BUSINESS SCHOOL TECHSPECTATIONS

Technology in the Daily Lives and Educational Experiences of Business Students

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Foreword

Business School Techspectations is the second in a series of reports based on research by the DCU Leadership, Innovation and Knowledge Research Centre (LInK) at DCU Business School. With its roots in an Irish business school, it is no surprise that LInK's mission is to strengthen the competitiveness, productivity, innovation and entrepreneurial capacity of the Irish economy. Ireland's next generation transformation will be enabled by information and communication technologies (ICT) and digital participation by members of Irish society. As a university research centre we have an important role to play in supporting education, industry and government to accelerate this transformation.

With support from DCU Business School, Enterprise Ireland's Innovation Voucher Programme, DCU's Learning Innovation Unit, Cambridge University Press and the Nominet Foundation amongst others, LInK has undertaken a wide variety of activities to accelerate digital participation. These include applied research projects, seminar programmes, workshops and occasional research papers. Influenced by the US ECAR and Pew Internet and American Life projects, these digital participation activities were brought together under the *Techspectations* initiative in June 2010. The objective of *Techspectations* is to create both a body of research and analysis on ICT usage and expectations by Irish society and an interface for Irish education, industry and government institutions.

Study of Business School Students

Business schools face many of the same challenges and opportunities as the management they seek to educate. Attracting and retaining talent, attracting customers [students], funding, commoditisation, technology and globalisation are changing the competitive landscape for business schools too (Hawawini, 2005). If businesses can no longer rely on old solutions and proven products and services, can business schools?

Many rationales have been put forward for the use of ICT in education including:

- Social Rationale – ICT helps students to prepare to function adequately as citizens in a society permeated with new technologies.

- Vocational Rationale - ICT helps students to prepare to function adequately as professional workers in a technological society.

- Pedagogical Rationale - ICT may improve the instructional processes and learning outcomes.

- Catalytic Rationale - the use of ICT may accelerate another educational innovation like more emphasis in the teaching and learning process on information handling and problem solving, and less on rote memorisation.

- Information ICT Rationale - the use of ICT to stimulate the national ICT industry by placing ICT products in education.

- Cost-Effectiveness Rationale - ICT can reduce the cost of education drastically as they will allow for reductions in the numbers of academic staff and increased productivity.

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- Opportunistic Rationale - the expectation that the use of ICT may contribute to attract more students to a particular educational institution or subject area and therefore remain competitive (or comparable) to peer institutions or industry segments.

Despite this, lack of investment and ongoing commitment by government and national agencies combined with institutional obstacles and individual capability challenges result in less than optimal use of ICT in education. Business Schools are not exempt.

This study of student ICT usage and expectations is part of a series of ongoing activities by DCU Business School to inform its technology strategy for teaching and learning. Understanding the need, relevance and prioritisation of ICTs and student usage and expectations is central to this. Business Schools cater for a wide range of students from school leavers to experienced executives. This study provides a reference point for their ICT expectations and ICT relevance.

While the findings of this initial study are detailed in the remainder of the report. I would like to draw attention to some areas of note. Firstly, it is clear that there are major, but expected, variations in student use of ICT for entertainment, communication and information gathering. When it comes to ICT in business school education, one size may not fit all and as such business school decision makers need to consider how flexible and agile any given ICT approach or policy is in practice. Secondly, the importance of ICT training cannot be underestimated. The findings of this study suggest that ICT training in post-primary education is positively associated with computer self-efficacy and indeed attitudes towards computer-mediated learning. Greater investment in IT training at post-primary level and prior to study at business schools may have a significant effect on the success of a any ICT-mediated learning and teaching initiative. Thirdly, while students have access to computing devices, local infrastructure in educational institutions can be a major barrier. For example, architects of older buildings did take in to account wireless access or indeed the need for up to 400 students to power their laptops. Finally and possibly more seriously, students (and one might suggest the institution) may not have or be able to articulate their concept of an ideal learning environment, let alone an ideal online learning environment.

A Note of Thanks
This study was a result of the work of a wide range of people in both DCU Business School and LInK. Dr. Angelos Alexopoulos was the primary research interface in LInK and was supported by Louise Gorman, Kieran Linehan, and Neil Bruton. We also owe our gratitude to Professor Kathy Monks (Director of LInK), Dr. Anne Sinnott (Deputy Dean, DCU Business School) and the numerous academic and support staff that supported our work.

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1. Introduction

In the wake of the current economic downturn, higher education institutions, both in Ireland and internationally, face several critical challenges in meeting effectively and efficiently the diverse learning needs and rising expectations of their students. One of those challenges is to continue developing innovative teaching and learning methods that take full advantage of new information and communications technology (ICT)[1]. For business schools, in particular, this is a key aspect of their strategic value proposition towards becoming a new *agora* where producers and users of knowledge relevant to individuals, businesses, and the society meet, interact, and learn from each other (Starkey *et al.*, 2004).

The latest report by the Campus Computing Project®, the largest continuing study of the role of ICT in American higher education, suggests that despite the major budget cuts introduced over the last two years, the majority of universities, including business schools, seem acutely aware of the need to move forward. That is to embrace fast and at a low cost new ICT which students already own, use in their daily and professional lives, and would therefore expect from their universities to make use of it as well. The challenge, as Kenneth C. Green, founding director of the Campus Computing Project®, puts it, "it's not a matter of if, but when" (Kaya, 2010).

Driven by the need to inform better decisions made by deans, faculty, IS administrators, and all those interested in the advancement of ICT-enabled teaching and learning in business school education, this study, the second in the series of the *Techspectations* Digital Participation Project, offers insights into the role of new ICT in the daily lives and educational experiences of business students. The premise of this study is that understanding the technology needs, preferences, and expectations of students requires understanding of their habits and skills with it beyond the campus. It also requires recognition of the distinctive diversity of the business school student population – one which includes freshmen net-geners and MBA baby boomers.

This study builds on previous research on the role of ICT in higher education and society, and particularly on the works by the EDUCAUSE Center for Applied Research (ECAR) and the Pew Internet & American Life Project. It is one of the largest and most detailed investigations of the role of ICT in Irish business school education. In particular, by including a sample of nearly 1,000 business students from a top Irish university, it addresses the following questions:

- What ICT do business students own and use in their daily lives?
- To what extent have they adopted new ICT, including portable media and social networking?
- What are their IT skills? How have they acquired them and how these are associated with students' ability to use a computer effectively for their academic tasks?

[1] ICT refers to all kinds of communication devices or applications, such as radio, television, mobile telephony, computer hardware and software, electronic data processing, networking, satellite communications and so on. It also includes services and applications associated with the above, such as social networking, teleconferencing, e-learning and m-learning.

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- Do students differ in their learning styles?
- How do they perceive the role of ICT in business school education?
- How do they rate the ICT infrastructure in the business school?
- What ICT do students use frequently on campus and what are their favourite learning resources?
- How do they value ICT-enabled learning tools and technologies in the business school?
- What are their expectations of an ideal ICT-enabled learning environment in the business school?
- How do student perceptions of, and experiences with, all the above vary across different age, gender, and nationality groups?

In providing answers to the above questions, we hope that this study can serve as a valuable source of information for higher education policy makers, educational technologists, and businesses interested in realising the instructional benefits and the wider societal role of ICT among a diverse body of business school learners. We also believe that this study is a useful benchmark against which future research on the ICT habits, needs, and expectations of business (and not only) students in Ireland and abroad can be compared.

2. Key Findings

ICT Ownership

- On average, business students own eight electronic devices, including both fixed and portable ones. Yet the two devices the majority of them "can't live without" are their mobile phone and laptop.
- Home broadband is the primary means by which students access the Internet. Yet younger students make considerably more frequent use of the university's wireless and wired network compared to older students.
- More than one third of students perceive themselves as innovators or early technology adopters. Yet gender, and to a lesser extent nationality, account for significant differences in student technology adoption profile.

ICT Use

- There is a clear variation in student use of ICT for entertainment, communication, and information gathering purposes between different age, gender, and nationality groups.
- Portable devices have taken over fixed devices for many ICT activities, with younger students, females, and international students leading the way.
- Social networking sites are very popular particularly among younger students and females, but they are also entering the daily lives of older students. Personal blogging is used more by international than Irish students, while personal websites are used more by older than younger students.

IT Training, Skills and Learning Styles

- About one third of students have completed some kind of IT training course prior to or during their studies in the business school. Yet the percentage of older students with an IT training qualification is double than that of younger students. ECDL is the most popular IT training qualification among Irish students, and MOUS among international students.
- Younger and female students seem to have acquired their IT skills mainly through informal ways, such as interacting with friends and family, whereas older students have done so at the workplace, while international students have done so mainly through self-taught methods.
- Older and male students are more confident than younger and female students in their ability to use a computer for academic tasks.
- IT training is significantly and positively associated with computer self-efficacy.
- Older students report that they learn best by working in a group, while younger students learn best by working alone.

ICT in the Business School

- Students express very positive views of the societal, career development, and learning benefits of ICT use in business school education, with older students stressing more the learning benefits, and international students valuing more the career development benefits.

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- Students have mildly positive views of the ICT infrastructure in the business school in terms of computer equipment and Internet access. Notably, male students' ratings of lecturers' competence with ICT are lower than those of female students.
- Laptops, mobile phones, wireless internet access, and secure file and document sharing capabilities are viewed by students as integral to a successful learning experience in the business school. Mobile phones are particularly favoured by younger students, and laptops by older students.
- While all students use the Internet a lot on campus for college-related work, younger students use it considerably more frequently than older students for information gathering, social networking, and instant messaging.
- Search engines, emailing, and online lecture notes top students' list of most useful digital learning resources for their studies. On the other hand, e-journals and e-books are viewed particularly valuable by older students.
- Students are generally satisfied with the use of a Learning Management System for their studies. Yet the five applications of LMS which students, particularly younger and female ones, would like to see in a LMS are: reminder service, faster page loading, more user-friendly interface, integrated audio and video applications, and recommender service.
- On average, student views of the importance of one-to-one computing are mildly positive, but significantly more positive among younger and international students.
- Yet less than one quarter of laptop owners use their laptop in the business school, and that is mainly younger and male students.
- Two of the top barriers to laptop use in the business school, according to students, are related to technical issues – that is, lack of battery power, and lack of access to ports and printers. Yet about half of them believe that laptop use in class can act as a distraction. Moreover, one quarter of students feel that their lectures are against laptop use in class.
- Yet students believe that laptop use in the business school provides them with ubiquitous access to a computer and the Internet, improves their computer literacy skills, and helps them in their career preparation.
- The majority of students, and particularly innovators and early technology adopters, are very positive about the idea of delivering instructional content online through podcasting. They believe that podcasting can provide them with flexible access to extra learning material which they can revise and absorb more efficiently, leading to better learning.
- Students, regardless of age, gender, and nationality, agree on the top five features of an ideal ICT-enabled learning environment in the business school. These include: wireless access everywhere on campus, more course material available online, laptop support in a one-to-one computing program, extensive use of podcasting for lectures, and introduction of mobile phone reminder services.

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3. Methodology

This report is based on data collected through a survey of 988 students enrolled in undergraduate, postgraduate, and executive education courses run by DCU Business School in the academic year 2009-2010. The survey was conducted from October through November 2009.

3.1 Data Collection

Students completed anonymous, 30-minute paper questionnaires in the classroom. Members of the *Techspectations* research team were present in each classroom to provide students with an overview of the study, and to assist them in completing the survey, if needed. All questionnaires were returned directly to members of the research team immediately after their completion.

In total, 1,003 questionnaires were returned, yielding an initial response rate of 40% of DCU Business School's student population. After screening the data for incompleteness and missing values, 988 questionnaires were included in the statistical analysis. This equals to a response rate of 39% of DCU Business School's student population, and almost 10% of DCU's whole student population.

3.2 Instrument

The questionnaire used in this study is based on an instrument designed for the wider *Techspectations* research programme. Specifically, the questionnaire included 62 closed- and open-ended items organised into five sections gathering data on: (1) student demographics; (2) ICT ownership and access; (3) ICT use; (4) ICT training, skills, and learning styles; and (5) experiences with, and expectations of, ICT in the Business School (Table 3.1).

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Table.3.1 **Questionnaire Structure**

Section	Focus	Categories
Section 1	**Demographics**	- Gender - Age - Nationality
Section 2	**ICT Ownership**	- Device Ownership - Internet Access - Technology Adoption Profile - Favourite Companies, Products and Services
Section 3	**ICT Use**	- Overall Use of ICT - Online Activities at Home - Portable Media Use - Social Media Use
Section 4	**ICT Training, Skills and Learning Styles**	- ICT Training - ICT Skills Acquisition - Computer Self-efficacy - Learning Styles
Section 5	**ICT in the Business School**	- Technologies for a Successful Learning Experience - Access, Competence and Motivation for Using ICT - Learning Resources - Online Activities on Campus - Learning Management System Use - One-to-one Computing - Podcasting - Ideal ICT-enabled Learning Environment

3.3 Sample Demographics

A summary of the demographic profile of the sample is presented in Table 3.2. As shown, data were weighted in order to match the sample's demographic distribution with that of DCU Business School's student population.

Table 3.2 **Demographic Distribution of Techspectations Sample**

Demographic Characteristic	Techspectations Sample %**	DCUBS Population %
GENDER		
Male	52	55
Female	48	45
AGE*		
Boomer	5	4
Gen-Xer	20	17
Net-Gener	75	79
NATIONALITY		
Irish	86	85
Non-Irish	14	15
	(n=988)	(N=2511)

*Based on Oblinger & Oblinger (2005) classification of living generations: Net Generation (b. 1982-1991); Generation X (b. 1965-1981); Baby Boomer (b. 1946-1964).
**Weighted.

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3.4 Data Analysis and Reading

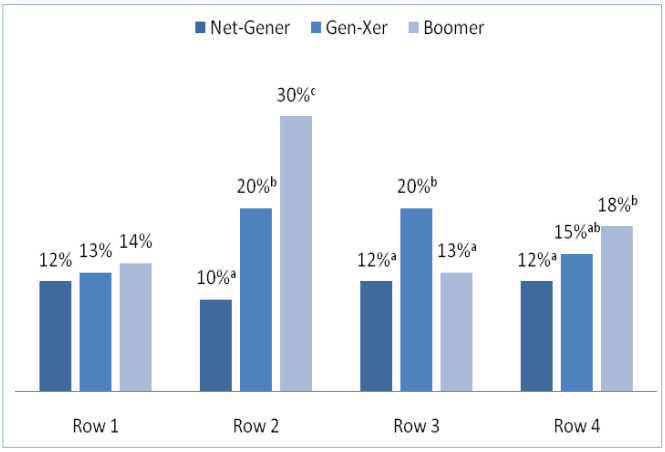
In line with the research questions addressed in the introduction, quantitative data were analysed in a straightforward manner. The results are, therefore, presented in terms of frequencies using means and percentages. To examine the associations between the variables of interest, basic statistical analyses, including Pearson's chi-square (χ^2) tests, *t*-tests, paired *t*-tests and analysis of variance, were performed. The level of statistical significance applied was 5% (i.e., $p < .05$). In tables and figures, superscripts are used to indicate whether items differ significantly or not. Those items that do not have a superscript or share a common superscript do not differ significantly. An example of reading the data presented in table and figure format is provided below.

Table 3.3 Data Reading

Category	Net-Gener	Gen-Xer	Boomer
Row 1	12%	13%	14%
Row 2	10%^{a}	20%^{b}	30%^{c}
Row 3	12%^{a}	20%^{b}	13%^{a}
Row 4	12%^{a}	15%^{ab}	18%^{b}

- Row 1: None of the items differ significantly.
- Row2: Each item differs from the other significantly.
- Row 3: Items in the first and third columns differ from the item in the second column but not from each other.
- Row 4: Items in the first and third columns differ from each other but not from item in the second column.

Figure 3.1 Data Reading



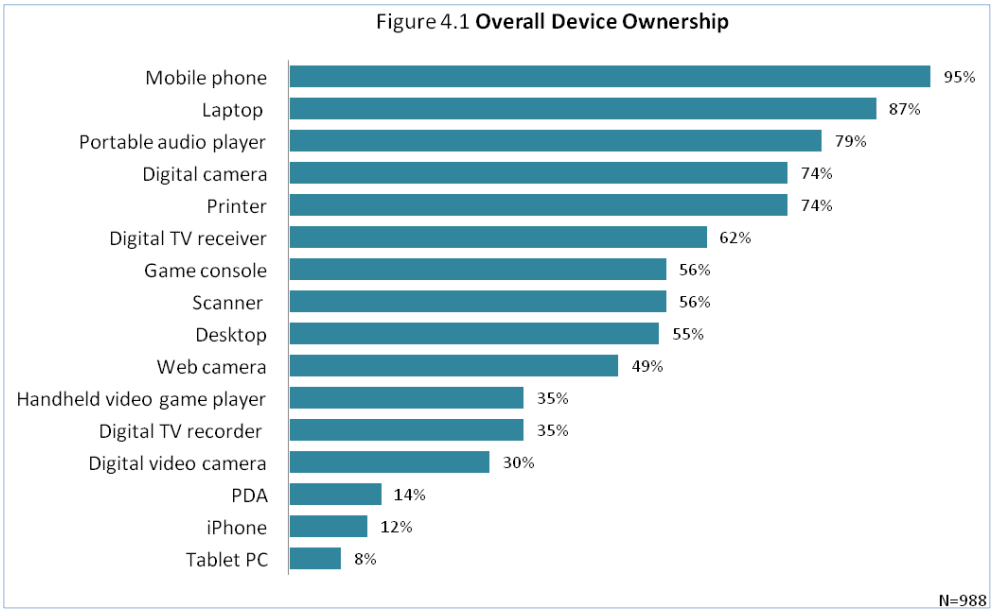
4. ICT Ownership

In this chapter, we first present results of student ownership of electronic devices and their access to the Internet. We then take a look at their technology adoption profile and compare it to results from previous research on university students in the USA. In the last section, we examine student perceptions of their favourite ICT companies, products, and services. Throughout the chapter, the results are structured so that they capture demographic differences among students.

4.1 Device Ownership

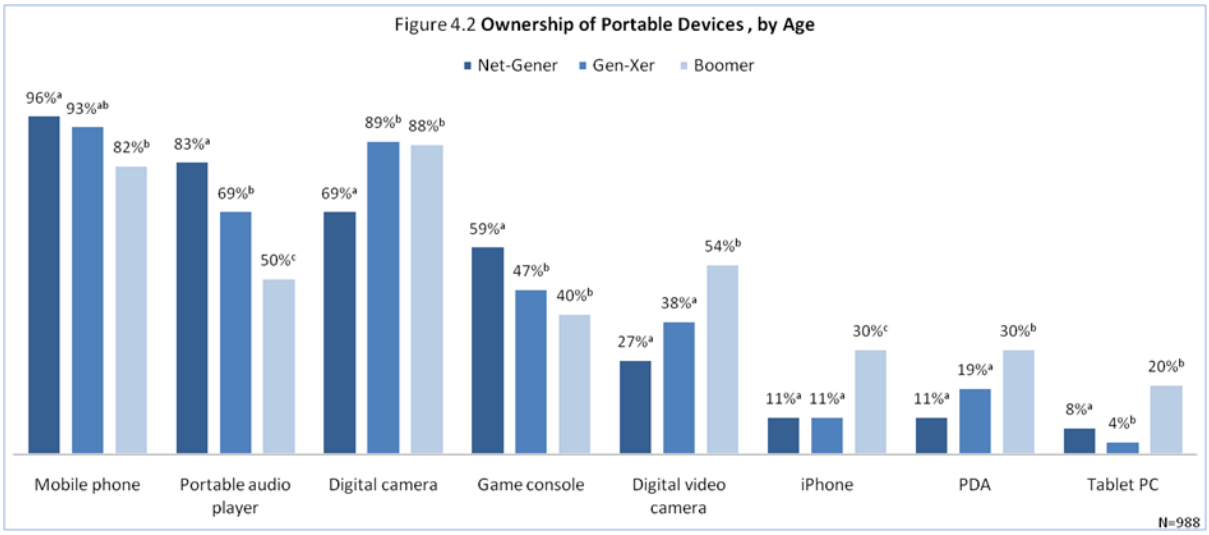
Reflecting the ever-increasing palette of electronic devices available today for communication, entertainment, and learning activities, the average student in our sample reported ownership of eight devices, with mobile phone (95%), laptop (87%), portable audio player (79%), digital camera (74%), and printer (74%) topping the list (Figure 4.1).

Figure 4.1 **Overall Device Ownership**

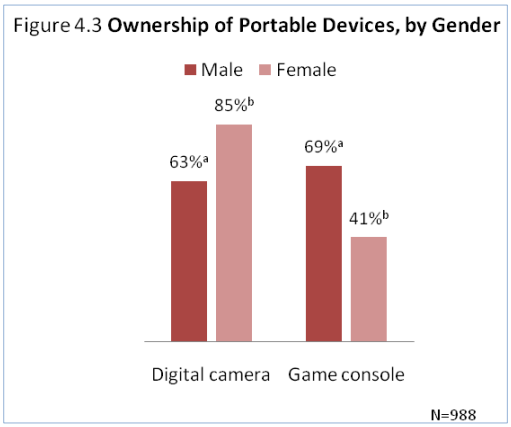


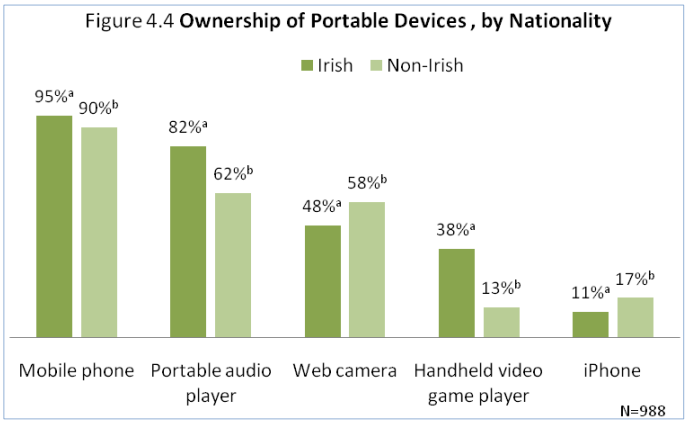
4.1.1 Portable Device Ownership

Taking a closer look at ownership of portable electronic devices, we found a number of differences related to student age, gender, and nationality. First, in relation to age, Net-Geners were more likely to own mobile phones, portable audio players and gaming consoles than Gen-Xers and Boomers. In contrast, ownership of more pricey portable devices, including digital video cameras, iPhones, PDAs, and tablet PCs, was higher among Boomers than Gen-Xers and Net-Geners (Figure 4.2).



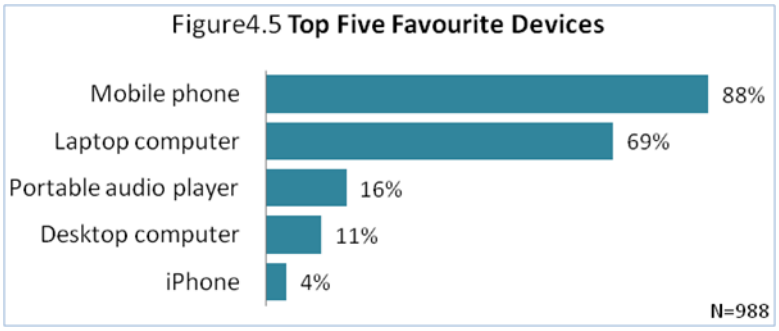
Second, in terms of gender differences, ownership of gaming devices was significantly higher among males than females, whereas the opposite was found for digital cameras (Figure 4.3). Finally, in terms of nationality differences, Irish students reported higher ownership of mobile phones, portable audio players, and handheld video game players than international students. Yet ownership of web cameras and iPhones was found to be higher among international students than Irish ones (Figure 4.4).

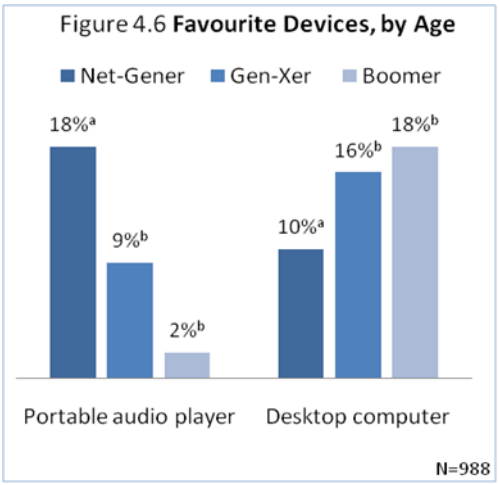


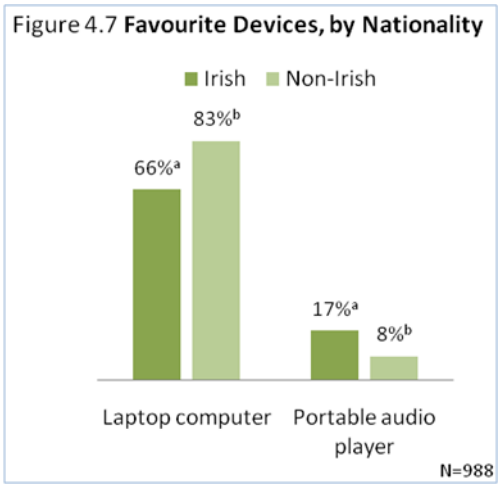


4.1.2 Favourite Devices

When asked to indicate their most favourite electronic devices, the ones "they couldn't live without", the majority of students indicated their mobile phone (88%) and laptop (69%). Portable audio player, desktop computer, and iPhone completed the top-five list (Figure 4.5). Again, a number of demographic differences were found, particularly related to age and nationality (Figure 4.6 and 4.7).

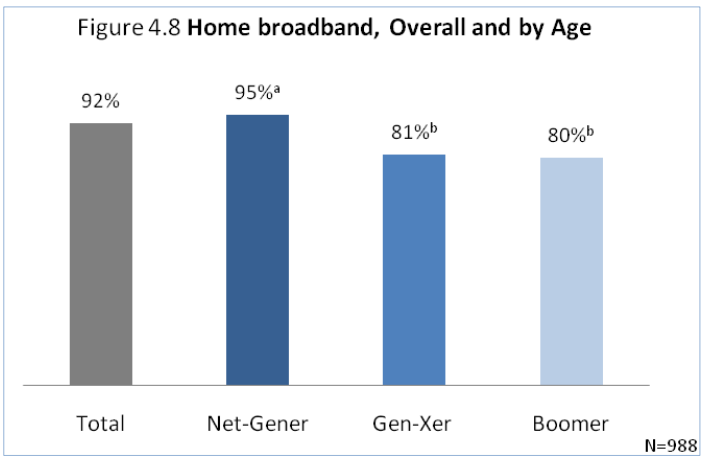






4.2 Internet Access

The primary means by which the vast majority of students were accessing the Internet was home broadband. Specifically, 92% of students reported having a broadband connection at their place of residence. In addition, and consistent with previous research on generational differences in Internet use among Americans (Jones and Fox, 2009), home broadband has been more widespread among Net-Geners than Gen-Xers and Boomers. Dial-up connection has, on the other hand, been more prevalent among Boomers (8%) and Gen-Xers (10%) than Net-Geners (5%).



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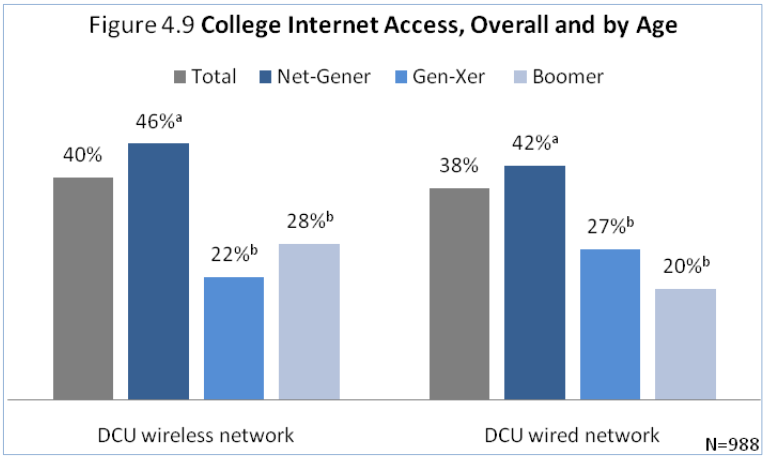
In addition to home broadband, about four out of ten students reported that, since they joined DCU, they were also using the university's network to access the Internet. In particular, Internet access though DCU's wired or wireless network was more prevalent among Net-Geners than Gen-Xers and Boomers (Figure 4.9).

Figure 4.9 **College Internet Access, Overall and by Age**



4.3 Technology Adoption Profile

To examine students' technology adoption profile, we employed Roger's (2003) classification of individuals within a social system into five distinct categories: innovators, early adopters, late adopters, and laggards. Following previous research on ICT and higher education (Smith et al., 2009), we asked students to indicate the category that best described them based on five statements (Table 4.1).

Table 5.1 **Technology Adoption Categories**

Technology Adoption Category	Which best describes you?
Innovator	I love new technologies and am among the first to experiment with and use them.
Early Adopter	I like new technologies and use them before most people I know.
Mainstream Adopter	I usually use new technologies when most people I know do.
Late Adopter	I am usually one of the last people I know to use new technologies.
Laggard	I am sceptical of new technologies and use them only when I have to.

Source: Smith, Salaway, & Caruso (2009: 44)

On average, more than half of the students identified themselves as mainstream adopters (53%), followed by 26% as early adopters, 11% as late adopters, 8% as innovators, and 2% as laggards. These results, as shown in Table 5.2, are very similar to the ones reported in Smith et al's (2009) study of US undergraduate students. Looking at the role of demographic characteristics, we found that gender is associated with significant differences in students' technology adoption profile. In particular, and consistent with Smith et al. (2009), more males (43%) than females (23%) described themselves as innovators or early adopters. Gender differences are illustrated in Figure 4.10. In our

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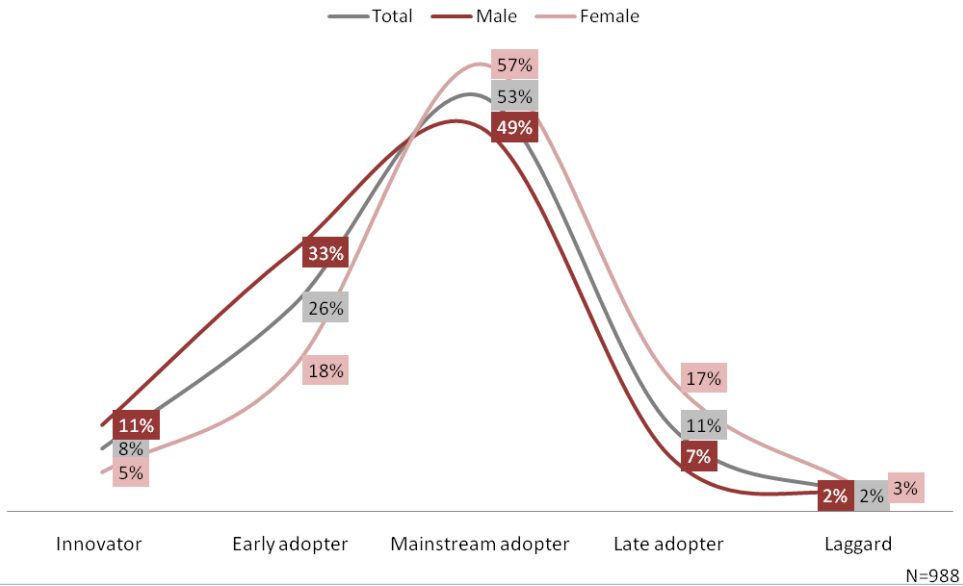
sample though, nationality also accounted for a difference in technology adoption, with significantly more international students (15%) than Irish ones (7%) falling under the innovator category.

Table 5.2 **Technology Adoption Profile of Business Student Sample**

Technology Adoption Category	US UGs*	Among all	AGE			GENDER		NATIONALITY	
			Net-Gener	Gen-Xer	Boomer	Male	Female	Irish	Non-Irish
Innovator	10%	8%	8%	8%	10%	11%[a]	5%[b]	7%[a]	15%[b]
Early adopter	26%	26%	25%	25%	31%	33%[a]	18%[b]	26%	25%
Mainstream adopter	51%	53%	53%	52%	48%	49%	57%	54%	47%
Late adopter	9%	11%	11%	14%	10%	7%[a]	17%[b]	12%	8%
Laggard	4%	2%	3%	2%	0%	2%	3%	2%	5%

N=988
Note: Significant differences should be read across rows by section.
*UGs=Undergraduates (Smith et al., 2009).

Figure 4.10 **Technology Adoption, Overall and by Gender**



4.4 Favourite Companies, Products and Services

Student ratings of their favourite ICT companies, products and services indicate that: (1) Google and Microsoft are the most widely recognised company names in the minds of students; (2) Moodle – the course management system used in DCU – is perceived by students as valuable; and (3) YouTube and Facebook feature highly in students' online entertainment and social interaction activities (Figure 4.10). In particular, as shown in Figures 4.11 and 4.12, Moodle, YouTube and Facebook are perceived as more important by Net-Geners and females than Gen-Xers, Boomers, and males, respectively.

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Figure 4.11 **Top Ten Favourite Companies, Products and Services**

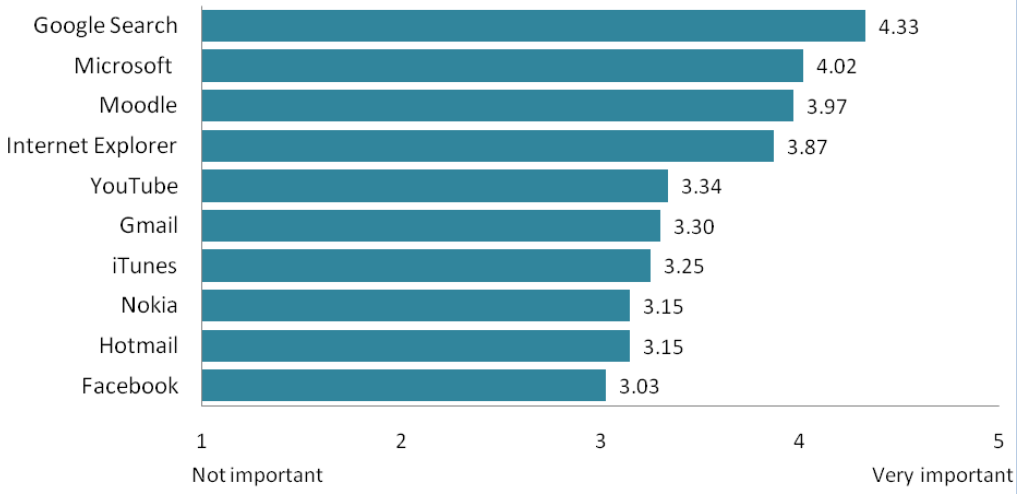


Figure 4.12 **Favourite Companies, Products and Services, by Age**

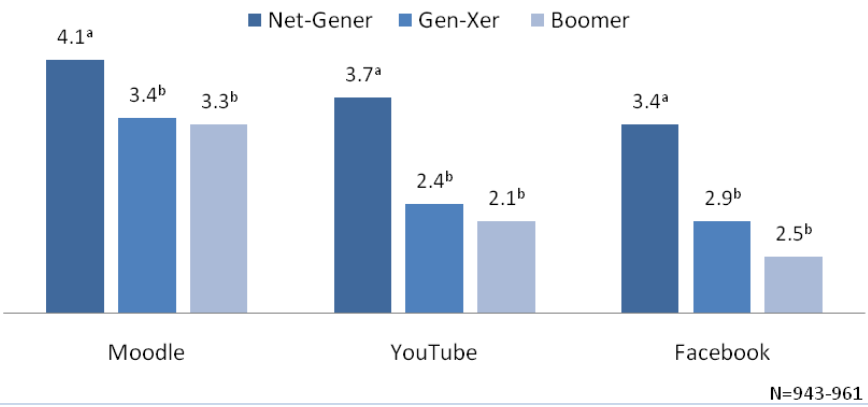
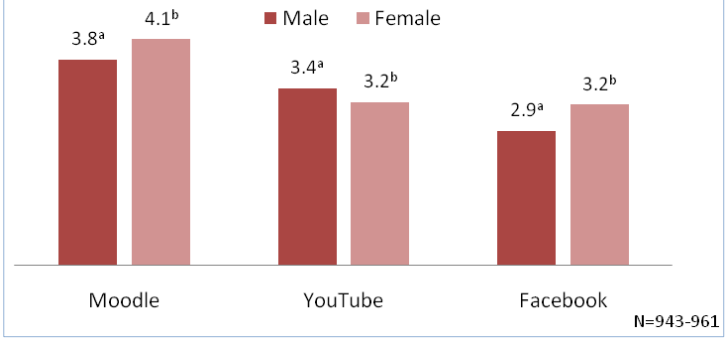


Figure 4.13 **Favourite Companies, Products and Services, by Gender**



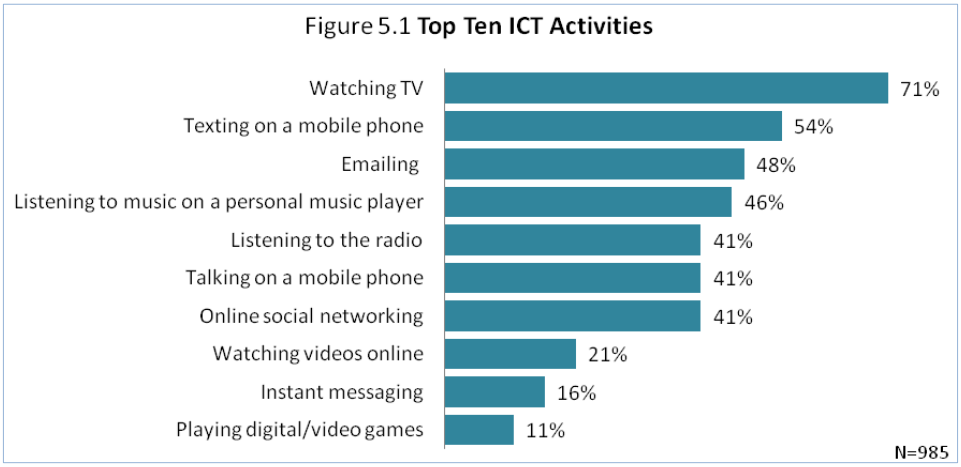
5. ICT Use

In this chapter, we first explore student overall use of ICT. This is followed by focusing on online activities at home in which students are typically engaged for information, communication, entertainment, and learning purposes. We then take a closer look at their ICT activities with portable devices and their use of online social media. By considering the role of demographic characteristics, the chapter provides a basis for understanding differences as well as similarities in student experience with ICT in their daily lives.

5.1 Overall ICT Use

Students were asked to indicate daily activities involving ICT in which they were spending at least one hour per day. As shown in Figure 5.1, those activities revolved around entertainment, communication, and information gathering, and included the use of a variety of media. In particular, watching TV (71%), mobile phone texting (54%), emailing (48%), and listening to music on a personal music player (46%) topped students' list of most frequent activities with ICT.

Figure 5.1 **Top Ten ICT Activities**



Looking at the role of demographic characteristics, we found significant differences in eight out of ten activities, which were attributed to student age and nationality, while gender accounted for differences in six activities.

With the exception of emailing and listening to the radio, Net-Geners scored significantly higher than Gen-Xers and Boomers on uses of ICT including mobile phone texting, listening to music on a personal music player, watching videos online, instant messaging, and digital/video game playing (Figure 5.2).

Several differences in ICT use between Irish and international students were also found. Those differences centred around communication and entertainment, with the former reporting spending more time on watching TV, listening to the radio, mobile phone texting, and digital video playing, whereas the latter scoring higher on social networking, instant messaging, and watching videos online (Figure 5.3). These differences may be attributed to the needs of international students for communication with friends and family in their countries of origin, as well as their preferences for accessing local entertainment content that is not available through Irish national TV or radio.

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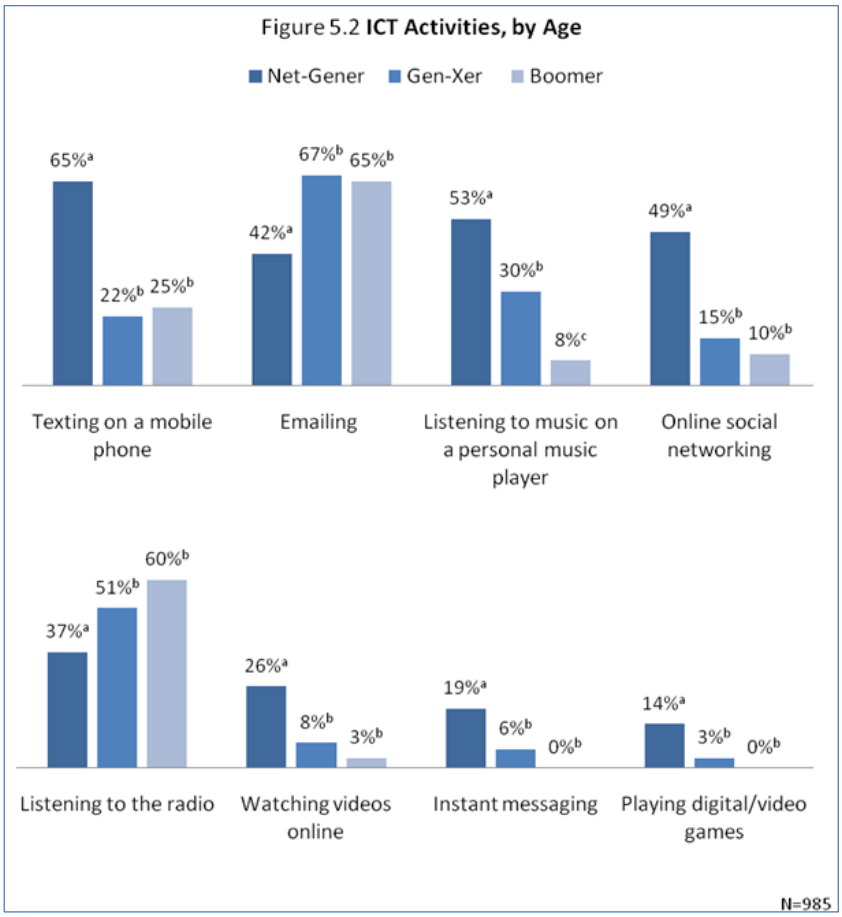

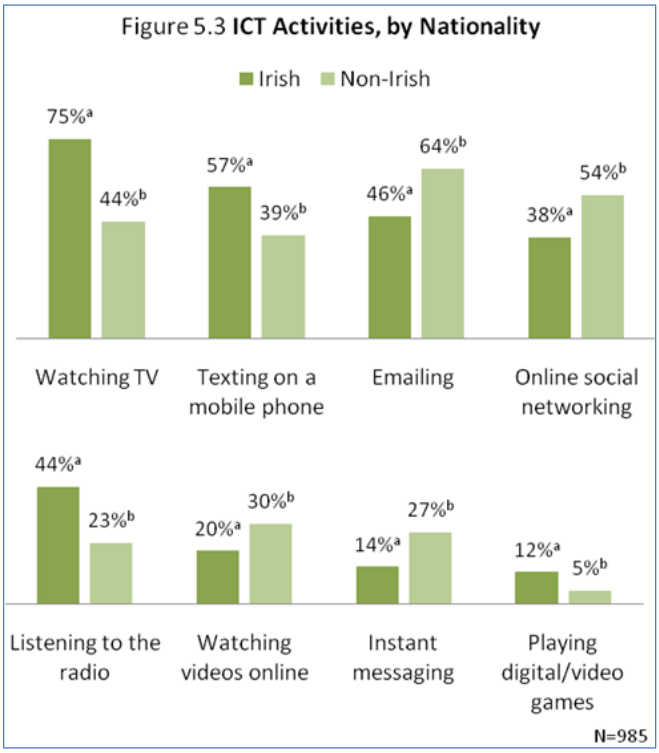

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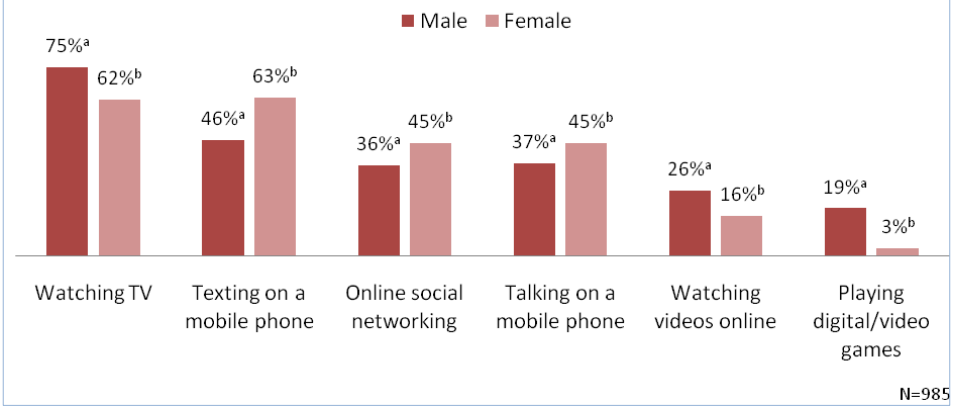
Gender differences in ICT use indicate females' preference for communication activities involving the use of mobile phone and social networking. On the other hand, males were found to spend significantly more time than females for entertainment activities including watching TV, watching videos online, and digital/video gaming (Figure 5.4).

Figure 5.4 **ICT Activities, by Gender**

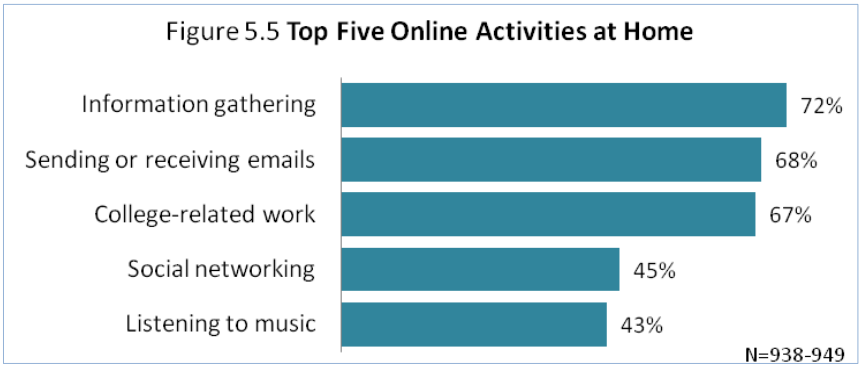


5.2 Online Activities at Home

In this section, we take a closer look at student online activities at home. Following previous research (Kvavik and Caruso, 2005; Jones and Fox, 2009), students were asked to indicate on a three-point scale (1=never or rarely, 2=sometimes, 3=a lot) the frequency with which they were using the Internet for information gathering, entertainment, communication, and learning activities.

Figure 5.5 shows the top five online activities while at home on which students were spending a lot of their time, with information gathering (72%) topping the list. and followed by emailing (68%), college-related work (67%), social networking (45%). and listening to music (43%).

Figure 5.5 **Top Five Online Activities at Home**



Results of demographic differences in students' online activities at home indicate that, in terms of communication purposes, Net-Geners made relatively equal use of emailing and social networking, whereas Gen-Xers and Boomers were using emailing considerably more than social networking. Regarding information gathering and college-related work, we found the exact opposite as Gen-Xers

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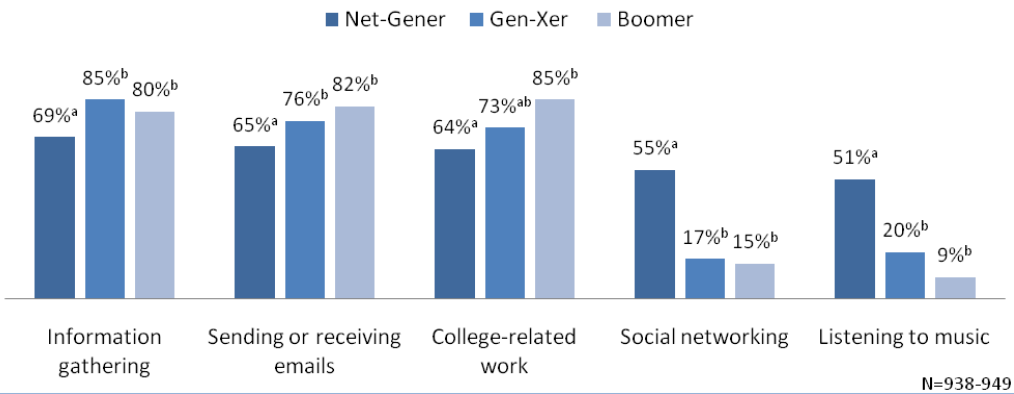
and Boomers were spending considerably more time than Net-Geners. Listening to music – the entertainment activity featuring in students' top five list – was associated more strongly with Net-Geners than Gen-Xers and Boomers (Figure 5.6).

Figure 5.6 **Online Activities at Home, by Age**



Gender and nationality were also found to account for differences, albeit fewer than those attributed to age, in student online activities, with males spending less time on information gathering and social networking than females (Figure 5.7). Finally, international students were found to use the Internet significantly more than Irish students for emailing (Figure 5.8).

Figure 5.7 **Online Activities at Home, by Gender**

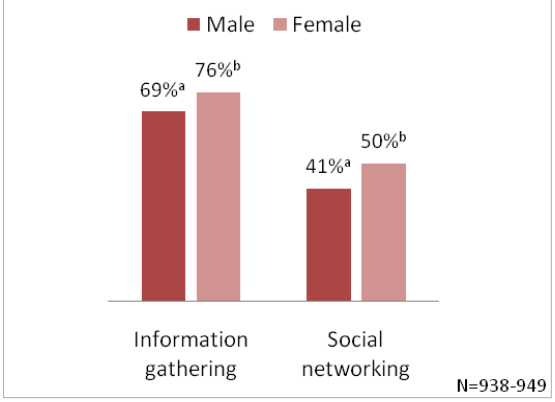
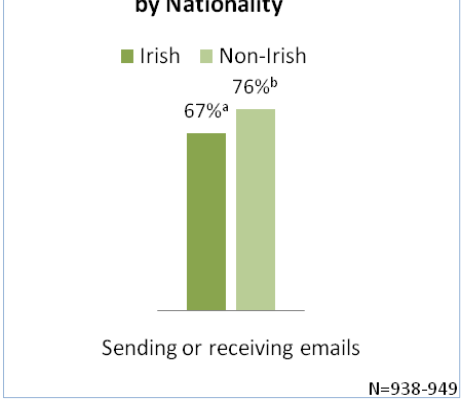


Figure 5.8 **Online Activities at Home, by Nationality**



5.3 ICT Activities On-The-Go

Recent years have seen a rapid increase in portable ICT ownership and use, particularly among younger people. As Rideout, Foehr, & Roberts (2010, p. 3) state, "the transformation of the cell phone into a media content delivery platform, and the widespread adoption of the iPod and other MP3 devices, have facilitated an explosion in media consumption". Indeed, portable devices afford young (but not only) people ample opportunities for media multitasking – surfing the Internet while chatting to their friends and family or listening to their favourite music – while on-the-go.

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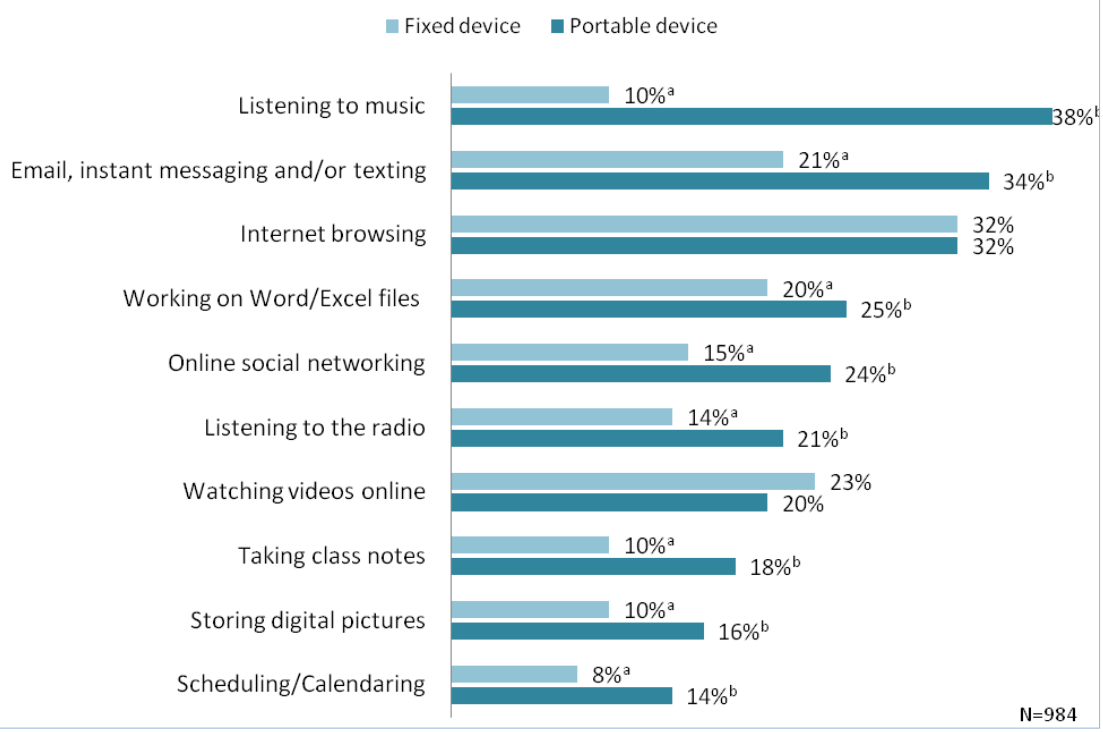
Students were asked to check from a list of twenty three activities the ones which they were performing at least once a week with a fixed (e.g., desktop PC) and/or a portable device (e.g., laptop, mobile phone, PDA).

Figure 5.9 shows how students' top ten activities with a portable device compare to those performed with a fixed device. With the exception of Internet browsing and online video watching, results highlight that portable devices have indeed taken over fixed devices for a wide variety of ICT activities associated with entertainment (e.g., listening to music), communication (emailing, instant messaging, social networking), and work (word/excel processing, scheduling/calendaring).

Figure 5.9 Top Ten ICT Activities with Portable and Fixed Devices



Looking at the role of demographic characteristics, results show that Net-Geners' portfolio of ICT activities with portable devices is more diverse than that of Gen-Xers and Boomers who, as shown in Figure 5.10, use portable devices primarily for work-related activities, such as word/excel processing and scheduling calendaring.

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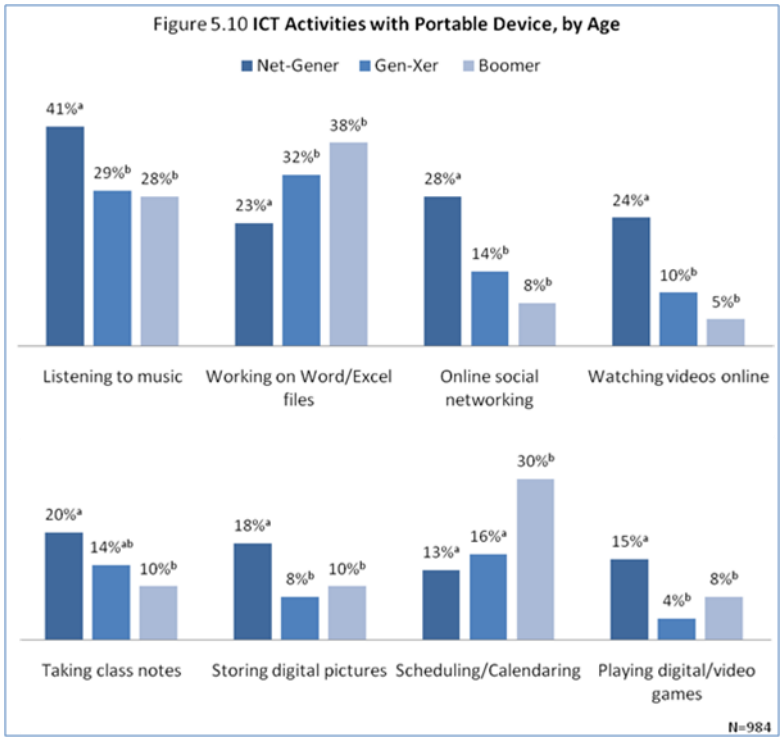
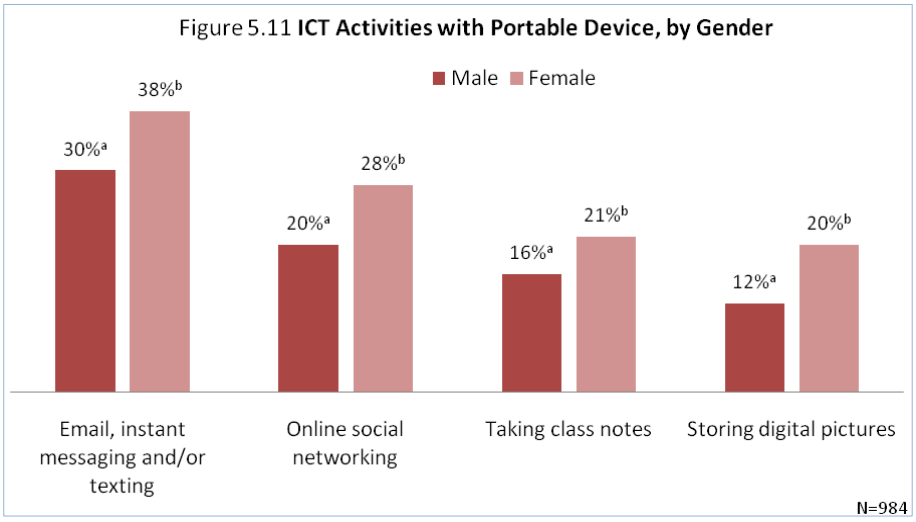


In addition, gender was found to account for differences in student ICT activities, with more females than males reporting use of portable devices for communication (i.e., emailing/instant messaging/texting, social networking), college-related work, and recreational purposes (Figure 5.11).



Finally, in terms of nationality differences, more international students than Irish ones reported use of portable devices for entertainment (e.g., watching videos online) as well as college-related work (e.g., taking class notes).

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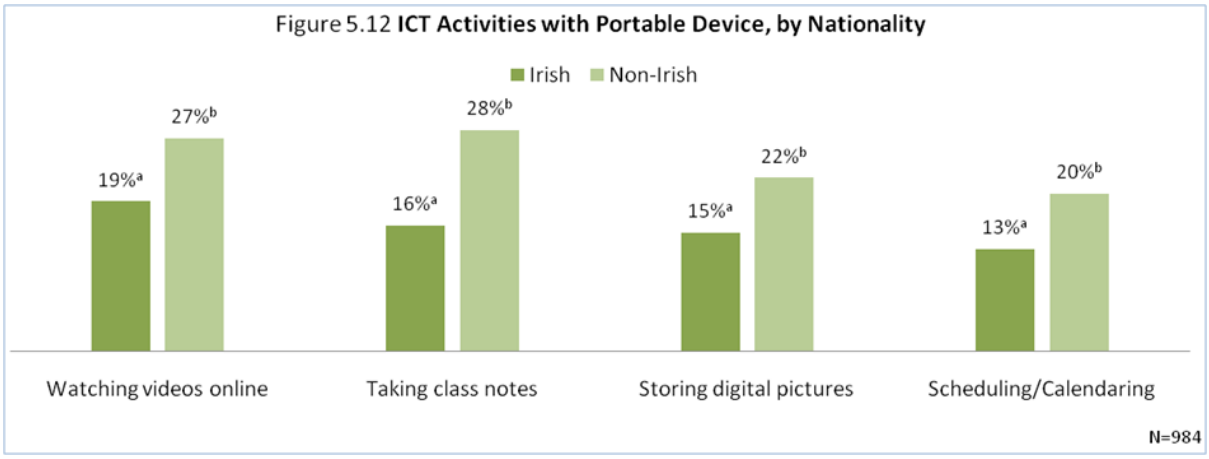

5.4 Social Media Use

Social media comprise "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content" (Kaplan & Haenlein, 2010, p. 61). According to the Organisation for Economic Cooperation and Development (OECD), user generated content needs to fulfil three criteria in order to be considered as such: accessibility through public websites or social networking sites, demonstration of creative effort, and content without a commercial market context in mind (OECD, 2007). Social media have historically evolved from personal websites, to blogs, and more recently to social networking platforms or sites, such as Facebook, microblogging services, such as Twitter, and virtual worlds, such as Second Life.

Social media have increasingly entered the everyday lives of many people. The diffusion of social networking sites, in particular, has been rapid. According to a new report by the PEW Research Centre, in 2009 social networking use among US adults ages 18 and over increased from 41% to 61% (Madden, 2010). Interestingly, the same report indicates that while Net-Geners are topping the list (86%), social networking use among older adults (ages 50+) has almost doubled from 22% to 42% over the same period.

To examine social media use among our sample, we asked students to indicate whether or not they were using or had created a profile in the following types of social media: personal website, personal blog, social networking site, microblogging (i.e. Twitter), and virtual worlds.

Results, as shown in Figure 5.13, confirm recent trends in social media use. Social networking is by far the most frequent social media activity (84%), followed by personal website (14%) personal blog (13%), Twitter (7%), and virtual worlds (7%).

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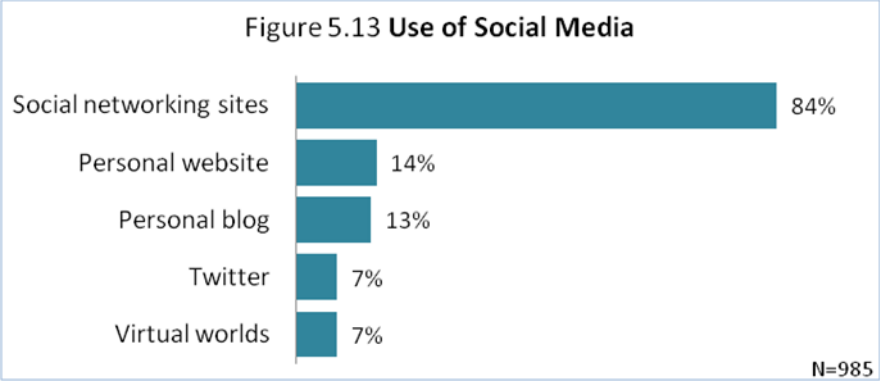
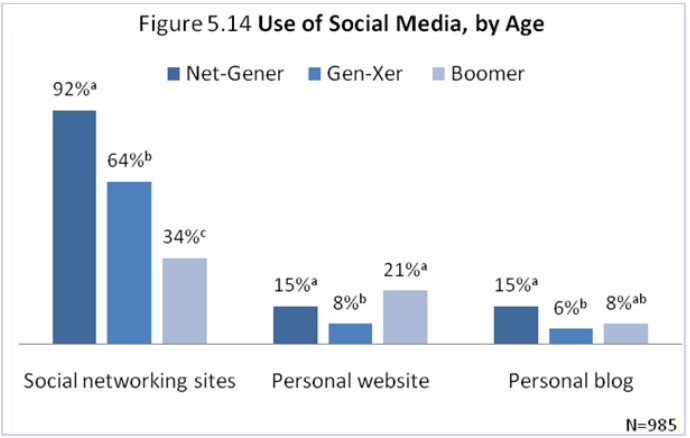
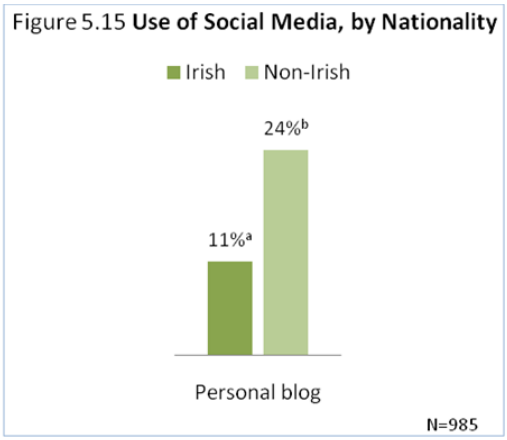


Looking at demographic differences in social media use (Figure 5.14), we found that the vast majority of Net-Geners (92%) have created a profile in a social networking site, followed by about three quarters (64%) of Gen-Xers (64%) and just about over one third (34%) of Boomers. Notably, personal websites were least popular among Gen-Xers (6%) and most popular among Boomers (21%). In addition, Blogging activity was found to be generally low, particularly among Gen-Xers (6%) and Boomers (8%). There were no significant gender differences in social media use, and the only nationality difference found was related to blogging, with international students reporting more frequent use than Irish ones (Figure 5.15).





Given the prominence of social networking sites, we also asked students to indicate their most preferred sites. Facebook, LinkedIn and Bebo comprised students' top three list. In particular, as shown in Figure 5.16, Facebook was found to be the most popular among students and particularly among Net-Geners and Gen-Xers. On the other hand, Bebo attracted almost exclusively the preferences of Net-Geners, whereas LinkedIn was most popular among Boomers and Gen-Xers.

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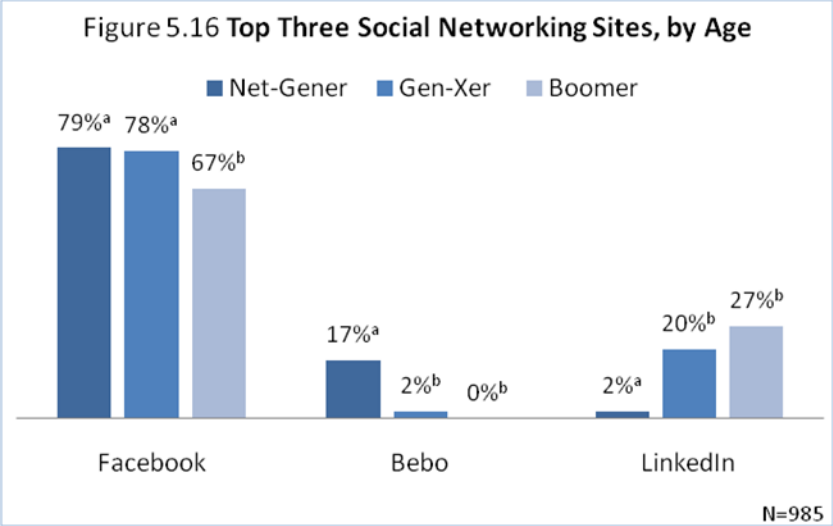

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6. IT Training, Skills and Learning Styles

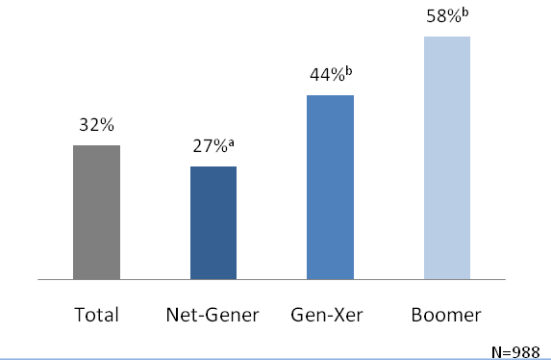
The focus of this chapter is on student IT training and skills, a building block of digital literacy. We first examine the extent and types of IT training courses students completed, followed by exploring methods, both formal and informal, by which they acquired their IT skills. We then present results on student computer self-efficacy, and how this is associated with their IT training. Finally, we take a look at student learning styles and examine how those styles are related to methods of IT skills acquisition. As in previous chapters, the analysis considers the role of student demographic characteristics.

6.1 IT Training

Students were asked to indicate whether they had completed an IT training course prior to or during their studies in DCU Business School. Accordingly, they were presented with a list of IT courses, including the European Computer Driving Licence (ECDL), the International Computer Driving Licence (ICDL), and Microsoft Office Specialist (MOUS), to select from. They were also given the option to include a course other than those listed.

In total, almost one third of students (32%) reported completion of an IT course prior to or during their studies in DCU Business School. Regarding the role of demographic characteristics, age emerged as the only factor accounting for significant variation in student overall IT training, with over half of Boomers (58%) and 44% of Gen-Xers reporting completion of some kind of IT training compared to less than one third of Net-Geners (Figure 6.1).

Figure 6.1 **IT Training, Overall and by Age**



Taking a closer look at the types of IT training courses completed by students, we further found that except age, nationality also mattered, with Irish students reporting significantly higher completion rates for ECDL, whereas international students reporting higher completion rates for MOUS and other types of IT courses (Table 6.1).

Table 6.1. **Types of IT Training Course, Overall and by Student Demographics**

Percentage of students who:	Among all	AGE			GENDER		NATIONALITY	
		Net-Gener	Gen-Xer	Boomer	Male	Female	Irish	Non-Irish
Have completed an IT training course	32%	27%[a]	44%[b]	58%[b]	32%	32%	32%	32%
Have completed :								
European Computer Driving Licence (ECDL)	22%	22%[a]	18%[a]	38%[b]	22%	22%	24%[a]	10%[b]
Microsoft Office Specialist (MOS)	6%	5%[a]	8%[a]	18%[b]	6%	6%	5%[a]	12%[b]
International Computer Driving Licence (ICDL)	2%	3%	1%	2%	3%	2%	2%[a]	5%[b]
Other IT training course	12%	8%[a]	25%[b]	22%[b]	12%	12%	10%[a]	22%[b]

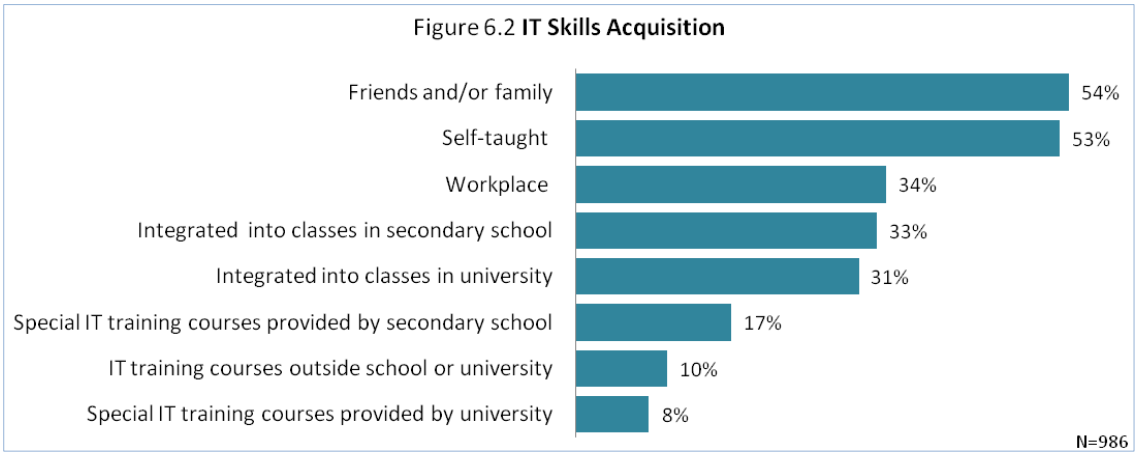
N=988
Note: Significant differences should be read across rows by section.

6.2 IT Skills Acquisition

To get a more precise idea of when and the ways through which students acquired their IT skills, we asked them to choose from a list of eight IT skills acquisition methods, both formal (e.g., special IT course provided by secondary school) and informal (e.g., through interacting with friends and/or family), the ones which they had used.

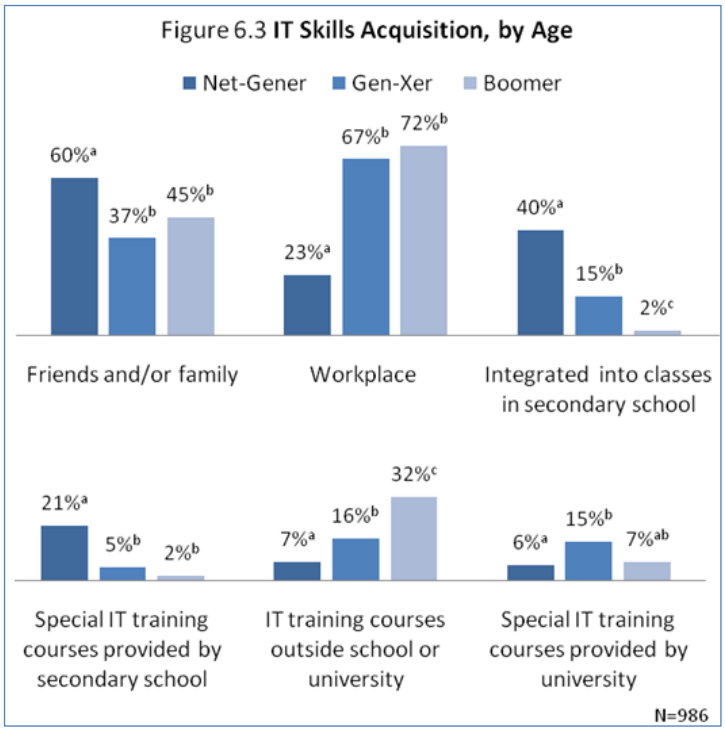
Results, as shown in Figure 6.2, indicate that, on average, students acquired their IT skills mainly through informal ways, such as interacting with friends and/or family (54%), and by themselves with the help of manuals, handbooks etc. Around one third of students mentioned IT skills acquisition at the workplace (34%), while an almost equivalent percentage of students mentioned the school and the university. Finally, one out of ten students mentioned IT courses provided outside the school or university, while 8% mentioned IT courses provided by the university.

Figure 6.2 **IT Skills Acquisition**



Looking further at the role of student demographic characteristics, we found that age accounted for significant differences in six out of the eight methods, followed by gender and nationality accounting for differences in three and two out of eight methods, respectively. In terms of age, there was a clear

pattern regarding utilization of family and friends as a main source of IT skills acquisition for Netgeners (60%), whereas workplace was the main source for Boomers (72%) and Gen-Xers (67%). In addition, and as somewhat expected, a significantly higher percentage of Net-Geners (40%) than Gen-Xers (15%) and Boomers (2%) reported IT skills acquisition to be integrated into classes in secondary school. In addition, the percentage of Gen-Xers reporting IT skills acquisition outside the school or university was two times, and in the case of Boomers almost five times, higher than that of Net-Geners (Figure 6.3).



In terms of gender, Figure 6.4 shows that more females than males reported IT skills acquisition through interaction with friends and/or family, and through IT training courses provided by their secondary school. Moreover, the percentage of females who reported IT skills acquisition via integrated classes in secondary school was significantly higher than that of males. Finally, in terms of student nationality, self-learning but also special IT training courses provided by the university were found to be more common among international than Irish students (Figure 6.5).

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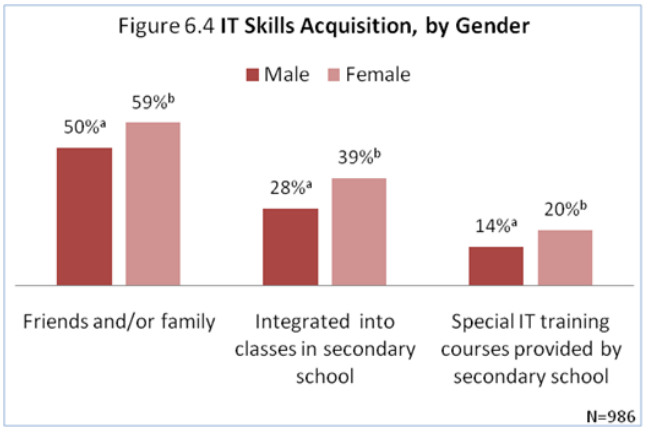

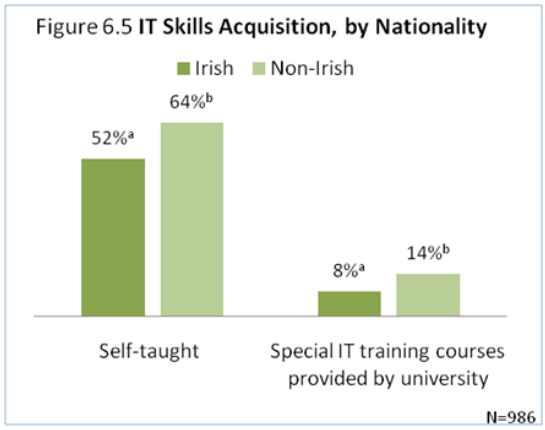

6.3 Computer Self-Efficacy

Computer self-efficacy refers to an individual's confidence in his or her ability to use a computer to perform various tasks. Those tasks can be divided into three dimensions: magnitude (i.e., level of task difficulty), strength (i.e., strength (conviction that a given level of task performance is attainable), and generality (degree to which the judgment is generalized across different situations) (Bandura 1977). In our study, we employed an adapted version of Young's (2001) computer self-efficacy measure, which is particularly pertinent to an educational setting. This measure focuses on five tasks for which a computer is expected to be used by students in their studies: preparation of written reports/papers, creation of visual presentations, analysing data, searching for information electronically, and communicating with others electronically. Accordingly, students were asked to indicate their degree of confidence in their ability to use a computer to perform each of the five tasks on a five-point scale (1=not all confident, to 5=very confident).

Results indicate that, overall, student self-efficacy was above the average (mean=3.82). However, as shown in Figure 6.6, Net-Geners' mean scores were significantly lower than that of Gen-Xers and Boomers. In addition, computer self-efficacy was found to be significantly higher for males than females. Yet, as indicated in Table 6.2, this was due to males' higher confidence in their ability to perform data analysis tasks.

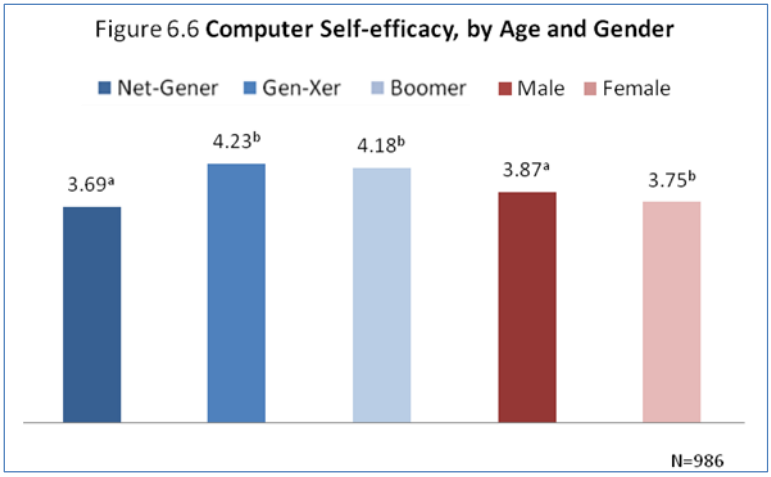

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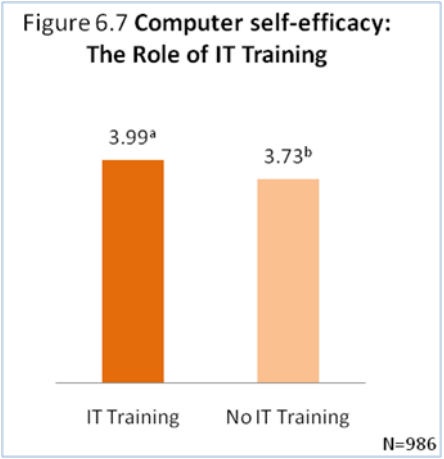
Table 6.2 **Computer Self-Efficacy, Overall and by Student Demographics**

Computer self-efficacy dimensions	Among all	AGE			GENDER		NATIONALITY	
		Net-Gener	Gen-Xer	Boomer	Male	Female	Irish	Non-Irish
Communicate with others electronically	4.07	3.99[a]	4.38[b]	4.13[ab]	4.12	4.02	4.07	4.09
Prepare written reports/papers	4.04	3.92[a]	4.43[b]	4.39[b]	4.09	3.99	4.05	4.01
Search for electronic information	3.83	3.71[a]	4.22[b]	4.16[b]	3.87	3.79	3.81	3.95
Create visual presentations	3.72	3.57[a]	4.17[b]	4.32[b]	3.76	3.68	3.71	3.79
Analyse data	3.40	3.26[a]	3.80[b]	3.92[b]	3.50[a]	3.28[b]	3.38	3.49

N=986
Notes:
-Significant differences should be read across rows by section.
-Numbers shown are mean scores on a 5-point Likert type scale (1=not confident at all, 5=very confident) for the question "How confident do you feel in your ability to…?"

In addition, as shown in Figure 6.7, IT training accounted for a small yet significant difference in student mean scores of computer self-efficacy, with those students having completed some form of IT training reporting higher self-efficacy than those students with no IT training completed.

Figure 6.7 **Computer self-efficacy: The Role of IT Training**



There were also significant differences in computer self-efficacy scores associated with six of the eight methods of IT skills acquisition reported by students. Ranked in an order from higher to lower, in all but one method (i.e., interaction with friends and/or family), computer self-efficacy scores were significantly higher for those students who acquired their IT skills: (1) though IT training outside school or university; (2) at the workplace; (3) at the university (4) through IT training provided by the university; and (5) by self-learning (Table 6.3).

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Table 6.3 **Computer Self-Efficacy and IT Skills Acquisition**

Computer Self-Efficacy Scores		
IT training courses outside school or university		
Yes	No	
4.15[a]	3.79[b]	
At the workplace		
Yes	No	
4.11[a]	3.66[b]	
IT training integrated into classes in university		
Yes	No	
4.06[a]	3.71[b]	
Special IT training courses provided by university		
Yes	No	
4.04[a]	3.79[b]	
Self-taught with the help of manuals, handbooks etc.		
Yes	No	
3.93[a]	3.68[b]	
Through interacting with friends and/or family		
Yes	No	
3.70[a]	3.95[b]	

N= 986
Notes:
-Significant differences should be read across rows by section.

6.4 Learning Styles

Following previous work conducted by ECAR, we employed a measure of learning styles that sought to capture the extent to which students valued more independent or team-based learning. In particular, students were asked to indicate whether or not they learn best by working (1) alone, (2) in a group, and (3) alone or in a group.

Consistent with results of the ECAR studies (e.g., Salaway et al., 2007) we found that, on average, the largest group consisted of students who reported that they learn equally well working alone or in a group (43%), followed by independent learners (36%), whereas less than two out of ten students (18%) reported that they learn best by working in a group. While gender and nationality did not account for differences in student learning styles, age emerged as an important factor. Specifically, as shown in Figure 6.8, we found that independent learning was associated most strongly with Net-Geners, whereas group-based learning with Boomers. Gen-Xers were finally found to be the most flexible in terms of their learning orientation.

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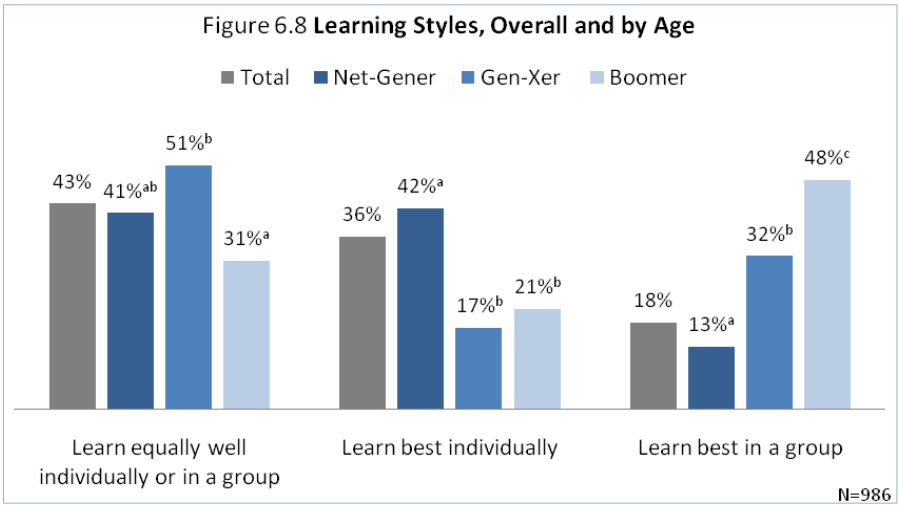

We also found that independent and group-based learners differed in terms of two informal methods of IT skills acquisition. In particular, as shown in Table 6.4, IT acquisition through interaction with friends and/or family was significantly lower for independent learners, while IT acquisition through self-taught methods was significantly lower for group-based learners.

Table 6.4 **Learning Styles and IT Skills Acquisition**

	IT Skills Acquisition			
	Through interacting with friends and/or family		Self-taught with the help of manuals, handbooks etc.	
Percentage of students who:	**Yes**	**No**	**Yes**	**No**
Learn equally well working alone or in a group	59%	52%	57%	52%
Learn best working alone	50%[a]	58%[b]	57%	53%
Learn best working in a group	54%	55%	45%[a]	56%[b]

N=965

Note: Significant differences should be read across rows by section.

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7. ICT in the Business School

Having explored in the previous chapters student ownership, everyday usage of, and skills in ICT, finally we come to examine their experiences with ICT in the business school environment. We begin with highlighting how students view the societal, work, and learning impact of technology use in business school education. This is followed by identifying technologies students perceive as essential to a successful learning experience in the business school. We also examine their perceived access to, motivation for, and their lecturers' competence with, using ICT in the business school. In the second section, we shift attention to the online activities in which students are engaged while on campus. The relative importance of various learning resources, both digital and physical, for their studies is examined in the third section. In the fourth section, we focus on key elements comprising a digital learning environment in the business school by presenting results on student use of, and satisfaction with, a learning management system, their experiences with one-to-one computing, and their views on the instructional uses and benefits of podcasting. The chapter concludes with identifying student expectations of the top five features comprising their ideal ICT-enabled learning environment in the business school.

7.1 Technology in Business School Education

In this section, we explore three themes associated with the role of ICT in the business school context. First, we present results on students' views of the role that inclusion of ICT in business school education plays in preparing them to be active citizens, employees, and learners in the information society. Second, we focus on technologies that provide the infrastructural basis on which ICT-based learning in the business school is built. That is, we identify devices and technologies which are, at a minimum, expected by students to contribute to a positive learning experience. Finally, we examine how students perceive their own access to, motivation for, and their lecturers' competence in using ICT.

7.1.1 Societal, Work and Learning Role of Technology Use in Business School Education

In line with previous work on the role of ICT in higher education, we adapted three items from the ECAR studies that assess students' views of the societal, work, and learning impact of technology use in business school education. Those items as presented in Table 7.1.

Table 7.1 **Technology in Business School Education: Societal, Work and Learning Impact**

Dimension	Technology should be used in business school education…
Societal	…to prepare me to contribute fully in a society surrounded by technology.
Work	…to prepare me to be a productive worker.
Learning	…because it has a positive impact on my learning.

Source: Salaway et al. (2009)

Results indicate that students, on average, expressed very positive views on all three aspects of technology inclusion in business school education. There were, however, two small yet significant

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differences in student ratings, which were associated with age and nationality. In particular, as shown in Table 7.2, Net-Geners' ratings of the learning impact of ICT were lower than those given by Gen-Xers, while international students rated higher the work impact of ICT than Irish students.

Table 7.2 **Technology in Business School Education, Overall and by Student Demographics**

Technology in Business School Education	Among all	AGE			GENDER		NATIONALITY	
		Net-Gener	Gen-Xer	Boomer	Male	Female	Irish	Non-Irish
Societal Impact	4.30	4.28	4.37	4.33	4.33	4.27	4.28	4.41
Work Impact	4.14	4.11	4.25	4.08	4.13	4.15	4.11[a]	4.29[b]
Learning Impact	4.12	4.06[a]	4.29[b]	4.22[ab]	4.11	4.12	4.10	4.22

N=961
Notes:
-Items are rated on a 5-point Likert type scale ranging from 1=strongly disagree, to 5=strongly agree.
-Significant differences should be read across rows by section.

7.1.2 Access, Competence and Motivation for Using ICT in the Business School

Based on an adapted version of the Access, Competence and Motivation (ACM) model developed by Viherä and Nurmela (2001) and used in previous research (Korte & Hüsing, 2006), we asked students to state on a five-point scale (1=strongly disagree, to 5=strongly agree) their agreement or disagreement with five items corresponding to the three dimensions of the ACM model: access to computers and the Internet (two items), lecturers' competence in using computer software and the Internet and applying them for teaching purposes (two items), and motivation gauged through student perceptions that using computers results in significant learning benefits for them (one item) (Table 7.3).

Table 7.3 **ACM Dimensions**

ACM Dimension	Items
Access	1. The business school is well-equipped with computers. 2. The Internet connection we have is sufficiently fast.
Competence	1. Lecturers do not have the sufficient computer skills.* 2. Existing teaching materials on the Internet is of poor quality.*
Motivation	1. Using computers does not have significant learning benefits for me.*

*Reverse-coded item.
Note: All items are rated on a 5-point Likert type scale ranging from 1=strongly disagree, to 5=strongly agree.

Results, as shown in Table 7.4, revealed that, while student ratings were generally positive, Net-Geners scored significantly higher than Gen-Xers in the access dimension. Moreover, males' scores for the competence dimension were significantly lower than those of females. Finally, international students' ratings for the access dimension were lower than those of Irish students but higher for the motivation dimension.

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Table 7.4 **ACM, by Student Demographics**

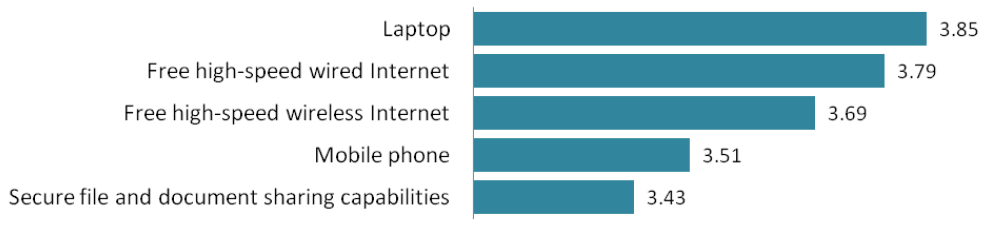
ACM Dimension	N	Among all	AGE			GENDER		NATIONALITY	
			Net-Gener	Gen-Xer	Boomer	Male	Female	Irish	Non-Irish
Access	957	3.68	3.78[a]	3.34[b]	3.52[ab]	3.70	3.66	3.73[a]	3.40[b]
Competence	939	3.36	3.38	3.34	3.10	3.27[a]	3.45[b]	3.36	3.36
Motivation	971	3.24	3.28	3.17	3.03	3.27	3.21	3.21[a]	3.47[b]

Note:
- Significant differences should be read across rows by section.
- Items are rated on a 5-point Likert type scale ranging from 1=strongly disagree, to 5=strongly agree.

7.1.3 Devices and Technologies for a Successful Business School Experience

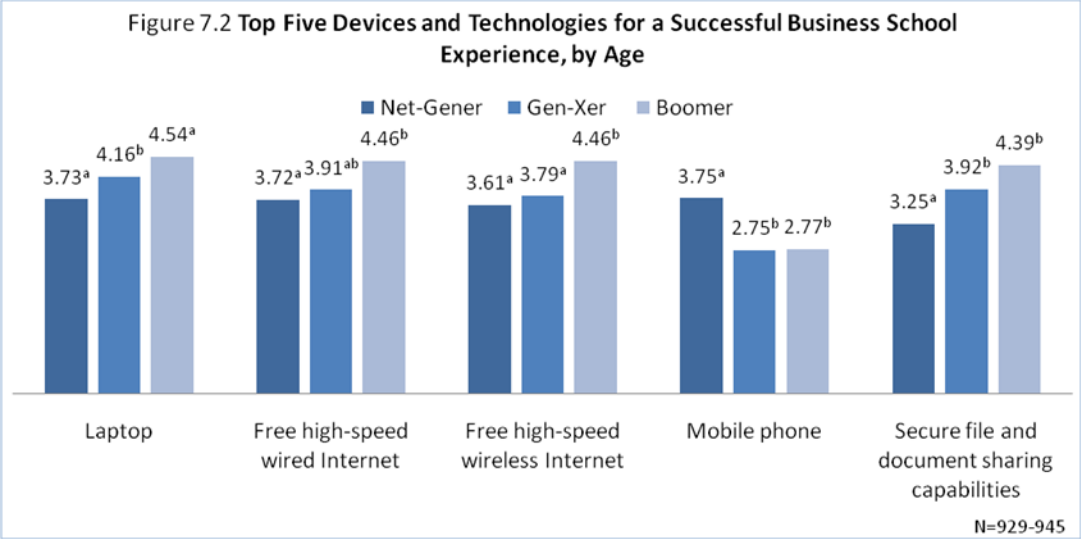
Students were presented with a list of various devices and technologies, and asked to rate on a five-point scale (1=not important at all, to 5=very important) the ones which they considered more or less important for a successful learning experience in the business school. Results, as shown in Figure 7.1, indicate that laptop and mobile phone were viewed by students as the two most important devices for a successful learning experience in the business school. In addition, ubiquitous internet access via the university's wireless or wired network along with secure file and document sharing capabilities were placed in students' top-five list.

Figure 7.1 **Top Five Devices and Technologies for a Successful Business School Experience**



Note: Items rated on a 5-point scale ranging from 1=not imporant at all, to 5=very important N=929-945

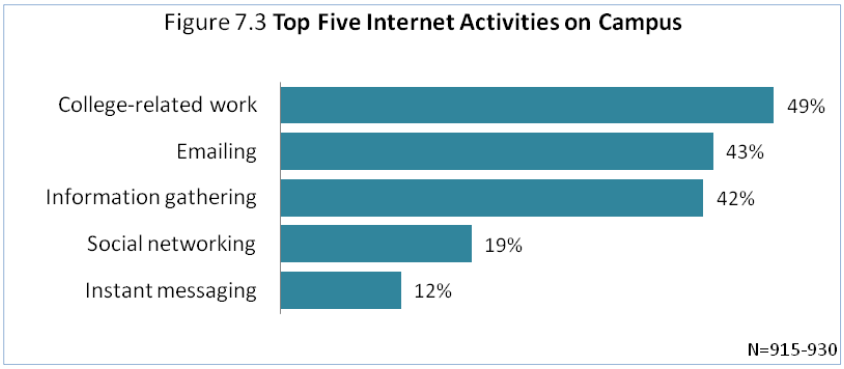
The relative importance of those devices and technologies was, however, found to differ significantly according to student age. In particular, with the exception of mobile phone, which was viewed as more important by Net-Genders compared to Gen-Xers and Boomers, all the rest devices and technologies comprising the top-five list were rated higher by Gen-Xers and Boomers, with the largest difference found for secure file and document sharing capabilities.



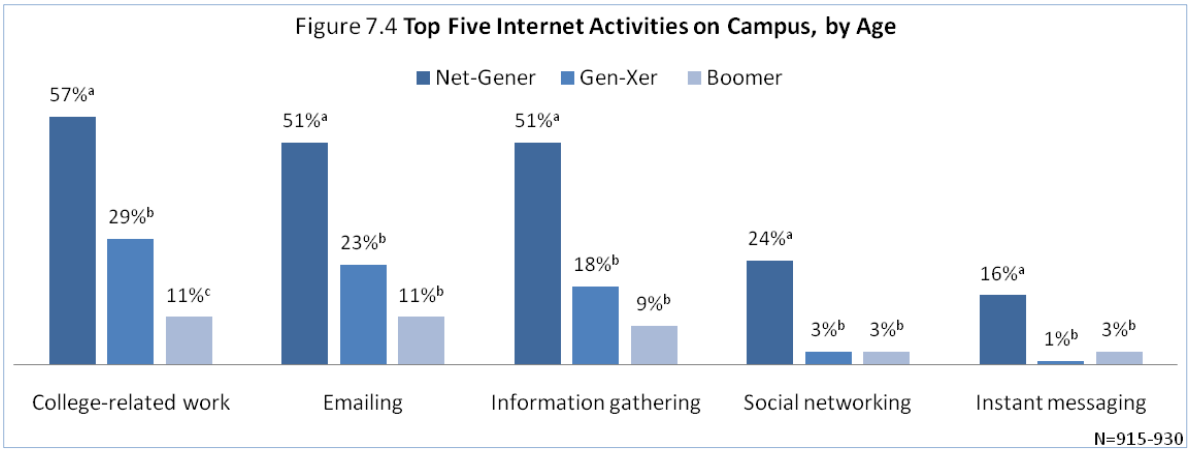
7.2 Online Activities on Campus

In chapter 5 we explored students' online activities at home. In this chapter, we focus on their online activities while on campus. Students – except first-year undergraduates as they had very little experience of internet use in a university setting – were asked to indicate on a three-point scale (1=never or rarely, 2=sometimes, 3=a lot) the frequency with which they were using the Internet for information gathering, entertainment, communication, and learning purposes.

Figure 7.3 shows the top five online activities on which students were using the Internet a lot while on campus, with college-related work topping the list (49%), and followed by emailing (43%), information gathering (42%), social networking (19%), and instant messaging (12%).



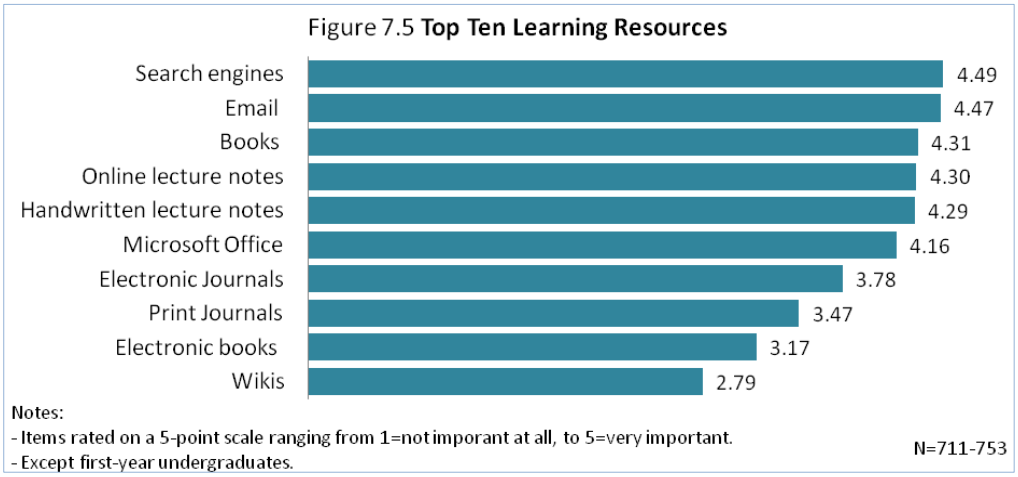
Taking a look at the role of demographic characteristics in those activities, we found that age accounted for large differences between students, with Net-Geners reporting significantly higher use of the Internet for all five activities compared to Gen-Xers and Boomers (Figure 7.4).



7.3 Learning Resources: Digital vs. Physical

What types of learning resources did students consider important for their studies? What was the relative importance of digital resources against more traditional, physical resources? To answer these questions, students – except first-year undergraduates as they had very little experience with learning resources in a university context – were presented with a list of 15 resources, both digital (e.g., electronic journals) and physical (e.g., books), and asked to rate on a five-point scale (1=not important at all, to 5=very important) how important they considered each of them.

As shown in Figure 7.5, students, on average, placed the highest importance on search engines. Interestingly, though, Wikis were placed at the bottom of the top-ten list. In addition, results revealed that online and handwritten lecture notes were perceived by students as equally important. In contrast, electronic books were rated as less important than physical books. Yet the opposite was found for electronic journals versus print journals.



Moreover, there were significant age and gender differences in student ratings of the relative importance of digital and physical learning resources. In particular, in terms of age differences, as shown in Figure 7.6, online lecture notes and Wikis were viewed as more important by Net-Geners than Gen-Xers and Boomers. On the other hand, Boomers' and Gen-Xers' ratings of journals,

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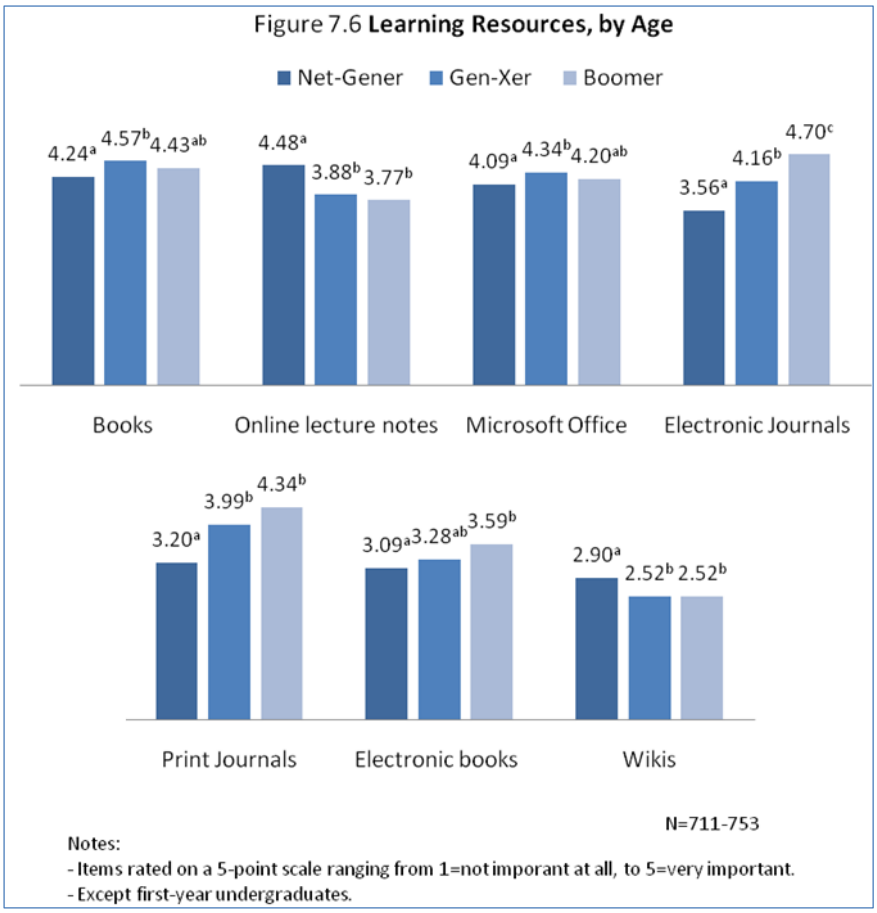
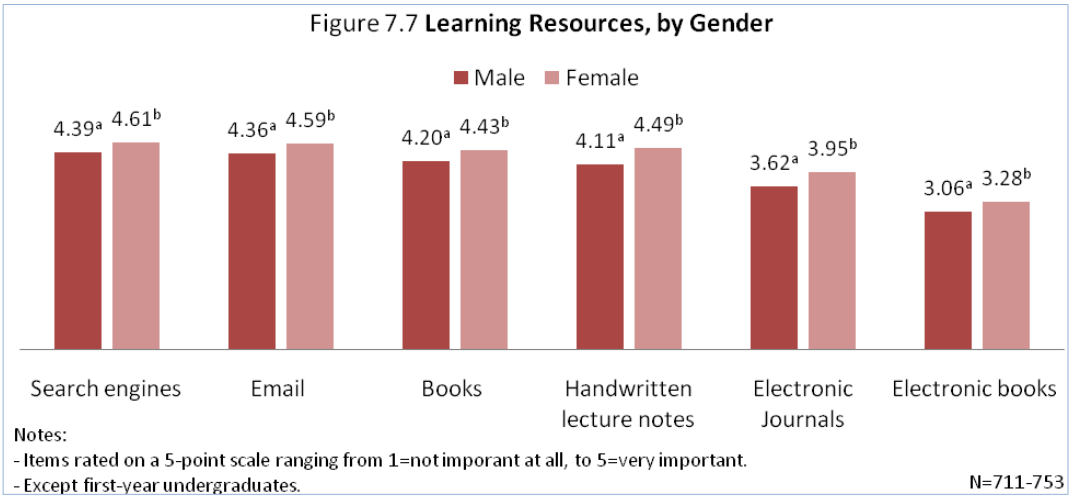
particularly electronic ones, were considerably higher than those of Net-Geners. Finally, females were found to place higher importance than males to both digital and physical learning resources (Figure 7.7).





7.4. Digital Learning Environment: Tools and Technologies

In this section, we explore three key aspects comprising a digital learning environment. First, we focus on student experience with Learning Management Systems (LMS), also known as Virtual

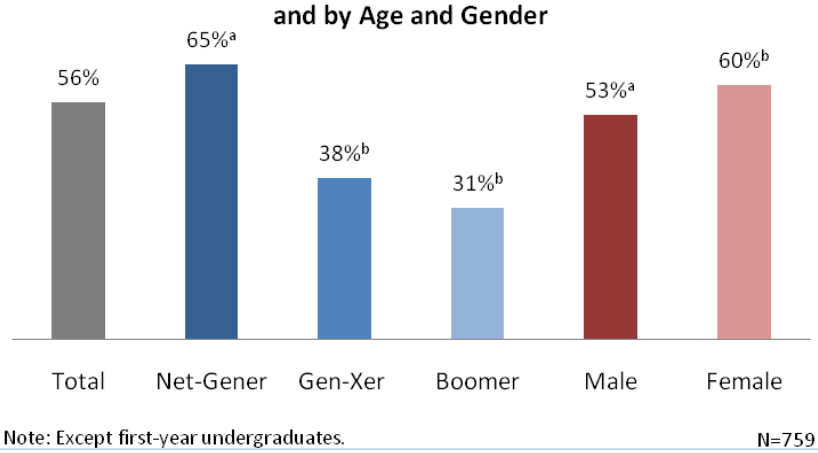
Learning Environments or learning platforms, with which much of the success of e-learning and online education has been associated. Second, we focus on students' experience with one-to-one computing. Finally, we explore their views on podcasting, an integral aspect of mobile learning.

7.4.1 Learning Management System Use

A LMS is essentially software for delivering, tracking, and managing educational material and learning resources (Hall, 2003). LMS are increasingly utilised by higher education institutions as tools to improve the learning experience and performance of students by enabling them ready access to, reuse, and sharing of educational resources and learning objects. A recent study examining Irish undergraduate students' perceptions of LMS use indicates that students see LMS as an expected and integral part of their learning experience, with over 70 percent of them reporting high levels of satisfaction with the e-learning aspect of their modules (Concannon, Flynn, & Campbell, 2005).

Our results, as shown in Figure 7.8, indicate that over one half of the students had used a LMS in their studies. In particular, LMS use was significantly higher among Net-Geners than Gen-Xers and Boomers. In addition, more females than males reported use of LMS.

Figure 7.8 **Learning Management System Use, Overall and by Age and Gender**



We were also interested in assessing student satisfaction with LMS by asking them to indicate on a five-point scale (1=very negative, to 5=very positive) their overall experience with LMS use. Overall, students expressed relatively positive views, with Net-Geners and Irish students reporting significantly higher levels of satisfaction with LMS than Gen-Xers, Boomers and international students, respectively (Figure 7.9).

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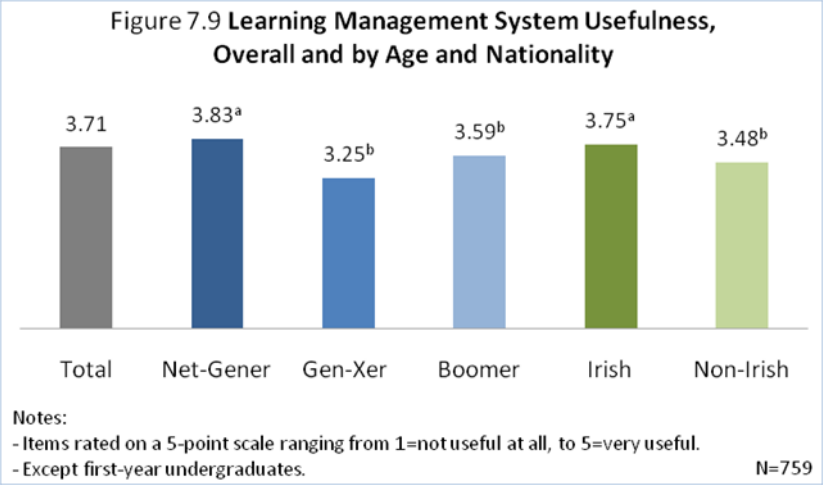


Finally, students were presented with a list of eight features of the LMS used in DCU Business School and asked to indicate on a five-point scale (1=not important at all, to 5=very important) which of those features they would recommend as more or less important.

Student top-five list, as shown in Table 7.5, included the following features: (1) reminder service of deadlines and updates on important events, (2) fast page loading, (3) user-friendly navigation, (4) integrated audio and video applications, and (5) recommender service based on user's history. In addition, we found that age and gender accounted for significant differences in student ratings, with Net-Geners' and female students' perceived importance of some of the above features being higher than that of Gen-Xers, Boomers and male students.

Table 7.5 **Top-Five Features of LMS, by Student Demographics**

			AGE			GENDER		NATIONALITY	
LMS Feature	N	Among all	Net-Gener	Gen-Xer	Boomer	Male	Female	Irish	Non-Irish
1. Reminder service	753	4.05	4.19[a]	3.59[b]	3.29[b]	3.95[a]	4.17[b]	4.07	3.98
2. Fast page loading	758	3.98	4.06[a]	3.66[b]	3.84[ab]	3.82[a]	4.15[b]	3.98	3.96
3. User-friendly navigation	746	3.91	4.06[a]	3.40[b]	3.06[b]	3.82[a]	4.01[b]	3.93	3.80
4. Integrated audio and video	755	3.37	3.48[a]	3.02[b]	2.53[b]	3.34	3.40	3.38	3.28
5. Recommender service	749	3.32	3.34	3.36	2.76	3.31	3.33	3.35	3.14

Notes:
- Significant differences should be read across rows by section.
- Items are rated on a 5-point Likert type scale ranging from 1=not important all, to 5=very important.

7.4.2 One-to-One Computing

The basic idea behind one-to-one computing is that students are provided with laptop computers loaded with educational software, including LMS applications, which enable them to access the Internet through the university's wireless network but also at home, and consequently help them complete successfully their academic tasks (Penuel, 2006). A key feature of one-to-one computing is

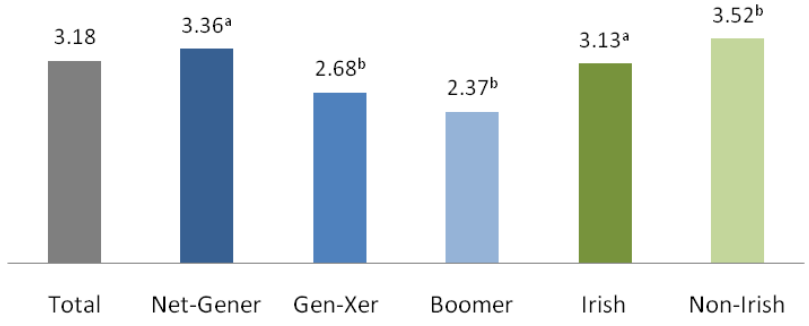
that it makes possible for students and lecturers to transition from occasional and supplemental use of computers, often taking place in computer labs, to more frequent and integral use of technology in a multitude of settings (Roschelle & Pea, 2002). One-to-one computing, in other words, has the potential for providing students with equitable access to up-to-date educational resources and learning opportunities, thereby transforming the learning experience from a lecturer-centred activity to a much more collaborative and participatory process, leading to improved learning outcomes for students and more technology-savvy lecturers.

In this study, we were interested in student perceptions of the importance of one-to-one computing, their actual use of laptop in class, and their views of key benefits and barriers to laptop use in the business school. Students were first presented with a brief description of one-to-one computing as follows:

> "In 1:1 computing, each student would be expected to have a laptop computer, and instructional activities would be designed around that expectation. 1:1 computing however involves much more. The learning environment or 'platform' is a critical component of 1:1. What is the 'platform'? It includes the way that courses are delivered online (Moodle, for example) as well as other online and computer based resources".

Results, as shown in Figure 7.10, indicate that student ratings of the importance of one-to-one computing were slightly above average. In particular, the ratings given by Net-Geners and international students were significantly higher than those given by Gen-Xers, Boomers, and Irish students, respectively.

Figure 7.10 **Importance of One-to-One Computing, Overall and by Age and Nationality**



Notes:
- Items rated on a 5-point scale ranging from 1=not important at all, to 5=very important.

N=937

Results also indicate that, among laptop owners (87% of the total sample), about one quarter (23%) were using their laptops in class at least once a week, with Net-Geners (26%) and male students (26%) reporting significantly higher use compared to Gen-Xers (17%), Boomers (13%), and female students (18%), respectively (Figure 7.11).

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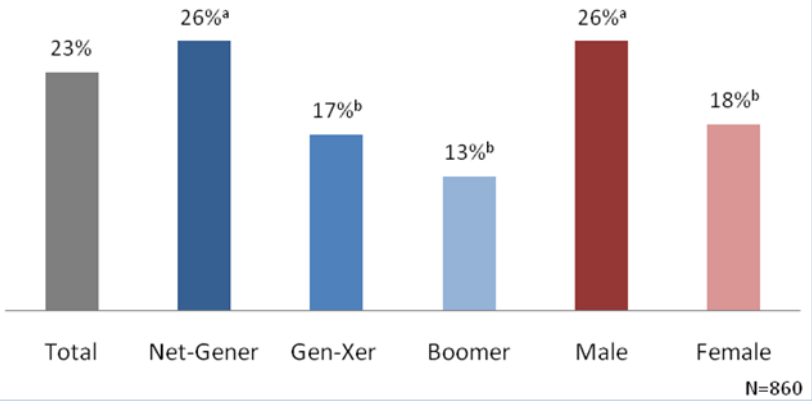
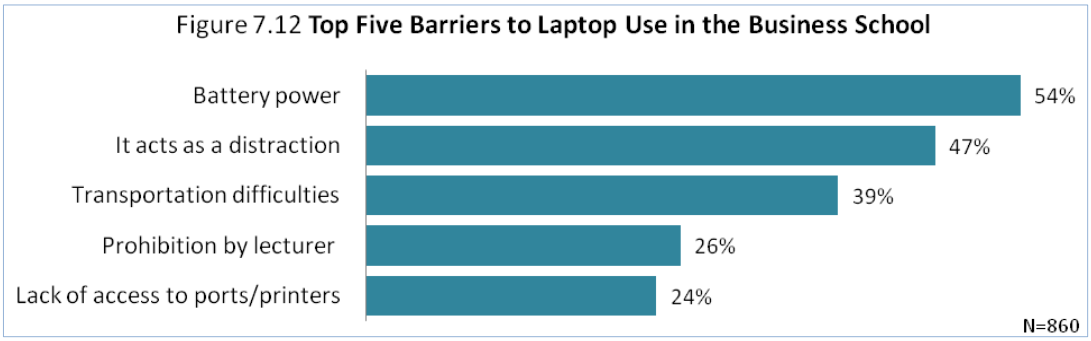
Figure 7.11 **Laptop use in class (at least once a week), Overall and by Age and Gender**



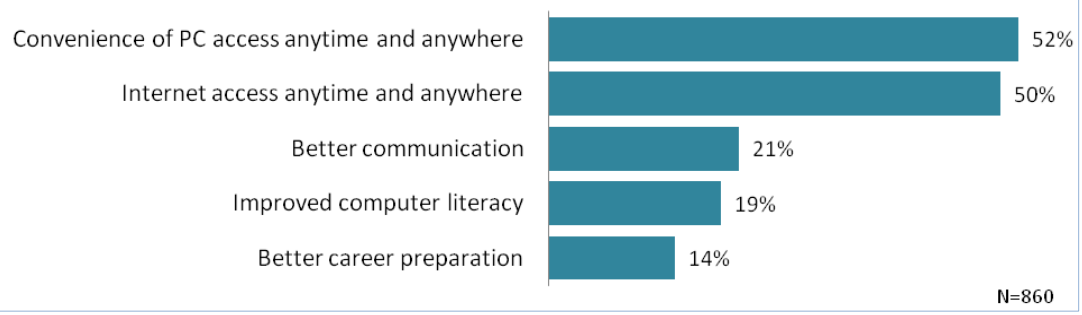
Laptop owners were also asked to choose from a list of various barriers to laptop use in the business school (Young, 2001). As shown in Figure 7.12, the top five barriers identified were: battery power (54%), 'laptop use acting as distraction' (47%), transportation difficulties (39%), lecturer's prohibition (26%), and lack of access to ports and printers (24%).

Figure 7.12 **Top Five Barriers to Laptop Use in the Business School**



As shown in Figure 7.13, students did also acknowledge that laptop use in the business school held certain benefits, the top five of which were: ubiquitous access to a computer (52%) and the Internet (50%), better communication (21%), improved computer literacy (19%) and, finally, better career preparation (14%).

Figure 7.13 **Top Five Benefits of Laptop Use in the Business School**



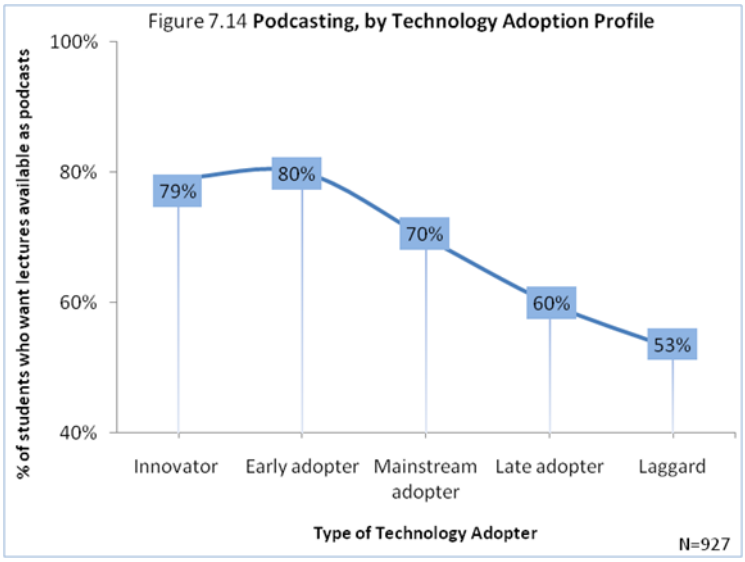
7.4.3 Podcasting

The term "podcast" stems from the combination of the widely known portable personal player "iPod" with "broadcast". Podcasting is essentially a form of mobile learning in which a device is used to listen or watch audio and/or video broadcasts published on the Internet (Evans, 2008). Broadcasts are readily available to download on a PC, and can automatically be transferred to a handheld digital media player so that users can listen or watch them when, where, and how they want. Accordingly, podcasting represents an ideal learning tool for students by allowing them flexibility to study on-the-go. An additional advantage of podcasting is that it is more a "push" or "subscription" than a "pull" technology as learning material is directly downloaded from the Internet to the device rather than asking the user to search for it and download it (Campbell, 2005).

Podcasting is increasingly embraced by higher education institutions for academic purposes (Duke, 2005; Blaisdell, 2006; Malan, 2007). Previous research has shown that podcasting is effective in enriching the student learning experience by affording accessibility of learning material to a diverse body of students (Cebeci and Tekdal, 2006), contributing to informality and engagement (Edirisingha and Salmon, 2007), and helping reduce student anxiety (Chan and Lee, 2005). For example, in a recent study of approximately two hundred first-year undergraduates in Business and Management at an English university, Evans (2008) found that podcasting was viewed by students as: more efficient than handwritten notes for revising a lecture; more effective than textbooks as a revision tool as well as for absorbing learning material and constructing understanding.

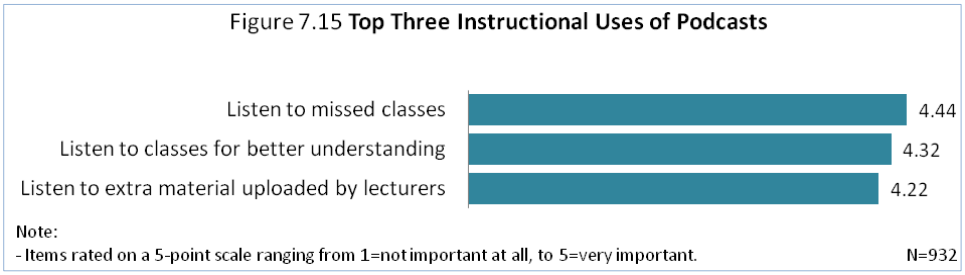
In this study, we were interested in gauging student views of the instructional uses and benefits of podcasting. In particular, we asked students to indicate: (1) whether they would like their lecturers to make their lectures available as podcasts, (2) the devices which they prefer to use for listening to or watching podcasts, and (3) the importance of instructional uses of podcasts.

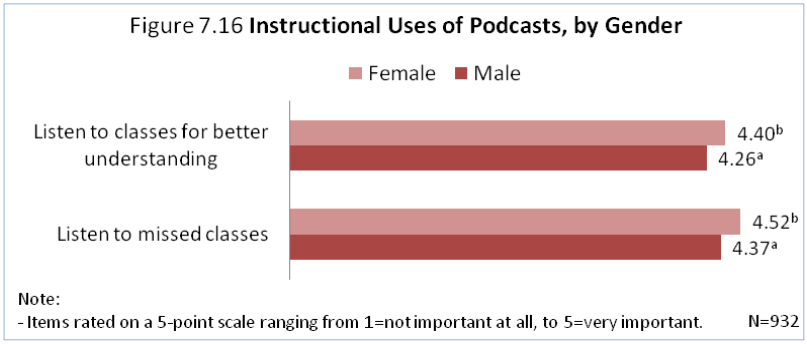
First, results indicate that the majority of students (72%) were positive about lecturers making their lectures available as podcasts. While there were no significant differences found between different demographic groups, student ratings differed significantly according to their technology adoption profile, with a significantly higher percentage of innovators and early technology adopters than mainstream and late adopters, and laggards expressing a positive view (Figure 7.14).



Second, results on student preferences of devices in which they would like to use for podcasting show that the majority of students (53%) suggested as a first choice a laptop, followed by 42 percent suggesting a portable media player (e.g., MP3 player, iPod), and 35% suggesting a mobile phone.

Finally, as shown in Figure 17.5, the three most important uses and associated benefits of podcasting as perceived by students were associated with: ready availability of learning material when they could not attend classes, revision of learning material leading to better understanding, and access to complementary learning material uploaded by lecturers. In particular, the first two uses of podcasting were viewed as more important by female than male students (Figure 7.16).





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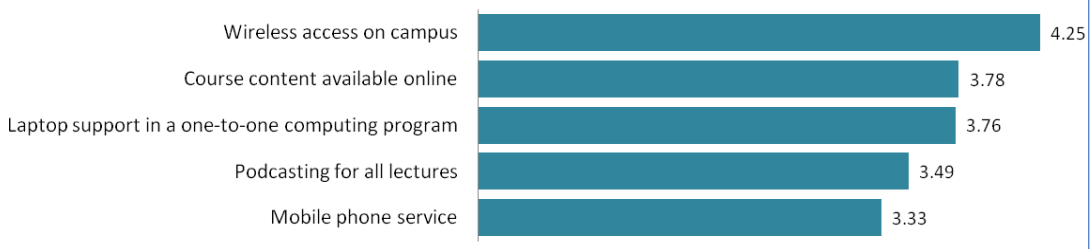
7.4.4 Ideal ICT-enabled Learning Environment

Understanding student expectations of the technology services they consider important for their studies is a requirement for the development of an effective ICT-enabled learning environment in the business school. Accordingly, students were presented with a list of ICT applications services, and were asked to indicate on a five-point scale (1=not desirable at all, to 5=very desirable) the ones they desired more or less.

As shown in Figure 7.17, wireless access everywhere on campus topped students' top-five list of their ideal ICT-enables learning environment. This was followed by provision of course content online, including text transcripts of lectures, laptop support in a one-to-one computing program, podcasting for all lectures, and mobile phone reminder services. To note that there were no significant demographic differences in student ratings of those features.

Figure 7.17 **Top Five Features of an Ideal ICT-Enabled Learning Environment**



Note:
- Items rated on a 5-point scale ranging from 1=not desirable at all, to 5=very desirable.

N=886

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