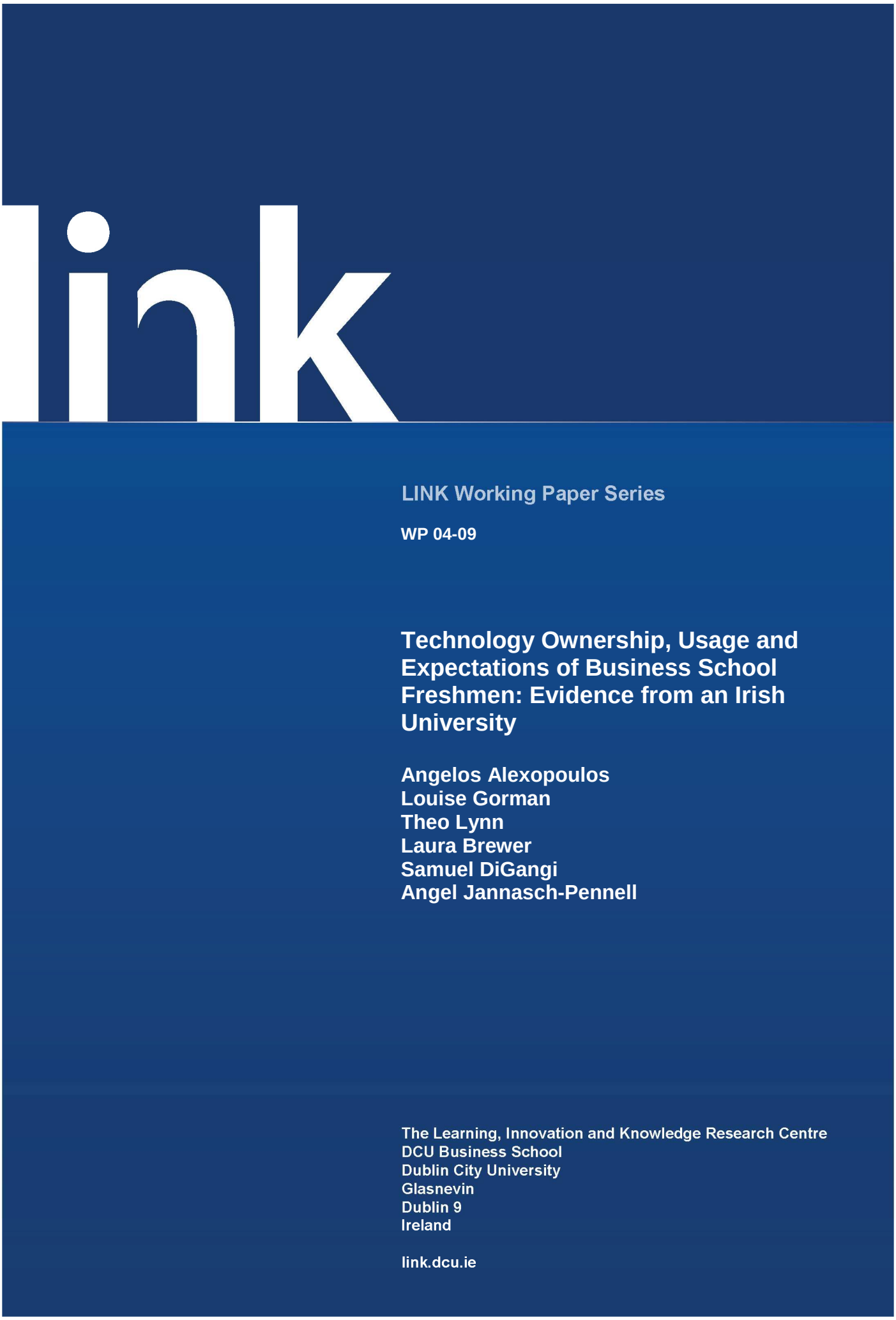

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Technology Ownership, Usage and Expectations of Business School Freshmen: Evidence from an Irish University

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ABSTRACT

Based on survey data from 374 incoming, first-year undergraduates of an Irish university business school, this study examines student ownership, usage and expectations of information and communications technology (ICT) and how these are influenced by student characteristics, such as gender, nationality, socioeconomic background, place of residence, and prior levels of ICT experience. Results indicate significant differences in technology ownership and usage attributed to gender, nationality, socioeconomic background, and place of residence. Additional differences in expectations of ICT-enabled learning activities related to student pre-entry ICT experience are also found. The findings present business schools with challenges and opportunities in addressing the technology needs of a diverse body of netgeners by developing infrastructure and learning strategies that match these needs with their wider experience and expectations of ICT.

Key Words: ICT, ownership, usage, expectations, business school, freshmen, net generation

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INTRODUCTION

In light of today's technology-infused globalised economy and society, higher education institutions in general and business schools in particular are confronted with pressing challenges in accommodating the interests and needs of the 'Net Generation' (Tapscott, 1998) to revisit the relevance of their business strategies, learning goals and teaching models in order to build the skills of today's future technologically savvy workers (e.g., Amirault & Visser, 2009; Hawawini, 2005; Lorange, 2005). The effective integration of ICT into higher education has thus attracted the interest of researchers and also become a key priority for policymakers and governments in both economically developed and developing countries (e.g., Gibbons, 1998; Kennedy, 1997; Melville, 2009; National Center for Education Statistics, 2001; UNESCO, 2003; United Nations, 2000; World Bank, 2003). In this respect, "the future success of the University as an integral educational structure will only be as great as its ability to successfully integrate and adapt to technological change" (Amirault & Visser, 2009: 66).

Yet despite claims, assertions and recommendations regarding the urgent need for higher education institutions to adapt to today's increasingly competitive educational environment by catering for the needs of the 'digital natives' (Prensky, 2001), there still remains relatively little understanding of the ownership, usage of, and preferences for technology products and services as perceived by the actual end-users; that is the postsecondary students themselves (cf. Bennet, Maton, & Kervin, 2008; Brewer, Kilic, DiGangi, & Jannasch-Pennell, 2008). In addition, while prior research has shown that freshmen pre-university preparation and experience influence their expectations of the wider teaching and learning environment in higher education (e.g., Lowe & Cook, 2003), relatively little work has been conducted in the context of ICT-enabled learning (Laing, Robinson, & Johnston, 2009).

This paper contributes to the ongoing dialogue about the role of ICT in reshaping business school education by providing empirical evidence, based on self reports of incoming undergraduates from an Irish university business school, on student technology ownership and usage as well as their expectations of ICT-enabled learning and vision of ideal learning environments in the future. Consistent with an emerging body of research (e.g., Brewer et al., 2008; Kennedy et al., 2006; Kvavik, Caruso, & Morgan, 2004), the results of this study portray a more nuanced view of the role of ICT in the lives of digital natives by demonstrating that technology ownership and usage, while generally high among those students, is not uniform, but reflects differences related to gender, nationality, socioeconomic background, and place of residence. In addition, results indicate that students may prefer a more blended instructional approach by valuing both campus-centred experiences, including face-to-face contact with staff, and virtual learning. Interestingly, their prior levels of ICT literacy are found to be positively related not only to increased usage of ICT during their secondary education but also to their preferences for self-paced online learning

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in the business school environment. Finally, a set of institutional and technical barriers are also identified in relation to their perceived usage of mobile devices for education purposes. Taken together, the findings presented in this paper offer insights, useful both for higher education policymaking and business school management purposes, into incoming students' technology ownership, usage, expectations and training needs and, subsequently, provide a basis for additional research on changes in technology usage and needs by an increasingly diverse student body, faculty attitudes to and training in ICT, and the impact of technology on learning outcomes.

The remainder of the paper is structured as follows. Preceded by an overview of the changing role of higher education institutions within a globalised knowledge economy, the next section discusses some of the main challenges business schools are faced with in responding to the need for integrating ICT into their teaching and learning models. This is followed by reviewing empirical studies on technology ownership, usage and needs of the Net generation, and also on student transition into higher education, which provide the basis for setting the research goals of the current study. The methodology of this study is then presented, followed by its results. The key findings are then discussed in light of the existing literature and their implications for business school administration and higher education policy. The paper concludes by outlining the limitations of the study and offering directions for further research.

THEORETICAL BACKGROUND

Higher Education in the Knowledge Economy

In *The Rise of the Network Society*, Castells (1996: 31) pointed out that the defining feature of today's technological revolution is not found in the primacy of knowledge and information per se but rather in the "application of such knowledge and information to knowledge generation and information processing/communication devices, in a cumulative feedback loop between innovation and uses of innovation". Under the new technological paradigm, "the human mind is a direct productive force, not just a decisive element of the production system" (ibid.).

In this network society, actionable knowledge has thus become the central resource in the new economy (Dyson et al., 1994). If one accepts that actionable knowledge is the key economic resource, then those organisations in the knowledge business, including higher education institutions, must have a leading role to play (Goddard, 1998). As Levine (2001) states:

> The New Economy puts a premium on intellectual capital and the people who produce it. This means that the demand for higher education is expanding dramatically. Education is needed throughout a lifetime, and the market place for that education is international.

More recently, policy focus on the importance of knowledge creation and transfer to sustainable economic growth has brought education systems internationally

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under scrutiny (McKenzie, 2007; OECD, 2004; UNESCO, 2008). In present uncertain times, when government funds are in scarce supply, universities must strive to attain the financial resources needed to continue to generate a workforce of the highest calibre. Development of higher education is thus a prudent investment.

Ireland is no exception. The government's renewed attention to the key role higher education is called to play in assisting the country's transition to a 'smart economy' has brought into the forefront the issue of the very capacity of Irish universities to develop business strategies and learning practices focusing on the continuous development of students' competencies, thereby building upon their actionable knowledge in ways in which the advantages offered by the next generation of ICT can be fully exploited (Department of the Taoiseach, 2008; Forfás, 2009).

However, despite consensus among policymakers and indeed acceptance by the sector of the significant role higher education institutions should play as knowledge spaces in encouraging the development of high quality human capital (United Nations, 2000; World Bank, 2003), universities have yet to become fully proficient in providing students with the ICT skills, competencies, and training required in the emerging knowledge-driven networked society (IBEC, 2008; SHRM, 2007). Specifically, and given that ICT, particularly Web 2.0 technologies, feature prominently within the higher education policy agendas of mature economies (Melville, 2009), the key question for universities "is not *if* technology will be integrated into University based educational structures, but *how* such technological integration can be most successfully employed to meet the new educational missions of the twenty-first century" (Amirault & Visser, 2009: 66, italics in the original). In the next sub-section, we explore this question in the context of business schools and the technology challenges they face in the years ahead.

Technology Challenges for the Business School of the Future

Located at the "fault line where the future of the university and the future of the society interact" (Starkey et al., 2004: 1527), the business school of today is faced with numerous challenging issues, among which is the implications of emerging ICT for their teaching and learning models and, by extension, their long-term survival in an increasingly globalised and competitive educational marketplace (Pfeffer & Fong, 2002). Although no particular configurations of technology-enabled learning models have yet emerged as 'best practice' solutions, it seems that many of the proposed models are informed by a shared understanding that the business school of the future will no longer be a knowledge carrier but will have to evolve into a 'knowledge and learning network' (Hawawini, 2005; Lorange, 2005).

In this respect, conventional 'cottage industry' models of top-down interaction between lecturers and students within the confines of the classroom give place to 'blended' technology-enabled models aimed at supporting knowledge acquisition and sharing in an open, interactive environment, wherein students are encouraged to accommodate their learning needs by combining on-campus sessions with fast and

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economical access to, and self-paced use of ICT including mobile phones, webcasts, video conferencing and podcasting (Fleck, 2008; Jonassen, Mayes & McAleese, 1993). The demand-driven, customised focus of the latter models stands in sharp contrast to the supply-driven, mass-marketing focus of the traditional models and, therefore, responds better to students' particular needs and preferences even before they come to the business school (Lorange, 2005). Additional potential benefits of 'blended' technology-enabled models include streamlining of operations, controlling the cost of administrative support, leveraging the limited faculty resources, enhancing internal and external communications, reaching out to students and alumni around the world, and responding to the needs of companies and individuals for lifelong learning (Hawawini, 2005). In essence, a shift of the business school structure from a traditional production-based model towards a learning and knowledge network reflects a transformation of an "intense, on-campus, short-term experience into a lifelong partnership to the mutual benefit of its members and the school" (ibid: 780).

In light of these challenges, a number of issues must be addressed. In particular, the need for a better understanding of student technology ownership and usage is a key requirement for developing innovative ways in which the provision of ICT-enabled learning practices can be integrated into and aligned with the wider life experience of the Net generation. In addition, given that students' perceptions of those practices are likely to be contingent upon their previous educational experiences (e.g., Laing, Robinson, & Johnston, 2005), it is also important that attention should be paid to the assessment of their existing ICT skill-sets so that incoming students can successfully be inducted into the requirements of business school education. Each of the two issues is explored in more detail in the following sub-sections.

Technology Ownership and Usage of the Net Generation

Younger students (i.e., those born roughly between 1982 and 1994) entering education today, referred in the literature as the 'Net Generation (Tapscott, 1998), 'digital natives' (Prensky, 2001) or 'Millennials' (Howe & Strauss, 2000; Oblinger, 2003), are claimed as unique and historically unprecedented in terms of their (i) sophisticated knowledge and skills with ICT, and (ii) their particular learning preferences or styles which differentiate them from earlier generation of students such as 'Gen-Xers', 'Baby Boomers' or as 'digital immigrants' (Prensky, 2001). For example, according to Prensky (2001: 1), digital natives are described as 'surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age'. Howe & Strauss (2000) describe millenials as optimistic and experiential learners, team-oriented achievers who are proficient in multi-tasking, willing to work collaboratively, and relying heavily on ICT, particularly more mobile devices (Project Tomorrow, 2006), for information acquisition and social interaction purposes. As a result of growing up in a technologically-rich environment and alongside the computer industry, Netgeners are immersed in technology so that they do not even view computers as 'technology'

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anymore (Frand, 2000). It is expected that the Net Generation will constitute 45 percent of the world's population by 2015 (Goldenberg, 2006).

In contrast to theoretical claims, assertions and anecdotal evidence suggesting Netgeners' ubiquitously high access to and usage of digital technologies (e.g., Prensky, 2001), a growing body of empirical research, based mainly on US and Australia student population samples, while indicating that certain technologies, particularly interactive online media (e.g., instant messaging), are indeed embraced increasingly by younger students, has nevertheless provided a more complex view (Brewer et al., 2008; Kennedy et al., 2006, 2008; Kvavik, Caruso, & Morgan, 2004; Lenhart et al., 2007; Oliver & Goerke, 2007; Salaway, Caruso, & Nelson, 2007).

For example, the results of EDUCAUSE Center for Applied Research's latest survey of 27,864 undergraduates across 103 US colleges, universities and community colleges showed that while nearly of the respondents (98.4%) owned a personal computer, and over three quarters entering college with a laptop at hand, there was a significantly lower percentage of students (10%) owning smart phones or personal digital assistants (PDAs) (Salaway et al., 2007). Similarly, a survey of over 4,000 students from 13 US universities found that while the vast majority of students owned personal computers and mobile phones, only 12 percent owned handled computers (Kvavik et al., 2004). The results of the same survey also demonstrated that the most common technology uses were word processing, emailing and surfing the Net, though only one fifth of the students were engaged in creating/editing video, audio and web pages. Moreover, two studies of university students in Australia found that while the majority of students were using a wide range of ICT in their daily lives, usage of emerging technologies such as maintaining a blog, using social networking technologies (Kennedy et al., 2006) and downloading podcasts (Oliver & Goerke, 2007) were reported by less than one quarter of the students.

Empirical studies conducted in the US, Australia and the UK have also identified a number of differences in student technology usage related to gender (Broos, 2005; Kennedy et al., 2008; Kvavik, 2005), socio-economic status (Ipsos MORI, 2008), digital divide (Cotten & Jelenewicz, 2006; Melville, 2009; Rye, 2006) and discipline specialisation (Kvavik et al., 2004). For example, recent empirical evidence drawn from a large-scale survey of over 2,500 first year students from three Australian universities (Kennedy et al., 2008) found that males were significantly more involved in gaming than females (Gorriz & Medina, 2000). Gender differences in preference for the use of technology in the classroom, as well as in attitudes towards new communication technology have also been documented in studies conducted in the US (Kvavik, 2005) and Belgium (Broos, 2005). The role of several dimensions of the digital divide, such as race and ethnicity, in student technology ownership, use and access has also been identified in previous empirical work conducted in the US (Cotton & Jelenewicz, 2006). In addition, a qualitative study of distance education in Indonesia has highlighted the implications of the uneven geographical distribution of digital technologies for students' study situations and

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activities and, effectively, their participation in higher education (Rye, 2006). Moreover, discipline specialisation can also be an important predictor of preferences for technology in the classroom. For example, in Kvavik et al's (2004) study, business students expressed particularly strong preference for the use of technology in the classroom. Interestingly, the results of the same study indicated that the most cited benefit of using technology in the classroom was convenience (48.5%), while improved learning was chosen only by 12.7 percent of the students.

Netgeners' Transition into Higher Education

Various studies conducted in the UK have shown that student expectations of the teaching and learning environment in third-level education are influenced by their educational and wider life experience (Ozga & Sukhnandan, 1998) and, more particularly, their level of pre-university preparation (Lowe & Cook, 2003). For example, a survey of students in English universities indicated that those students who had previously attended schools with regimes similar to those at university found the transition into higher education relatively easy (Roberts & Higgins, 1992). Additional research has shown that while the teaching and learning methods employed in secondary schools may not be pertinent to the proactive and autonomous learning styles expected in a university context, they nevertheless tend to persist to the end of the first semester of university life (Cook & Leckey, 1999). Recognising the needs of, and providing support to incoming students is therefore important for student retention, given that almost two-thirds of those students who withdraw do so during the first year of their studies (Yorke, 1999).

Cumulatively, research on student transition into higher education highlights that the mismatch of student expectations regarding the teaching and learning styles at the pre-entry and post-entry stage contribute to disengagement from the educational and social aspects of university life. This, in turn, can have a negative impact on the academic and personal development of the student, leading to high non-completion rates.

Evidently, as the introduction of the on-line Spiral Induction Programme in Southampton Institute has shown (Laing et al., 2005), ICT-supported induction activities can help incoming students feel more integrated into the teaching and learning environment of their new institution by providing them with more targeted assistance and customised support rather than the 'one size fits all' model of induction typically known as 'freshers week' (ibid.). Moreover, as evidenced in a recent longitudinal study examining the effect of ICT on student learning at Queen's University, Belfast, fully integrated technology into a module can also have a significantly positive impact on student pass rates, especially for foundation-level students (Turney et al., 2009).

Given the importance of matching student skill-sets, particularly ICT-related competencies, developed during secondary education with the skill-sets expected at third-level, we posit that more emphasis should be placed on managing netgeners'

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transition into the ICT reality of the business school. The evaluation of incoming students' expectations regarding technology aspects of the business school life and also the extent to which, and how, these are influenced by their pre-entry experience of ICT is a step towards this direction.

The Present Study

The remainder of the article examines data from incoming undergraduate students in Dublin City University (DCU) Business School and considers the following questions:

- Is technology ownership and usage among business school freshmen uniform or patterned along student characteristics such as gender, nationality, socioeconomic background, and place of residence?
- What devices and digital technologies do they perceive as important for a successful business school experience and how their perceptions influenced by student characteristics?
- What is their vision for the ideal learning environment?
- How are their expectations of ICT-enabled learning activities in the business school environment influenced by their pre-entry ICT experience?

METHODS

Sample

All full-time, first year undergraduate entrants in DCU Business School (n=448) were surveyed in September 2008 with a web-based questionnaire originally designed in Fall 2006 for use by Arizona State University's Applied Learning Technology Institute (alt^I). A total of 378 respondents completed the entire survey, resulting in 84.4 percent response rate. A summary of the demographic profile of the study sample is provided in Table 1.

Insert Table 1 about here

As shown in Table 1, the sample was relatively equally distributed between females (51%) and males (49%). The majority of the respondents were under 21 years (95%), Irish (85%), living previously in the South-East regions of Ireland (76%) and having completed their secondary level education in a public school (77%). Almost four out of ten respondents (40.5%) were enrolled for a Bachelor of Business Studies degree, followed by around one third (31.5%) enrolled for a Bachelor of European or International Business Studies degree, while the remaining 28 percent were enrolled for an Accounting and Finance degree. The sample comprised approximately 22 per

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cent of the total number of full-time first-year undergraduates enrolled in DCU in the academic year 2007/8. As shown in the same table, the sample distribution in terms of the above characteristics (except socioeconomic background due to lack of available data) followed the distribution of the total population of DCU freshmen.

Data Collection and Measures

All DCU Business School freshmen were invited via personal e-mails to participate in our study by completing a self-administered web-based questionnaire survey about technology ownership, usage, and needs. The voluntary nature of participation and the anonymity of responses were emphasised. The survey consisted of a combination of closed- and open-ended items based on five areas: technology ownership and usage, one-to-one computing, past experiences and expectations of ICT-enabled learning, vision for ideal learning environments in the future, and demographics.

Technology ownership and usage. Students were asked to provide details on their ownership of electronic desktop and portable devices, operating systems and software, and internet access (0=no; 1=yes), and also to indicate the frequency (i.e., hours per week) of use of those devices for entertainment, communication and educational purposes. They were also asked to indicate on a 5-item Likert type scale the devices and digital technologies they perceived as important for a successful college experience.

One-to-one computing. Students were asked to indicate on a 5-item Likert-type scale their perceptions of the importance of one-to-one computing. Questions were also asked on student behaviour with available ICT devices as well as on funding options.

Pre-entry ICT experience and expectations of ICT-enabled learning. Students were first asked to indicate their level of pre-entry ICT experience by stating whether they had completed successfully the European Computer Driving Licence (ECDL) prior to enrolling in DCU Business School. They were then asked to indicate on a 5-item Likert-type scale their perceptions of how well their teachers in their secondary schools integrated technology within their courses, and also what ICT they would like to be made available to them at DCU Business School. Finally, they were asked to indicate on a 5-item Likert-type scale how important they would consider several devices and technologies for a successful college experience in DCU Business School.

Vision for the ideal learning environment. A series of closed- and open-ended questions were used to capture student views of their vision and use of technology in DCU Business School within a three-year horizon.

Demographics. Data on several demographic characteristics of the sample were also collected (i.e., gender, age, nationality) as well as on student subject discipline specialisation (i.e., business studies, business studies with languages, accounting and finance). Student place of residence prior to their entry in DCU Business School was used as a proxy for the geographical dimension of the digital divide in Ireland (i.e.,

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South-East, Borders-Midlands and West) (Central Statistics Office, 2008). Finally, due to lack of available data on family income, parents' education and profession, student secondary schooling attainment (i.e., public, private) was used as a rough proxy for socioeconomic background.

Data Preparation and Analysis

Quantitative data were prepared, screened and analysed with the Statistical Package for the Social Sciences (SPSS) v.15. Four partially completed questionnaires were identified and excluded from further statistical analysis reducing the total sample from 378 to 374 respondents. The results of Little's MCAR test indicated that the data were missing completely at random (Chi-Square = 14497.704, DF = 14292, Sig. = .112).

All 374 surveys were screened with the use of both graphical and statistical methods for outliers and normality and were found suitable for analysis. Descriptive statistics, response distributions and variances were examined with the objective of considering student technology ownership, usage, and expectations. A series of t-tests were performed to examine for significant differences in the mean values of all variables of interest across the dimensions of student gender, nationality, place of residence, secondary school attainment, and pre-entry ICT experience.

RESULTS

Student Technology Ownership

Table 2 provides a summary of DCU Business School first-year undergraduate students' responses to technology ownership.

Insert Table 2 about here

As shown in Table 2, the majority of students reported ownership of a variety of mobile devices, including mobile phone (99.7%), portable audio player (92.3%), digital video camera (78.6%), and laptop computer (73.9%). In addition, more than two out of ten students reported ownership of wireless PDA. Students also reported high ownership of desktop-based devices including desktop computers (70.9%) and peripherals such as printers (82.9%) and scanners (66%). Furthermore, high ownership of game consoles (62.8%) and digital TV receivers (64.9%) was also reported.

Furthermore, the results revealed a number of significant differences in student technology ownership in terms of gender, nationality, place of residence, and socioeconomic background. A summary of the results is provided in Table 3.

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Insert Table 3 about here

Male students reported significantly higher ownership of game consoles, handheld game units, and digital TV receivers than female students. On the other hand, there was a significantly higher ownership of digital video cameras by female students compared to male students. Significant differences in technology ownership were also found in terms of student nationality. In particular, compared to non-Irish freshmen, Irish freshmen indicated higher ownership of desktop-based devices, including desktop computers, game consoles, printers, and digital TV receivers, whereas the opposite was the case for ownership of mobile devices, particularly laptop computers. Nationality differences in freshmen preferences for special pricing and support provided by DCU for electronic devices were also patterned along the portability criterion. Irish students ascribed significantly higher importance to special pricing and support for portable music players [$t(353) = 1.985$, $p<.05$] than non-Irish freshmen, whereas the opposite was found to be the case for non-portable devices, such as printers [$t(351) = -1.973$, $p<.05$] and scanners [$t(348) = -2.049$, $p<.05$].

In terms of digital divide, those students who were residents in the South-East counties of Ireland reported significantly higher ownership of game consoles, printers, and digital TV receivers than those who were coming from Borders-Midlands and West counties. Finally, in terms of student socioeconomic background, significantly higher ownership of digital TV receivers was reported by freshmen having completed their secondary education in a private compared to a public school.

Student Technology Usage

Table 4 provides a summary of incoming DCU Business School undergraduates' responses to technology use.

Insert Table 4 about here

As shown in Table 4, watching television (62.1%), listening to the radio (58.8%) and playing video/digital games (58%) were rated by the majority of students as the technology related activities in which they spend at least five hours a week. In addition, more than one third of the students reported over 5 hours per week listening to music on a portable music player (34.7%) and using a mobile phone for texting (34%). Web-related technology activities were also reported, with almost a quarter of students spending more than five hours a week editing a personal website (24.3%), followed by 20.6 percent watching videos online, 19.6 percent using the web for

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instant messaging (IM), 12.8 percent for emailing and finally 6.6 percent for interacting with friends on a social networking website.

A number of significant differences in student technology use were found in terms of gender, nationality, place of residence, and socioeconomic background, which are shown in Table 5.

Insert Table 5 about here

In terms of gender differences, as shown in Table 5, male students compared to female ones reported significantly higher levels of technology use for watching videos online, while the opposite was the case for watching television, listening to music on a personal music player, and emailing. A number of significant differences in student technology use attributed to nationality were also found. In particular, Irish freshmen indicated higher technology use mainly for entertainment purposes, such as watching television, listening to the radio and watching video online. On the other hand, non-Irish freshmen indicated use of technology mainly for communication purposes, such as emailing and IM. In terms of student residency, results indicate that freshmen from the South-East counties of Ireland made significantly more frequent use of email and IM compared to those students from Borders-Midlands and West. Furthermore, students who had completed their secondary education in a public school compared to a private school reported significantly higher levels of technology use for entertainment purposes, including watching television, listening to the radio, and listening to music on a personal music player. However, students who had completed their secondary education in a private compared to a public school reported significantly higher levels of technology use for social communication purposes, particularly use of the web for IM.

Regarding mobile technology use, Table 6 shows that the majority of students were using mobile devices more than once a week mainly for entertainment purposes, and particularly for listening to music (80.7%), playing games (60.8%) and making videos (50.8%). Mobile devices were also used for communication purposes, including emailing, IM and mobile texting (60.3%), and online social networking (30.6%). In contrast, students reported relatively low use of mobile devices for educational purposes, such as taking class notes (46.6%), scheduling/calendaring (25.9%), making audio recordings of class notes/lectures (21.4%), listening to course seminars/lectures (3.7%), and doing word processing/spreadsheets (4.8%).

Insert Table 6 about here

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A number of significant differences in student mobile technology use were found in terms of gender, nationality, and place of residence. These are presented in Table 7.

Insert Table 7 about here

As shown in Table 7, male freshmen indicated significantly higher mobile technology use than their female counterparts for entertainment and communication purposes. Female freshmen, on the other hand, reported higher use for education purposes. A similar distinction in mobile technology use was found in terms of student nationality, with Irish freshmen using more frequently mobile devices for watching videos and non-Irish freshmen for education purposes such as making audio recordings of class notes and word processing. Similarly, use of mobile technology for word processing, although generally low, differed significantly between students from the South-East regions of Ireland and those from the Borders-Midlands and West.

Student Technology Ownership and Usage for a Successful College Experience

When asked to indicate which devices they considered important for a successful college experience, the majority of students reported the following portable and non-portable devices: mobile phones (86.6%), laptop computers (81.5%), desktop computers (66.7%), portable audio players (e.g., iPod, iRiver) (59%), and interactive whiteboards (53.4%). Notably, 44.2 percent of students also reported wireless PDAs as important devices for a successful college experience. Furthermore, as shown in Table 8, significantly higher importance to laptop ownership for a successful college experience was reported by females and students from Borders-Midlands and West than females and students from South-East, respectively.

Insert Table 8 about here

When asked to indicate which digital technologies they consider important for a successful college experience, the large majority of students reported the following: high speed wireless access in a variety of convenient locations (91.3%), including across the DCU campus (84.8%), and near campus (73.9%). More than eight out of ten students (84.6%) also placed importance to the provision of secure file and document sharing capabilities. Again, as shown in Table 9, females and students from Borders-Midlands and West reported significantly higher levels of importance to high speed wireless access across and near the DCU campus as well as to the provision of secure file and document sharing capabilities compared to males and students from

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South-East, respectively. To note that, in general, freshmen reported relative ease in accessing the internet, with more than two thirds of students indicating use of broadband access at home (67.2%), while 53.2 percent of students reported use of DCU's wired (23.8%) or wireless network (29.4%), followed by 12 percent of students using publicly available WiFi. Only 9 percent of students reported that they access the internet by visiting internet cafés.

Insert Table 9 about here

Approximately 44 percent of students viewed one-to-one computing as important to their college experience. In addition, 69 percent of students reported they would be willing to bring their laptop to class at least once a week, and approximately 60 percent of students stated they would benefit from more integrated use of laptops in the classroom. However, despite the high degree of laptop ownership among the sample (72%), only 15.5 percent of students stated that they would bring their laptops to every class. Interestingly, students perceived a set of institutional, technical and practical barriers to laptop use in class including the following: battery power (54%), in-class use of laptops acting as a distraction (38.6%), prohibition by lecturer (38.1%), difficulties in transporting to and from college (36.8%), wireless access (29.9%), and safety worries (28.6%).

When asked which services they would like to be included in a technology fee if one was introduced, the majority of students (54.8%) indicated a preference for laptop support in a one-to-one computing initiative. Almost four out of ten students were also in favour of the delivery of lectures online via podcasts or otherwise. Finally, among the purchasing options available for securing a laptop computer as part of a one-to-one computing initiative, 37.6 percent of students reported purchasing it on their own as their first choice, and 38.5 percent as their second or third choice. 36 percent of students stated as their most preferred laptop purchase option the inclusion of its cost in the tuition fee, and 23 percent the use of a financial aid assistance program.

Student Vision for the Ideal Learning Environment

Results indicate that over nine out of ten (92%) freshmen considered technology as imperative to their educational learning experience, with 82.2 percent agreeing that use of educational technologies can impact positively on student learning outcomes. When asked to indicate the key components that constitute an ideal learning environment, the majority of students reported the following: wireless access everywhere on campus, provision of mobile phone services, access to and use of audio-visual recording facilities, and interactive whiteboards. In addition, over two thirds of students expressed a clear preference for a hybrid instructional approach

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encompassing both the physical and virtual classroom. Specifically, 68.2 percent of respondents stated that they would prefer a combination of online learning and physical attendance in the classroom. Similarly, almost 66 percent of students expressed their preference for access to recorded lectures as well as to text versions of those lectures.

Furthermore, the large majority of students (85.7%) considered ICT training in a more interactive learning environment as an important aspect of their wider learning experience in college. Moreover, female students held significantly stronger views on the importance of technology training than their male counterparts [$t(374) = 1.938$, $p<.05$]. Notably, more than 40 percent of freshmen stated that technology literacy was not considered as an expected learning outcome in their previous school. Similarly, almost 39 percent felt that during their secondary education they were somewhat poorly equipped with the technology skills required for a successful college experience.

Student Experiences and Expectations of ICT-enabled Learning

Approximately 34 percent of students had completed successfully the European Computer Driving Licence (ECDL) prior to their entry to DCU Business School. In particular, results indicate that students who had completed the ECDL had used live online learning instead of physical attendance in the classroom more often than those who had not completed it [$t(364) = 2.197$, $p<.05$]. An additional and in the same direction difference was also found in relation to student mobile technology use for listening to course seminars/lectures [$t(358) = 2.067$, $p<.05$]. Finally, a marginally significant, and in the same direction, difference was also found in relation to student perceptions of interest and willingness to engage in courses which required the use of technology [$t(365) = 1.832$, $p<.068$].

When asked whether technology literacy was included in their secondary institutions as an expected learning outcome, students who had completed the ECDL held a significantly stronger view compared to those who had not completed the ECDL [$t(364) = 3.478$, $p<.001$]. Similarly, a difference in student perceptions of the extent to which their secondary institutions had equipped them with the technology skills required for their transition into the university was found to be significant and in the same direction [$t(364) = 5.919$, $p<.001$].

Regarding student expectations of ICT-enabled learning activities in a university environment, results, as shown in Table 10, indicate that students who had completed the ECDL would also expect to use self-paced online learning instead of physical attendance in the classroom at a significantly higher level than those who had not completed it. In addition, these students perceived ICT training in a more interactive learning environment as a particularly important aspect of their wider learning experience in DCU Business School.

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Insert Table 10 about here

DISCUSSION

Student Technology Ownership

Consistent with recent trends in technology ownership among university undergraduates in the US (Brewer et al., 2008; Salaway et al., 2007) and Australia (Oliver & Goerke, 2007), the results of our study indicate that the large majority of DCU Business School freshmen owned a wide repertoire of portable electronic devices including mobile phones (99.7%), audio players (92.3%), digital video cameras (78.6%), laptop computers (73.9%) and game consoles (62.8%). Interestingly, more than one-fifth of DCU Business School freshmen owned wireless PDAs, nearly ten percent higher than the average ownership for US netgeners reported in Brewer et al's (2008) and Salaway et al's (2007) studies.

Furthermore, and in line with prior research (e.g., Brewer et al., 2008; Kennedy et al., 2008), the data from our study showed clear differences between male and female freshmen in regard to ownership of gaming devices, suggesting that gender may be an important factor in the design and delivery of improved teaching and learning initiatives through the use of educational gaming and visual devices (cf. The New Media Consortium, 2007). Female students' tendency not to engage in digital gaming may therefore require the design of alternative forms of applied learning that are sensitive to different gender-based learning styles. For example, the finding that females owned significantly more digital video cameras than males may provide an alternative means of delivering learning and teaching activities to that particular group.

Our study also found that ownership of laptop computers, while generally high among freshmen, differed in terms of student nationality, with international students reporting significantly higher ownership (86%) compared to Irish students (72%). On the other hand, ownership of desktop devices, such as desktop computers and printers, was found to be significantly higher among Irish students than international students. Unsurprisingly, these differences were reflected in Irish and international student preferences for special pricing and support provided by DCU for purchasing portable and non-portable electronic devices respectively. Our study suggests that freshmen nationality differences should be given significant attention in the design of technology product pricing policies, thereby responding to the increasing internationalisation of the Irish business school market. Undoubtedly, while research has shown that owning a laptop computer is not necessarily translated into improved student performance, it nevertheless has a positive impact on flexibility in choosing where and when to study (Read, 2006).

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Finally, a noteworthy finding from our study is that student residency, a proxy for the geographical dimension of the digital divide in Ireland, and type of secondary schooling, a proxy for student socioeconomic background, emerged as significant factors accounting for differences in ownership of digital TV receivers. In particular, students living in the South-East regions of Ireland and had previously attended private secondary schools were found to own more digital TV receivers compared to public secondary school students from the Borders-Midlands and West. With the recent advent of interactive digital TV in Europe and the possibilities that it offers for the widespread delivery of educational audiovisual material (Dosi & Prario, 2004), our findings suggest that the potential of TV-based interactive learning or t-learning especially for distance higher education purposes in Ireland may be subject to geographical and financial barriers.

Student Technology Usage

Our data suggests that DCU Business School freshmen's usage of technology in general and mobile devices in particular was associated more with entertainment and social communication purposes and less with educational purposes. This is not surprising as previous studies (Brewer et al., 2008; Salaway et al., 2007) have shown that younger netgeners are more likely than older ones to engage in recreational activities, such as downloading video, listening to music and playing video games, as well as communication activities such as IM and emailing.

However, our results highlighted small yet significant differences in technology usage associated with real-time communication (i.e., IM) which were attributed to student gender, residency and socioeconomic background. In particular, a gender distinction in certain uses of technology were identified, with males reporting higher frequency related to entertainment, whereas the opposite was found to be the case for communication activities. Again, this is consistent with the EDUCAUSE surveys (Kvavik, 2005; Salaway et al., 2007) which found that female undergraduates were spending more time than males communicating and socialising. In terms of the role of student residency and socioeconomic background, our results point to the possibility of at least two types of 'netgeners' in Ireland: (i) the privately schooled South-Easterners characterised by increased familiarity with and use of interactive ICT and (ii) the publicly schooled Borders-Midlands-Westerners engaged in more traditional technology activities, such as watching television or listening to the radio. Given the potential of real-time data communication modes for providing students with opportunities to share and collaborate in an open, interactive university environment (The New Media Consortium, 2007), addressing these forms of online division may therefore require a different set of responses from Irish higher education policymakers and business school authorities.

Notwithstanding these differences, our data suggests that DCU Business School freshmen are active rather than passive creators of content considering the proportion of respondents who reported having a personal website (78.8%) or blog (85%),

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making videos (50.8%) and editing a personal website (24.3%), which is considerably higher than the proportion reported in Brewer et al's (2008) study of US first-year undergraduates. Yet, and in contrast to previous research (Kvavik, 2005), DCU freshmen's active engagement with ICT, particularly mobile technology, was found to be less related to education or work.

However, our results contribute to a better understanding of mobile technology usage for educational purposes, by identifying differences attributed primarily to gender, and nationality, and to a lesser extent to place of residence. In particular, females and international students were found to integrate mobile technology use into educational activities more than males and Irish students. Based on the above, we suggest that the creation of a leaning environment in which business school freshmen, particularly male Irish freshmen, feel motivated to utilise their ICT skills and experience on campus for activities directly related to their university education is undoubtedly a challenge for business school administration.

Student Technology Ownership and Usage for a Successful College Experience

The majority of DCU Business School freshmen not only owned a wide variety of mobile digital devices, such as laptop computers, mobile phones and digital audio players, but also perceived these devices as important for a successful college experience. Ubiquitous and secure access to high-speed internet in a variety of convenient locations across and near campus was also reported by freshmen as an additional component of successful college experience. Notably, freshmen's ratings of the importance of mobility, accessibility and security for a successful college experience differed along the lines of gender and digital divide, with female students and students from the Borders-Midlands and West reporting significantly stronger views than males and South-Easterners.

While DCU Business School freshmen appeared to be overall cognisant of the benefits of one-to-one computing and integrated use of laptops in the classroom, only 15.5 per cent of them stated they would actually bring their laptops to every class. Besides technical and practical barriers to bringing laptops to campus, of particular interest is the finding that students considered that laptop use in class would either be prohibited by faculty or would act as a distraction. While it is unclear whether freshmen's views of laptop use in class was reinforced by their views on staff as generally averse to mobile technology use in class, our results point to the possibility of a gap between instructors and freshmen expectations of the scope and benefits of one-to-one computing. We suggest that meeting the digital habits of incoming students may require a shift of attitude on the part of faculty from technology averse and cautious to technology confident and supportive.

Student Vision for the Ideal Learning Environment

Our data suggests that not only were campus-based educational technologies (e.g., interactive whiteboards, audio-visual recording facilities) perceived by the vast

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majority of DCU Business School freshmen to be positively related to their learning outcomes, but particular importance was also attached to mobile technologies (e.g., ubiquitous WiFi access across and near campus, provision of mobile phone services) as an integral part of their ideal learning environment. This is further supported by the high proportion of students who ascribed importance to the potential benefits of podcasting of lectures as an enhancement to classroom learning. This may not be surprising as more than two-fifths of freshmen reported they had already been making audio recordings of classes at their secondary schools.

It is, however, important to keep in mind that DCU Business School freshmen, similarly to their counterparts in US universities (e.g., Salaway et al., 2007), expressed a clear preference towards a blended instructional approach which would not replace but combine virtual learning with classroom learning. In addition, our results indicate that, compared to their male counterparts, female students viewed technology training as especially important. This is in agreement with the findings of other authors (Salaway et al., 2007) who found that gender is associated with differences in student perceptions of their technology skills, particularly computer maintenance and use of video/audio software. Our results also indicate that, besides demographic factors, freshmen's expressed needs for technology training may be associated with lack of such training during their secondary education. Assessment of freshmen's level of knowledge, skills and competences in ICT may, therefore, be a necessary component of their induction at the business school so that the technology training needs of specific student groups, such as females and students poorly equipped with ICT skills during their secondary education, can be proactively identified and targeted.

Student Experience and Expectations of ICT-enabled Learning

We found that freshmen future expectations of ICT-enabled learning activities in a university context were not uniform but rather varied depending on the level of their technology skills acquired formally via completion of the ECDL prior to their enrolment in DCU Business School. We also found that those students who had completed successfully the ECDL had also used on-line learning methods including use of mobile technology for listening to classes. A possible reason for this, as the analysis showed, may be that technology literacy was an expected learning outcome in their secondary schools. Importantly, those freshmen equipped with technology skills acquired through formal ICT training during their secondary education did also identify the need for and benefits of further training in a more interactive learning environment, which may be indicative of their ability and motivation to adapt to the ICT requirements of business school education. However, only one third of our sample reported completion of the ECDL. This presents business school authorities with challenges as well as opportunities in developing creative and innovative approaches to increasing the critical mass of technology adopters.

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Limitations and Future Research Directions

Our findings should be interpreted in light of the following limitations. First, although our study sample was representative of the wider DCU incoming undergraduate student population, its size was small to capture in more detail nationality differences in freshmen ownership, usage and expectations of ICT. Given the increasing internationalisation of the European university sector and the competitive challenges it presents for Irish higher education institutions, we call for more large-scale research that specifically examines the role of national, ethnic and other cultural differences in the ICT habits, expectations and learning needs of incoming undergraduates. In addition, with the increasing trend towards multidisciplinary university courses, future studies can shed light into how technology ownership, usage and expectations of freshmen may differ in terms of subject specialisation. A further limitation of our study was the measurement of freshmen socioeconomic background based solely on their secondary school attainment. Future research is needed to use more accurate measures such as their parents' occupational status and level of attained education (Ensminger & Fothergill, 2003). Moreover, while our study revealed how pre-university acquired ICT skills may be related to freshmen expectations of technology enabled learning in a university environment, more research is needed to examine the impact of those skills on student satisfaction with technology infrastructure and university staff attitudes to and competence in ICT. Finally, while the results of our study contribute to a better understanding of student technology ownership, usage and expectations, their applicability is limited by focusing solely on students' perceptions. However students represent only one of the major stakeholders in higher education. Additional research is required on whether there is dissonance between students and faculty, administrators and support staff, and if such dissonance exists, the scale and potential impact on technology use and learning outcomes.

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TABLES AND FIGURES

Table 1 **Sample Demographics**

	2008/9 New First-Year Undergraduate Entrants in DCU Business School (Study Sample)	**2007/8 New First-Year Undergraduate Entrants in DCU (All Schools)**
	N (%)	**N (%)**
Gender		
Male	184 (48.7)	730 (44.6)
Female	194 (51.3)	974 (55.4)
Total	378 (100)	1704 (100)
Age		
< 18	57 (15.1)	136 (7.9)
18-21	304 (80.4)	1332 (78.1)
22-24	7 (1.9)	96 (5.6)
25-30	6 (1.5)	76 (4.3)
31-40	4 (1.1)	74 (4.1)
Total	378 (100)	1704 (100)
Nationality		
Irish	321 (84.9)	1459 (85.6)
Non-Irish	57 (15.1)	245 (14.4)
Total	378 (100)	1704 (100)
Place of Residence		
South-East	286 (75.7)	1309 (76.8)
Borders-Midlands & West	92 (24.3)	395 (23.2)
Total	378 (100)	1704 (100)
Secondary School		
Public	292 (77.2)	Not available
Private	75 (19.9)	
Not stated	11 (2.9)	
Total	378 (100)	

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Table 2 **Student Technology Ownership**

Device	Percentage (%)
Mobile phone	99.7
Portable audio player	92.3
Printer	82.9
Digital video camera	78.6
Laptop computer	73.9
Desktop computer	70.9
Scanner	66
Digital TV receiver	64.9
Game console	62.8
Handheld game unit	34.8
Digital camera	28.4
Wireless PDA	22
Tablet PC	6.1

Table 3 **Student Technology Ownership by Gender, Nationality, Place of Residence and Secondary School**

Device	Mean		*t*
	Gender		
	Males	***Females***	
Game console	0.87 (n = 167)	0.40 (n = 178)	*t* = 10.585, df = 312.683, p<.001
Handheld game unit	0.42 (n = 166)	0.28 (n = 177)	*t* = 2.715, df = 332.853, p<.01
Digital TV receiver	0.71 (n = 168)	0.59 (n = 178)	*t* = 2.337, df = 343.790, p<.05
Digital video camera	0.66 (n = 167)	0.91 (n = 181)	*t* = -5.666, df = 272.345, p<.001
	Nationality		
	Irish	***Non-Irish***	
Desktop computer	0.75 (n = 298)	0.46 (n = 52)	*t* = 3.912, df = 64.818, p<.001
Game console	0.67 (n = 295)	0.36 (n = 52)	*t* = 4.357, df = 345, p<.001
Printer	0.86 (n = 298)	0.63 (n = 52)	*t* = 3.239, df = 60.277, p<.001
Digital TV receiver	0.69 (n = 296)	0.40 (n = 52)	*t* = 3.914, df = 67.514, p<.001
Laptop computer	0.72 (n = 300)	0.86 (n = 52)	*t* = -2.732, df = 84.559, p<.01
	Place of Residence		
	South-East	***Borders-Midlands and West***	
Game console	0.67 (n = 266)	0.51 (n = 78)	*t* = 2.388, df = 119.707, p<. 05
Printer	0.86 (n = 267)	0.72 (n = 80)	*t* = 2.502, df = 108.574, p<. 05
Digital TV receiver	0.69 (n = 267)	0.54 (n = 78)	*t* = 2.373, df = 118.093, p<. 05
	Secondary School		
	Public School	***Private School***	
Digital TV receiver	0.66 (n = 270)	0.84 (n = 45)	*t* = -2.996, df = 71.178, p<. 01

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Table 4 **Student Technology Use (Five or more hours per week)**

Technology Use	Percentage (%)
Watching television	62.1
Listening to the radio	58.8
Playing digital/video games	58
Listening to music on a personal music player	34.7
Using a mobile phone (for text messaging, SMS)	34
Editing a personal website	24.3
Watching video on-line	20.6
Instant messaging (IM)	19.6
Email	12.8
Interacting with friends on a social network website	6.6

Table 5 **Student Technology Use by Gender, Nationality, Place of Residence and Secondary School**

Technology Use	Mean		*t*
	Gender		
	Males	***Females***	
Watching television	2.86 (n = 169)	3.39 (n = 177)	*t* = -3.397, df = 344, p<.001
Listening to music on a personal music player	2.08 (n = 169)	2.34 (n = 178)	*t* = -2.441, df = 344.739, p<.05
Email	1.72 (n = 171)	1.84 (n = 179)	*t* = -2.084, df = 329.532, p<.05
Watching video on-line	2.17 (n = 170)	1.27 (n = 177)	*t* = 9.449, df = 276.246, p<.001
	Nationality		
	Irish	***Non-Irish***	
Email	1.72 (n = 299)	2.32 (n = 53)	*t* = -5.291, df = 350, p<.001
Instant messaging (IM)	1.73 (n = 295)	2.13 (n = 53)	*t* = -2.688, df = 346, p<.01
Editing a personal website	1.84 (n = 297)	2.19 (n = 53)	*t* = -2.321, df = 60.277, p<.05
Watching television	3.24 (n = 296)	2.56 (n = 52)	*t* = 3.681, df = 346, p<.001
Listening to the radio	2.85 (n = 296)	2.13 (n = 53)	*t* = 5.096, df = 347, p<.001
Listening to music on a personal music player	2.28 (n = 296)	1.87 (n = 53)	*t* = 2.774, df = 347, p<.01
Watching video on-line	1.76 (n = 296)	1.45 (n = 53)	*t* = 2.084, df = 347, p<.05
	Place of Residence		
	South-East	***Borders-Midlands and West***	
Email	1.86 (n = 265)	1.65 (n = 83)	*t* = 2.095, df = 346, p<.05
Instant messaging (IM)	1.87 (n = 262)	1.57 (n = 82)	*t* = 2.316, df = 342, p<.05
	Secondary School		
	Public School	***Private School***	
Watching television	3.32 (n = 269)	2.84 (n = 45)	*t* = 2.472, df = 64.677, p<.05
Listening to the radio	2.87 (n = 269)	2.53 (n = 45)	*t* = 2.223, df = 312, p<.05
Listening to music on a personal music player	2.31 (n = 269)	1.98 (n = 45)	*t* = 2.074, df = 312, p<.05
Instant messaging (IM)	1.71 (n = 269)	2.05 (n = 44)	*t* = -2.103, df = 311, p<.05

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Table 6 **Student Mobile Technology Use (At least once per week)**

Mobile Technology Use	Percentage (%)
Communication	
Email/IM/SMS	60.3
Check MySpace, Bebo or Facebook	36
Web/Internet access	23.3
Entertainment	
Listen to music	80.7
Play games	60.8
Make videos	50.8
Watch videos	48.7
Listen to podcasts	16.1
Store/view digital pictures	7.4
Listen to radio	4.8
Listen to audio books	1.1
Education	
Take class notes	46.6
Scheduling/calendaring	25.9
Make audio recordings of class notes/lectures	21.4
Do word/processing/spreadsheets	4.8
Listen to course seminars/lectures	3.7

Table 7 **Student Mobile Technology Use by Gender, Nationality and Place of Residence**

Mobile Technology Use	Mean		*t*
	Gender		
Entertainment	***Males***	***Females***	
Listen to podcasts	0.83 (n = 183)	0.79 (n = 193)	$t = 2.046$, df = 352.589, $p<.001$
Make videos	0.58 (n = 183)	0.45 (n = 193)	$t = 2.608$, df = 374, $p<.01$
Store/view digital pictures	0.15 (n = 183)	0.04 (n = 193)	$t = 2.885$, df = 290.764, $p<.01$
Communication			
Check MySpace, Bebo or Facebook	0.49 (n = 183)	0.24 (n = 193)	$t = 5.264$, df = 358.016, $p<.001$
Education			
Take class notes	0.41 (n = 183)	0.52 (n = 193)	$t = -2.003$, df =373.415, $p<.05$
	Nationality		
Entertainment	***Irish***	***Non-Irish***	
Watch videos	0.51 (n = 321)	0.35 (n = 57)	$t = 2.298$, df = 79.058, $p<.05$
Education			
Make audio recordings of class notes/lectures	0.19 (n = 321)	0.35 (n = 57)	$t = -2.385$, df = 69.858, $p<.05$
Do word/processing/spreadsheets	0.03 (n = 321)	0.14 (n = 57)	$t = -2.052$, df = 71.085, $p<.05$
	Place of Residence		
Education	***South-East***	***Borders-Midlands and West***	
Do word/processing/spreadsheets	0.06 (n = 286)	0.00 (n = 88)	$t = 4.375$, df = 285.000, $p<.001$

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Table 8 **Student Technology Ownership for Successful College Experience by Gender and Place of Residence**

Device	Mean		*t*
	Gender		
	Males	***Females***	
Laptop computer	4.16 (n = 173)	4.45 (n = 182)	*t* = -3.258, df = 353, p<.001
	Place of Residence		
	South-East	***Borders-Midlands and West***	
	4.24 (n = 270)	4.48 (n = 83)	*t* = -2.168, df = 177.402, p<.05

Table 9 **Student Technology Use for Successful College Experience by Gender and Place of Residence**

Digital Technology	Mean		*t*
	Gender		
	Males	***Females***	
Ubiquitous high speed wireless access across the campus	4.34 (n = 173)	4.59 (n = 181)	*t* = -2.785, df = 342.826, p<.01
Secure file and document sharing capabilities	4.19 (n = 173)	4.49 (n = 181)	*t* = -3.323, df = 333.218, p<.001
	Place of Residence		
	South-East	***Borders-Midlands and West***	
Ubiquitous high speed wireless access across the campus	4.24 (n = 269)	4.48 (n = 83)	*t* = -2.134, df = 167.659, p<.05
High speed wireless access near campus	4.41 (n = 269)	4.61 (n = 83)	*t* = -3.700, df = 176.005, p<.001
Secure file and document sharing capabilities	4.29 (n = 269)	4.49 (n = 83)	*t* = -1.932, df = 350, p<.05

Table 10 **Student Expectations of ICT-enabled Learning Activities by Pre-entry ICT Experience**

Expectation of ICT-enabled Learning Activity	Mean		*t*
	Pre-entry ICT Experience		
	ECDL Completed	***ECDL Non-Completed***	
Use of self-paced online learning instead of physical attendance in a classroom	2.66 (n = 125)	2.38 (n = 239)	*t* = 2.252, df = 362, p<. 05
ICT training in a more interactive learning environment	4.42 (n = 126)	4.26 (n = 241)	*t* = 1.941, df = 365, p<.05

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