital resources in the teaching of your courses?

I have used simulations which I found online relating to Java applets. I also use Scratch which is a specifically designed programme to help visualise some of the concepts of programming. Sometimes I will screencast a lecture but this wouldn’t be a regular occurrence. I also use powerpoint presentations if that counts.

With the digital resources that you use – do the students ever give you any feedback?

Well I know from my students that they relate well to the Scratch application. The subject I teach is very maths oriented and can be difficult for some students to grasp so I’m always on the look out for things that will help to communicate and convey the programming theories and concepts.

Where do you source your resources from?

Different websites mostly. I have used the NDLR repository and I also used some material from MIT a few times but generally I will start with a web search and see what comes up. Sometimes I’ll hear of something through a colleague which saves a bit of time too.

Have you seen any value in using digital resources in your teaching?

Yes. As I said some of the maths concepts are abstract and not all students have the same abilities and so often a few could be left behind. It’s a common challenge in all universities in Ireland at the moment where there is a high drop out rate from this module. The level of maths sometimes is not strong enough and this can be a real problem for some students. I find that the screencasts at least allow the student to revise
the lecture at their own pace until they are comfortable with what I am explaining. The students seem to really like this and I’m slowly building up a collection which they can access through the VLE here.

**What is your key motivation for developing and using digital resources?**

I can see that using particular resources are making a difference in class and the students that are using them are benefitting from them. This is reflected in their grades and also comes through in the labs where we get more one on one time with the students. What I’ve also started doing is getting the students to review a piece of work before class and then use the class to discuss problems and questions around it. I find this approach very productive but not all the students will come prepared which can be a bit of a problem so I am thinking of assigning a % of their assessment grade towards contribution to a discussion blog on the problems.

I wouldn’t classify myself as an experienced user of digital resources but if I hear of something relevant I will take a look and see if it could work for me. I wouldn’t necessarily go out and seek resources online it just comes down to the class sometimes and whether I think they need something extra to keep their interest up or help them to learn.

**What do you think are the main inhibitors for not using or developing digital resources?**

It can be a bit of extra work initially and the problem is that people get moved around each year in this department and what you teach this year may be different next year. This is a real problem as you wouldn’t be as inclined to spend extra hours developing something if you aren’t going to be using and benefitting from it the following year.

**Do staff have support in your institution if they want to develop or find out more about digital resources?**

Well we have some support available in the centre for teaching and learning but not many people know about it and it’s very limited – mostly direction and advice in relation to the technology or licences. There’s no real hands on support available if you wanted to introduce some digital learning material into your course, there’s nobody to help you except yourself. This is just something people choose to do or not there’s no formal instruction so it’s really ad hoc. A lot of support comes from your colleagues – if someone is doing something that they think is working someone else might give it a go and this seems to be how things are working at the moment.

**With regards to encouraging more use of digital resources what do you think academics need in order to engage more with digital learning?**

I think people need to see more success stories and not just general ones but examples that relate to their subjects. I’m sure a lot of people are thinking about experimenting with different things like video but they need to see how it will help their teaching or enhance the students learning. People just think of the time and effort shy away from
getting involved especially if what they are doing is working for them – if it’s not broken don’t fix it!

**Do you think universities should provide support for the use and development of digital resources?**

I think the University administration thinks mostly about bottom line and reputation so they would have to see value in promoting the use of digital resources in relation to these two things before they would be willing to invest any resources behind it. This is the biggest obstacle because without the institutions support things will remain the same. Personally I think higher education institutions need to move with the times – technology is changing every day and society is becoming more and more dependent on it. What worked in education fifty years ago just isn’t good enough today and if we don’t keep on top of things the students will go to places that do. This reminds me of the days when the internet was first becoming prevalent in society and businesses were unsure of what it could do for them – it was seen as a fad by some people I used to work with! And now look businesses can hardly survive without an internet presence!! I feel we are in the same phase with education. It’s like people know they need to harness technology more for education but are not sure how. Maybe if the government provided some funding in this space it might encourage more interest – money is always a good motivator.

**What kind of support do you think institutions should provide to encourage more use of digital resources?**

Well licences to use certain applications and software packages would be a start, the cost of some licenses are prohibitive. We would also need training and follow up support for when people ran into difficulty. Once off training sessions are only helpful to a certain point you really need to be able to phone someone up while you are actually working on something and be able to get advice then as well. Of course this would require manpower which I’m not sure would be an option in these economic times but ideally more training and more people supporting the training would be great. It would also be useful for people to be able to contact someone to help them find subject specific resources. So like I mentioned already people would probably use more resources if they could find things that were relevant without spending too much extra time looking for them. If you want to get people to develop more resources then some compensation would have to be considered either with teaching hours being bought out or grants or even students available to help out with the development. It could be a great project for students to work on especially here in the computer science department - make it a part of a final year project or something similar – that could be a win win.
Susan – Interviewee 5
Are you a lecturing academic?

I have in the past but I’m not currently. I work in the centre for teaching and learning now.

When you were lecturing would you have ever used digital resources?

Well I would have used web based resources simulations things like that in my teaching but I wouldn’t have gone to a repository like the NDLR to find them as it was pre NDLR days.

Where would you generally source them from?

I suppose I would have done web searches maybe sites like the subject centres and then the NDLR communities of practice and other sites they linked to.

Was there any reason why you used digital resources in your teaching?

Well when I was lecturing I was teaching the uses of ICT in education so it was twofold really it would have been to support the teaching I was doing and also show the students what they could use in their teaching so it was a little bit of a double whammy and hopefully point out that it wasn’t as difficult as they might have thought it was to use digital resources as they might have thought they needed to learn programming or not been aware of what was out there. Em so even though there were some constraints on them I wanted to show that that they could find some useful stuff.

Was it mostly showing them how to use resources that were already available so reusing existing resources?

In the main it was but I remember showing them Webquest because that’s quite well developed and taking them through the methodology and showing them that they could develop ones for themselves. We would have done activities around that but I know that we did suffer from quite short sessions and they were being assessed by exams so it was difficult to motivate them to do hands on work as they knew they would be examined with a written question at the end of the year. So there were challenges there but I know that the course has since evolved and the students are now assessed on their digital resources and projects. They have to produce videos for Powerpoint and websites so it has moved on in leaps and bounds. It’s probably been helped by the improvement in landscape so when I was teaching on it it was called the HDipEd and it’s now called Postgraduate Diploma in Education and when I was teaching on it there were problems with access to broadband but now the improvements in technology is making it easier to mainstream the use and assessment of digital resources. If I go back to 2004 when I first started teaching on this course the mere mention of video would strike fear into the hearts of people – they thought I’ll need a camera, I’ll have these enormous files nobody will be able to upload or open or download them. But a lot of that has changed now with Flip cameras and they have cameras on their phones now so it’s not the only thing but it certainly has helped the general acceptance of technology in education. Most
people can get their hands on some kind of decent kit and will have access to broadband now.

Would you say people are less hesitant now to upload and share say their screencasts or video lectures than a few years ago?

I think so. In one way it’s quite remarkable it’s a bit like what happened with mobile phones where it used to be socially unacceptable for peoples phone to ring on the train or in the theatre and then suddenly it just flipped it became just a normal thing. I think we’re heading that way with this stuff because when I would have started some years ago in 2005/2006 there was a lot of resistance but now it’s like the genie has gotten out of the bottle and there are loads of things online if you go on Twitter people are Tweeting constantly about resources “here’s a resource about this or that links to articles”.... and now you have release of content much like MIT initiated. We look to the Open University Open Learn course material because it’s a great fit with Moodle. I showed some things to colleagues of mine recently and they couldn’t believe people would release that kind of material for free they couldn’t get over it. But people are coming around to the notion of sharing and see that nobody’s out to make a quick buck and that “my text or my content is not going to appear in a book published by someone else who will make millions out of it” – which was always nonsense but didn’t feel that way for academics I think now they see that that doesn’t really happen not that I’m aware of anyway. I think they are more concerned with data protection and copyright issues now if they have videoed students or used third party content.

So the whole of idea of sharing is normalising now I guess it’s finding its own level. A lot of academics would still be surprised though I think at how much say a student shares on Facebook so I think there is still a lot of confusion and they are a bit mystified by that but I think when it comes to sharing resources they can see the benefit of that. And in the case of the NDLR it has helped that there has been an incentive there to bid for a project and get the funding and the ones that have done that have shown that it can be done and it’s not that difficult to do it and that you get a certain amount of kudos and your name in lights on websites and so on. So I think we have crossed a bit of a threshold and it’s becoming normal.

In terms of your own Institution if somebody wanted to find out about say IP issues or digital resource tools would be there be any support available or person they could go to for advice?

There isn’t a designated officer so we’re not well resourced on that here at the moment. But we would be able to support them in the technical development around video although that’s quite tenuous as we would be relying on someone who is already very busy looking after AV requirement on campus but he has given me advice before on compression. For IP and Copyright concerns I would put them onto the likes of Creative Commons which is built in to some of the settings in Moodle 2. But what is interesting is when I talk to people in Moodle training most of them haven’t heard of Creative Commons licensing before.
In your experience have you any thoughts on what the main motivating factors for people are in getting involved developing using and/or reusing digital resources?

I’d have to be honest in terms of our experience here, the thing which really drove things forward more speedily and more effectively was the competition for grants. I mean nothing gets them going like a competition for money in my experience. Because the previous years we promoted the communities of practice where we really buttered them up and laid everything on for them to try and encourage them to join the Education community of Practice where with the introduction of the grants the onus was really put on them to compete for the grant. It made it a desirable thing and gave it an edge. That’s what drove them here I don’t think we’re an Institution that would naturally share probably because there are quite a number of traditional people also there wasn’t that drive that would have been present say in the Institutes of technology for them to get together and save themselves time in reproducing learning materials. They don’t function like that here they are very much independent republics and they are happy to work away by themselves. They would also give the disciplinary argument and often said to me “well this is how we do things here and those resources are not relevant to my teaching. I don’t care if I’m reinventing the wheel I like to do things from my perspective”.

Well this leads me into my next question which is what in your experience do you think are the main barriers for people in using or engaging with digital resources for their teaching and learning practice?

Well I do think the disciplinary issue is one thing or finding a resource that is relevant and tailored to their course. With our lot here the technical element is also a factor which I think is a result of the structure here. We only opened a centre for teaching and learning four years ago and before that if anyone wanted to find out about e-learning or digital resources they would have to go to the quality unit. So there may have been issues around that where they might have been interested but not know where to start looking for information and direction. Other things.....I think we are very much a face to face institution here and e-learning is very much seen as a support. The main concern would be would students stop coming to class if everything was made available to them online. So they are very oriented towards face to face teaching. I think those barriers around the culture of the place and the culture of the discipline is very important. There’s also the argument around whether they would save you any time but I do think it’s much more likely now than a few years ago for people to see the benefits through others who may have received some grant funding to develop a resource or someone in the UK who did a JISC project. So people are now seeing the benefits.

As a blue skys solution what measures do you think could be put in place in your institution to further encourage more people to develop and/or use digital resources?

I think in the broader terms of elearning it’s like the mountain and mohammad and from my own work and research around the use of Moodle. We need to work a lot more with going out to people and out to departments giving them playtime. If I had a blank
cheque in the morning I would love to have a person in each faculty who could show the academics digital learning material and/or tools that are directly relevant to their courses and real life examples that would demonstrate to the academics really good ways of using technology like Clickers or Moodle for example to bring the subject matter to life. It’s very important to take this information out to the departments because as a central unit our challenge is in getting people to come to us at the moment and us not having adequate resources to go out as much as we’d like. And I’ve had this issue where if I provoke a lot of interest and activity in learning or doing more with digital resources can I actually meet this demand? This is a real resource issue and this year with the upgrade of Moodle we were working at capacity and I wouldn’t have been able to handle any additional demands in our unit. So it’s important if you’re going to provoke or stimulate interest that you are able to address the need. I’m a great believer in that authentic or real life practice where you’re not just showing vanilla examples of tools or features people get play time to see how they can use and benefit from them in their own course. For me the challenge is if they can’t do it in two or three clicks or half an hour tops then they move on they just don’t have the time or resources to spend.

In terms of getting around the cultural barriers I think that as people see this kind of practice as becoming the norm and certainly through MIT and other established courses online which are making it into mainstream learning. But I do think that all change around this area takes a long time and you might get drivers like students asking for things or their children perhaps in other universities using particular technology or resources that cause people to want to know more or try new things but generally this change takes a long time.

**Do you think if there was a national policy around the use of digital resources or if the institutions gave more recognition for this type of work would it have an influencing factor around the use and attitudes towards using digital resources?**

I think recognition would I think anything that recognises effort would be a great thing especially now at the moment it’s a big ask to get people to do anything extra on top of what they are already doing. I think recognition is really key and if that’s tied into accreditation through a professional development framework that would help people a lot. I think if that then is part of a national strategy that’s a good thing because that would feed into lots of other strategies but I would shy away from a strategy that says people have to produce X number of resources or have to do something because it might not always fit with the discipline and also because of the natural tendency for people to resist once they here that that they have to do something the barriers immediately go up even if they know it’s a good thing. In a university context they can be extremely successful and good at resisting change - as a teaching and learning person I dread the compulsory approach. If you can get people to buy in to things on their own it’s a much better experience for everyone concerned.

**What about the issue of reward such as career progression linked to innovative teaching and use of technology?**

Well there’s an interesting discussion happening here at the moment as there was a limited promotion opportunity this year for some academics and one of the headings
was teaching. The difficulty is of course in measuring this where research is very straightforward and transparent through peer reviewed publications however the evaluation of teaching is not. I wonder whether they can ever have parity. But I would welcome what’s going on nationally with the national forum and recognising the importance of teaching. But it’s human nature isn’t it to devote time to the things that provide you with the most reward whether its recognition, a promotion or personal satisfaction. And I think the people who have been engaging and developing digital resources to date have done so out of a personal interest and drive without any expectation of external reward.

**Do you have any thoughts or opinions on OER use in higher education in Ireland?**

I think it’s very exciting and it’s good that we’ve reached a point where it’s on our radar. I mean the government’s report launched last week by Ruari Quinn shows the growing interest and support around open Education in Ireland. I think how we channel that to help the academics is also important and there are some challenges there. You’d like to think that this movement would mean that academics would go looking for this stuff and use it in their teaching but often that needs to be mediated by someone like a centre for teaching and learning or the NDLRs that they get a bit of a steer on it – if you like they are scaffolded a little bit as learners would be. Can we provide that expert knowledge in that area for them? But I think it is a very exciting time and I think it’s a great pay off for years of hard work that has gone on that this is finally becoming high profile, mainstream, normal useful, that it is something that people can benefit from especially at the moment when there are cuts coming from every direction and I’d like to see it as the educational dimension of the web. There’s been so much written about the web for education but it hasn’t delivered but OER can be a real contributor to how the web can deliver provided we do the right things with it.