AN INVESTIGATION OF THE SOCIAL AND ACADEMIC USES OF DIGITAL TECHNOLOGY BY UNIVERSITY STUDENTS

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An Investigation of the Social and Academic Uses of Digital Technology by University Students

DOCTORAL THESIS

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We STATE that the present study, entitled "An investigation of the social and academic uses of digital technology by university students", presented by Eliana Esther Gallardo Echenique for the degree of Doctor, has been carried out under our supervision at the Department of Pedagogy of this University, and that it fulfills all the requirements to be eligible for the European Doctorate Award.

Tarragona, May 15, 2014

Doctoral Thesis Supervisor

Dr. Luis Marqués Molias   Dr. Mark Bullen

To Dios, Carmen, Wili,
Mónica y Wilito

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List of Abbreviations

ECTS	European Credit Transfer System
GPS	Global Positioning System
ICT	Information and Communication Technologies
IWB	Interactive Whiteboard
LMU	Ludwig-Maximilians-Universität (Munich)
LMS	Learning Management Systems
MOODLE	Modular Object Oriented Developmental Learning Environment
PC	Personal Computer
RSS	Really Simple Syndication
TGA	Tarragona
TSA	Tortosa
UNESCO	United Nations Educational, Scientific and Cultural Organization
URV	Rovira i Virgili University
VDLL	El Vendrell

Glossary of Terms

For the purposes of the study, the following terms will be used based on the definitions given below:

- **Apps:** An abbreviation for application. An app is a piece of software. It can run on the Internet, computer, or on other electronic device (Attwell & Hughes, 2010).

- **Blog:** A shorthand term that means "Web log" and it is an online, chronological collection of personal commentary and links that allows users to reflect, share opinions, and discuss various topics in the form of an online journal (Attwell & Hughes, 2010; EDUCAUSE, 2005).

- **Blogging:** Online writing on a blog.

- **Curriculum:** A list of the topics to be learnt in a course of study. The terms "curriculum" and "syllabus" are used slightly differently in different countries, but essentially they both mean a list of what is to be learnt (UNESCO, 2011).

- **Digital divide:** A popularly used term (also known as digital gap) that originally was created to describe the gap between higher socio-economic groups and lower economic groups' access to the social and organisational resources needed to use technologies effectively (Coyne, Stockdale, Busby, Iverson & Grant, 2011; Pearce, 2013; Waycott, Bennett, Kennedy, Dalgarno & Gray, 2010).

- **Digital Immigrant:** A person who has adopted the Internet and related digital technologies, but who was born prior to the advent of the digital age (Palfrey & Gasser, 2008; Prensky, 2001a).

- **Digital Native:** A person born into the digital age (after 1980) who has access to networked digital technologies and strong computer skills and knowledge. Digital Natives share a common global culture that is defined not strictly by age but by certain attributes and experiences related to how they interact with in-formation technologies, information itself, one another, and other people and institutions (Palfrey & Gasser, 2008).

- **Electronic portfolio (e-portfolio):** A digital container capable of storing visual and auditory content including text, images, video and sound (Abrami & Barrett, 2005).

- **Help-seeking:** An achievement behaviour involving the search for and employment of an adaptive strategy that student can use to obtain success (Kitsantas & Chow, 2007; Roussel, Elliot & Feltman, 2011).

- **Interactive Whiteboard:** A large, touch-sensitive (thus interactive) boards that when used with a combination of a computer and digital projector facilitates interactive ICT engagement (BECTA, 2003; Smith, Higgins, Wall & Miller, 2005). It resembles a traditional whiteboard and can be used similarly. The computer connected to the interactive whiteboard can be controlled by touching the board directly or by using a special pen (BECTA, 2003).

- **Internet addiction:** Describe problematic, excessive, or mal-adaptive use of the Internet (Leung, 2004). For example, stay online for pleasure averaging 38 hours or more per week, largely in chat rooms.

- **Learning Management System:** Software that enables course sites to be created that helps to plan and deliver learning events and to "manage" learners by keeping track of their progress and their performance across a range of learning activities (Attwell & Hughes, 2010; Meishar-Tal, Kurtz & Pieterse, 2012).

- **Mahara:** An open source e-portfolio created in mid-2006 for Massey University, Auckland University of Technology, The Open Polytechnic, and Victoria University of Wellington (New Zealand) (Lopez-Fernandez & Rodriguez-Illera, 2009).

- **Mash-up:** A website or software tool that combines two or more sources (text, graphics, audio, video, and animation) to create a whole new service displayed in a single graphical interface (Chiang, Huang & Huang, 2009; Render, 2010).

- **Microblogging:** A form of blogging allowing users to compose brief text updates and publish them (Render, 2010).

- **Mobile blog (moblog):** A form of blog in which the user publishes blog entries directly to the Web from a mobile phone or other mobile device (Gao, Tian, Huang & Yang, 2010; Render, 2010).

- **Mobile technology:** Includes mobile computers (e.g. laptops), mobile devices (e.g. mobile phones, tablets) and wireless communication tools (e.g. GPS) that allow people to access unlimited information from virtually anywhere (Mayisela, 2013; Palfrey & Gasser, 2008).

- **Multitasking:** Simultaneous execution of two or more processing activities at the same time (Kirschner & Karpinski, 2010).

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- **Open source software (OSS):** A development methodology which offers practical accessibility to a product's source (goods and knowledge) to study, change and distribute the software to anyone and for any purpose (Chiang et al., 2009).

- **Peer-to-peer (P2P):** A computing or networking distributed application architecture that partitions tasks or workloads among peers rather than on a few dedicated servers for its service (Chiang et al., 2009; Gao et al., 2010).

- **Podcast:** A series of digital-media (audio or video) files which are distributed over the Internet using syndication feeds for playback on mobile devices (MP3 players or iPods) and computers (Bajt, 2011; Chiang et al., 2009; Pearce & Scutter, 2010).

- **Podcasting:** Distribution of audio online through RSS (Siemens & Tittenberger, 2009).

- **Really Simple Syndication (RSS)**: A format (based on XML) for syndicating content such as blog entries, news headlines, and podcasts in a standardized format (Chiang et al., 2009; Virkus, 2008). Users can subscribe to the site's RSS feed and get a notification every time new information is posted to the website (Render, 2010; Virkus, 2008).

- **Skype:** A peer-to-peer Internet telephony network that offers free voice and video conferencing (Palfrey & Gasser, 2008). Skype uses voice over Internet protocol (VoIP) technology, which converts voice signals into data streams that are sent over the Internet and converted back to audio by the recipient's computer (EDUCAUSE, 2007).

- **Social bookmarking:** A way for Internet users to store, organize, search, and manage bookmarks of web pages on the Internet with the help of meta-data (Baltaci-Goktalay & Ozdilek, 2010; Chiang et al., 2009).

- **Social media:** A group of new online "media" -social networking, text messaging, shared photos, podcasts, streaming videos, wikis, blogs, and discussion groups- which make it possible for virtually anyone to create, share and access content (Render, 2010; Williams, Crittenden, Keo & Mccarty, 2012).

- **Social networking sites (SNS)**: Member-based Internet communities that allow users to post information, to communicate, connect and interact with others on a particular subject (Boyd & Ellison, 2008; Pempek, Yermolayeva & Calvert, 2009).

- **Tablet:** A portable personal computer equipped with a touch-screen as a primary input device and designed to be operated and owned by an individual (Attwell & Hughes, 2010).

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- **Tag cloud:** A cloudlike illustration representing the most frequent words as visually larger and bolder to describe the content of websites (Chiang et al., 2009; Greenhow et al., 2009.

- **Trust:** One party's level of confidence in and willingness to open oneself to the other party (Hon & Grunig, 1999, p. 3).

- **Tuenti:** A Spain-based social networking service that has been referred to as the "Spanish Facebook" (Tuenti, 2014).

- **YouTube:** A video-sharing site based for viewing, sharing, hosting, and basic editing of online video (Jokisalo & Riu, 2009; Snelson, 2013).

- **Virtual meetings:** Real-time interactions that take place over the Internet using features such as audio and video, chat tools, and application sharing (EDUCAUSE, 2006).

- **Vlogging:** It is a form of blogging for which the medium is video, where many vloggers go to broadcast their opinions, ideas, and commentary (Gao et al., 2010; Snelson, 2013).

- **Web 2.0:** A term that is used to denote several different concepts: a) a platform on which innovative technologies have been built and b) a space where users are as important as the content they upload and share with others (Cormode & Krishnamurthy, 2008; Greenhow, Robelia & Hughes, 2009).

- **Wiki:** A collection of web pages designed to enable anyone with access to contribute or modify content with a Web browser and access to the Internet to create collaborative websites and to power community websites (EDUCAUSE, 2005; Jokisalo & Riu, 2009).

Abstract

In most developed countries university students use digital technologies and the Internet in all facets of their daily life. These students represent the first generation to grow up with this new technology and have been given various names that emphasize its affinity and tendency to use digital technology such as digital natives, Net generation and Millennials. Given the lack of empirical support for the notion of a "digital generation", this study presents a different perspective of what these learners think about their use of digital technologies for academic and social purposes and how they feel about the "Digital Native Generation" phenomenon. This study examines this issue in depth to gain an understanding of what the growing use of new digital technologies means for teaching and learning in higher education.

To address the aim of this study, the researcher adopted an interpretivist approach and developed a mixed-method research strategy. The main data collection techniques used in this research study are integrative literature review, online questionnaires and semi-structured interviews. The research was conducted in two main phases. In the first phase, the quantitative data was collected via an online questionnaire. The goal of this phase was to provide a general picture into how first-university students communicate with peers and professors and their general study habits and to examine the possible relationship between students' use of ICTs and communication and study habits. In the second phase, qualitative data was collected via semi-structured interviews with a sample of 40 students who participated in the first phase of the study. The goal of this phase was to delve deeply into students' use of digital technology for academic and social purposes, and to understand interviewees' views on their situations, experiences and lives as expressed in their own words. This study was conducted in the Faculty of Educational Sciences and Psychology at the Rovira i Virgili University (URV) in Tarragona, Spain.

Face-to-face interaction, social networks, personal email, text message and mobile cellphone were the preferred modes of communicating and connecting with others. Results indicate that most students feel comfortable with digital technologies and they see social networks as more about connecting and interacting with friends. Regarding study habits, students prefer to learn by themselves, used to perform various tasks simultaneously. Besides, the results indicate that students now depend on digital technology, specifically

mobile technology, to help fulfill their communication and academic, social, and emotional needs. SNS use has been integrated into student lives (social and academic). Most of students' communication is in groups (Facebook and WhatsApp groups). Most of the students integrate Facebook, as part of the learning process where the students were sharing with their friends' class-related information. The results suggest that the technological knowledge of the students is not what would be expected for representatives of the digital native generation. The range of digital technologies (devices and softwares) used for academic and social purposes is rather limited. In particular, our findings show that the vast majority of students were using different and particular digital technologies in their everyday lives, for their in-university and out-of-university contexts. The findings of this study do not support the claim that there is a substantial gap between more technologically adept younger students and their older classmates. Indeed, both used many of the same technologies in their everyday lives, with computer, mobile phones (WhatsApp), the Internet, e-mail (personal and institutional account) and Facebook; but this should not lead to the conclusion that the new generation of students has developed sophisticated technological abilities.

Publications

Part of the work in this thesis has been published and presented in the publications listed in this section.

Journals

Gallardo Echenique, E. E. (2012). Hablemos de estudiantes digitales y no de nativos digitales. *Universitas Tarraconensis. Revista de Ciències de l'Educació*, 7–21.

Gallardo Echenique, E. E., Marqués Molias, L., & Bullen, M. (2014). Usos académicos y sociales de las tecnologías digitales del estudiante universitario de primer año. *Tendencias Pedagógicas*, (23), 191–204.

Gallardo Echenique, E. E., Marqués-Molias, L., & Bullen, M. (in press). Students in higher education: Social and academic uses of digital technology. *RUSC. Universities and Knowledge Society Journal*.

Conferences

Gallardo Echenique, E. E., Marquès Molias, L., & Bullen, M. (2012). *Uso social de las TIC y prácticas educativas de los estudiantes digitales.* Paper presented at Congreso Internacional EDUTEC 2012: Canarias en tres continentes digitales: educación, TIC y NET-Coaching. Gran Canaria, Spain.

Gallardo Echenique, E. E., Marqués Molias, L., & Gisbert Cervera, M. (2012). *Nativos digitales y competencias digitales: Revisión bibliográfica y algunos comentarios.* Paper presented at III European Conference on Information Technology in Education and Society: A critical insight. Barcelona, Spain.

Gallardo Echenique, E. E. (2013). *Nativos e immigrantes digitales: ¿Mito o realidad?* Communication presented at Aniversario 35/20 de la Facultad de Humanidades, Universidad de Chiapas. Chiapas, Mexico.

Gallardo-Echenique, E. (2013). *An integrative review of literature on the learner in the digital era.* Paper presented at The European Conference on Educational Research (ECER) 2013. Istambul, Turkey.

Gallardo-Echenique, E., Bullen, M., & Marqués-Molías, L. (2013). *How first-year university students communicate in the digital era: a case study.* Poster presented at the VIII International Conference on ICT in education − Challenges 2013. Minho, Portuga.

Gallardo Echenique, E. E., Marqués Molias, L., & Bullen, M. (2013). *Estudiante digital: usos académicos y sociales de las tecnologías en la era digital.* Paper presented at II

Congreso Internacional Multidisciplinar de Recerca Educativa - CIMIE 2013. Tarragona, Spain.

Gallardo-Echenique, E. (2013). *Student communication and study habits of the digital learner.* Paper presented at JURE 2013. Munich, Germany.

Gallardo-Echenique, E., Marqués-Molias, L., Bullen, M., & Strijbos, J.-W. (2013). *Many terms to characterize students in the digital era: Time for a unifying concept.* Paper presented at The European Conference on Educational Research - ECER 2013. Istambul, Turkey.

Gallardo-Echenique, E., Marqués-Molias, L., & Bullen, M. (2013). *How learners use digital technology for academic and social purposes in the digital era.* Poster presented at the 15th Biennal Conference of the European Association for Research in Learning and Instruction (EARLI). Munich, Germany.

Gallardo Echenique, E. E., Marqués Molias, L., & Bullen, M. (2014, June). *The use of social networks by postsecondary learners in a public face-to-face university*. Paper presented at CIDUI 2014: Modelos flexibles de formación: una respuesta a las necesidades actuales. Tarragona, Spain.

Gallardo-Echenique, E. (2014, September). Communication habits and trends of digital learners in Higher Education. *Paper presented at ECER 2014: The Past, Present and Future of Educational Research in Europe*. Porto.

Gallardo-Echenique, E., Bullen, M., & Marqués-Molias, L. (2014, September). An approach to digital learners in a Catalonian public face-to-face university. *Paper presented at ECER 2014: The Past, Present and Future of Educational Research in Europe*. Porto.

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CHAPTER 1

Introduction

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Chapter 1: Introduction

1.1. Introduction

This chapter presents the statement of the problem, aim and research questions; and provides an overview of the thesis structure and a brief synopsis of the content of the chapters, as well as the scope and significance of studying.

1.2. Statement of the Problem

According to Battro and Fischer (2012), education is being transformed by emerging technologies and new approaches to teaching, learning, and pedagogy. In higher education, institutions employ technologies to enhance learning, teaching and assessment activities, for example, use learning management systems (virtual learning environments) and web-based applications to deliver both the curriculum and student support. According to Jorosi and Isaac (2008), there is considerable experimentation with using ICTs in European higher education institutions in general, having a variety of direct effects on teaching and learning in universities, and having an impact on the development of curriculum structures and quality control attitudes and procedures.

In most developed countries, today's students were born into a world of digital technology. However, the same cannot be said for many developing countries where access to digital technologies is much more limited (Acilar, 2011; Hilbert, 2011). The world that young people grow up in prior to their arrival at university is filled with new technology that is integral to the way they live, think, communicate, and the way they work (Jones & Healing, 2010; Simoneaux & Stroud, 2010); and are heavily immersed in social media such as social networking, text messaging, shared photos, podcasts, streaming videos, wikis, blogs, and discussion groups (Bicen & Cavus, 2011). According to Gabriel, Campbell, Wiebe, Macdonald and McAuley (2012), students arrive in colleges with different expectations, skills, and needs than those the traditional education system was designed to teach.

Some authors (Howe & Strauss, 1991, 2000; Oblinger & Oblinger, 2005; Palfrey & Gasser, 2008, Prensky, 2001, 2006, 2007; Tapscott, 1998, 2009) have described the

existence of a new generation of young people born after 1980 who have been profoundly influenced by digital technologies, showing different characteristics when compared to previous generations. There are a number of terms/labels to describe the young people currently studying at school/ college/university such as digital natives, Net generation, Google generation, Millenials and others (see Chapter 2 for more detail) (Helsper, & Eynon, 2010). All of these terms are being used to highlight the significance and importance of digital technologies within the lives of young people (Gallardo-Echenique, Marqués-Molías, Bullen & Strijbos, 2013). The term "digital natives" has been the most prominent in the past decade and this concept hinges on the assumption that this new group of students who entered the universities is essentially different than previous generations because of their constant and frequent use of digital technologies (Prensky, 2001a, 2001b).

Since 2007, a growing body of academic research has questioned the validity of the generational interpretation of the digital native concept (Kennedy, Dalgarno, Gray, Judd, Waycott,; Bennett, Maton & Kervin, 2008; Nicholas, Rowlands & Huntington, 2007;; Helsper, & Eynon, 2010; Rapetti & Cantoni, 2010b; Selwyn, 2010; Bullen, Morgan & Qayyum, 2011; Koutropoulos, 2011; Smith, 2012; Lai & Hong, 2014); and, the lack of empirical support for many of the claims being made. Despite this, the perception of today's learners as being technologically savvy is still a dominant discourse within higher education research and practice (Smith, 2012).

Given the lack of empirical support for the notion of a "digital generation", this study presents a different perspective of what URV learners think about their use of digital technologies for academic and social purposes and how they feel about the "Digital Native Generation" phenomenon. This study examines this issue in depth to gain an understanding of what the growing use of new digital technologies means for teaching and learning in higher education.

1.3. Aim and Research Question

The central aim of the study is to understand how university learners use digital technologies and what are the implications of their use for Higher Education.

The study was guided by the following research questions:

- Do postsecondary students distinguish between their social and educational use of ICTs?

- What impact does students' social use of ICTs have on postsecondary learning environments?

- What is the relationship between social and educational uses of ICTs in postsecondary education?

1.4. Research Approach

The current research is positioned in the interpretive paradigm. To address the aim of this study, the researcher developed a mixed-method research strategy. The main data collection techniques used in this research study are integrative literature review, online questionnaires and semi-structured interviews.

1.5. Scope of the Study

This study was conducted in the degree programs of Pedagogy, Social Education, Early Education and Primary Education of the Faculty of Educational Sciences and Psychology at the Rovira i Virgili University (URV) in Tarragona, Spain.

Study is limited to the perceptions of one group of students in one program attending a public university. The participants were not selected at random. The study relies on the accuracy of student perceptions, does not attempt to validate those perceptions through observation and does not attempt to relate student use of digital technology and achievement or impact on learning. The research context and rationale are described in Chapter Three.

1.6. Significance of Study

In responding to these questions, the research should contribute to knowledge in three ways. First, the study will add to the body of knowledge concerning the new generation of students in higher education, both in terms of concepts, definitions and characteristics. There has been no published systematic investigation (integrative literature review) related to the concept of "digital native" and its affiliates. This systematic literature review

compared with other types of reviews, critiques, and synthesizes representative literature on this topic. Besides, we also propose to unify these concepts under the term "digital learners". Second, this study is framed within the international research project "Digital Learners in Higher Education" (for more information see http://digitallearners.ca) that investigates how postsecondary learners in different institutional contexts and cultures think about technology and how they use it in their social and educational lives. The project has so far collected data from four institutions in Canada and Spain: the British Columbia Institute of Technology (BCIT), the University of Regina, the Open University of Catalonia (UOC) and Rovira i Virgili University. Finally, it will add to the general body of knowledge of students' academic and social uses of digital technologies in higher education that will help educators to understand how technologies should be used and what are the impacts of these technologies on postsecondary learning environments.

1.7. Structure of the Thesis

The following section will provide a description of the structure of the thesis that is structured into six Chapters which are described below:

- **Chapter 1: Introduction**

    This chapter introduces the study and outlines the overall structure of the thesis.

- **Chapter 2: Literature Review**

    This chapter present a review of the related literature. This review includes the fundamental theories and concepts that underpin this study. It also addresses some important conceptual issues and assumptions that underlie the researched phenomenon.

- **Chapter 3: Research Design**

    This chapter describes the theoretical position which frames the qualitative part of the research. It also details the methodology used in the study which included both quantitative and qualitative research tools. The choice of research instruments is explained with reference to the development of the study, and the ethical factors taken into consideration.

- **Chapter 4: Findings I: Student Communication and Study Habits**

  This chapter is the first of two findings chapters and presents the quantitative information along with a statistical description, from the online survey "Student Communication and Study Habits".

- **Chapter 5: Findings II: Semi-structured Interviews**

  This chapter provides a detailed description and analysis of the qualitative data collected in the 40 semi-structured interviews.

- **Chapter 6: Discussion**

  This chapter provides an in-depth discussion on empirical results presented in Chapter Four and Five, in particular through three research questions raised in Chapter Two and research and highlight similarities or differences. It also discusses its theoretical, methodological and practical contributions; address the limitation of the research; and advances suggestions for further research arising out of the study.

1.8. Summary

This Chapter has introduced the aim of the study: "To understand how university learners use digital technologies and what are the implications of their use for Higher Education", guided by the following research questions:

- Do postsecondary students distinguish between their social and educational use of ICTs?

- What impact does students' social use of ICTs have on postsecondary learning environments?

- What is the relationship between social and educational uses of ICTs in postsecondary education?

The next chapter will review relevant literature related to the proposed research study.

CHAPTER 2

Introduction

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Chapter 2: Literature Review

2.1. Introduction

In qualitative research, the purpose of the literature review is to provide a comprehensive understanding of what is known about the research topic (Mertens, 2010). The purpose of the review enable us: (a) to define the limits of the study; (b) to establish the importance of the study; (c) to identify previous research and to avoid unintentional duplication of well-established findings; (d) to introduce relevant terminology and to provide definitions to clarify how terms are being used in the context of the study; (e) to get an understanding of the appropriate research methodology to be used for the study; and (f) knowledge about the recommendations of previous researches listed in the study for further research (Ridley, 2008; Rocco & Plakhotnik, 2009; Strauss & Corbin, 1990). Such work provides us the theoretical starting point and the broad area from which the research questions have emerged.

This Chapter begins providing an overview of the relevant literature pertinent to the main two themes of the study: (a) "digital technology" and an overview of the most common digital technologies in terms of hardware and software, and (b) "new generation of students", their characteristics and related terms. We will first address the conceptual confusion in the literature and elaborate on terms, concepts and characteristics, leading to three distinct perspectives on students in the digital era. Subsequently arguments for our proposed unifying concept "digital learners" are provided. Also, we will describe the procedures that were followed in conducting and organizing the literature review contained in this chapter. The literature review on research paradigms (e.g. interpretivist) is provided in Chapter 3 in order to establish a research framework for this study.

2.2. Digital Technology

We use the term "digital technology" to refer to a wide range of technologies which store and transmit information in digital form and could be hardware-based/device (such as computers, mobile phones and other mobile devices, digital cameras, video and audio players, games consoles, etc.); or software-based (e.g. web applications, blogs, wikis,

Social Networking Sites, computer games, chat sites, etc.) (Abbott, 2007; Hague & Williamson, 2009). To focus on digital technologies, we will summarise the range of tools now in use by young people than would the use of a term such as Information and communications technology (ICT).

The growth in the use of Information and Communication Technologies (ICT), especially the Internet, is having a significant impact on society and on many aspects of daily life by affording a whole range of new possibilities (Jelfs & Richardson, 2012). ICT has entered our lives over a relatively brief period of time and is playing an increasingly important role in the work and personal lives of citizens. ICT use has led to changes in every field of knowledge, providing a range of tools and learning and communicative contexts with huge potential. Our sources of information, the ways we exchange and interact with information, and how information informs and shapes us has also changed.

Internet has had a great impact on almost every communication technology (Walther, Gay & Hancock, 2005). Internet changes the ways that people learn and communicate; allows them to stay in touch with family and friends and, in many cases, extend their social networks; permits easy access to a vast amount of information; enables fast synchronous as well as asynchronous communication; offers a wide array of entertainment prospects, and others possibilities (Bargh & McKenna, 2004; Battro & Fischer, 2012; Jelfs & Richardson, 2012). Internet has made possible new learning contexts, pedagogies, and learning outcomes (Greenhow, Walker & Kim, 2009). The Internet provides an array of tools for people to use for information and for communication: through asynchronous and synchronous forms of communications and/or one-to-one, one-to-many as well as many-to-many communications (December, 1996; Jensen & Helles, 2011).

Web 2.0, a term coined by O'Reilly in 2004, represents the second generation of Internet services and refers to the newest generation of online applications that allow users to create and modify content (Bajt, 2011; Greenhow, Robelia & Hughes, 2009). Web 1.0 is characterised as "read only" and Web 2.0 as "read-and-write" which enables the users to add, share, rate or adjust information (Greenhow, Robelia & Hughes, 2009: Virkus, 2008). Some of the typical features of Web 1.0 are: static and non-interactive web pages; content management systems; portals and taxonomy; meanwhile Web 2.0 is about blogs, wikis,

RSS (Really Simple Syndication), media sharing, social networks, social bookmarking and tagging, and others (Greenhow, Robelia & Hughes, 2009: Virkus, 2008). Table 1 summarizes the most frequently Web 2.0 features.

Table 1. Most Frequently Web 2.0 Features

Feature	Definition
Blog (e.g. Blogger, WordPress)	A blog, or weblog, is just an online diary where entries are commonly written/displayed in reverse chronological order and in addition to text messages, postings can include photos, links, video and audio (Baltaci-Goktalay & Ozdilek, 2010; Virkus, 2008).
Wiki (e.g. Wikipedia)	Wiki is a web site creation and authoring tool that allows a group of people collaboratively to add or edit web site content (Bajt, 2011; Virkus, 2008).
Vlogging (e.g. YouTube)	Vlogging, is a form of blogging for which the medium is video, where many vloggers go to broadcast their opinions, ideas, and commentary (Gao, Tian, Huang & Yang, 2010; Snelson, 2013).
Moblogs	Mobile blog, or moblog, is a form of blog in which the user publishes blog entries directly to the Web from a mobile phone or other mobile device (Gao et al., 2010; Render, 2010). People with camera-enabled smartphones allow people to either e-mail photos and/or videos, or use mobile blogging software to directly publish content to a Web server (Gao et al., 2010).
Microblogging (e.g. Twitter, Yammer)	Microblogging is a "form of blogging allowing users to compose brief text updates and publish them" (Render, 2010, p.58). A post could consist of a sentence, fragment, image or a brief ten second video (Render, 2010). In the case of Twitter, users can post 140-character updates (Junco, Elavsky & Heiberger, 2013).
Mash-up	Mash-up is a website or software tool that combines two or more sources (text, graphics, audio, video, and animation) to create a whole new service displayed in a single graphical interface (Chiang, Huang & Huang, 2009; Render, 2010).
OSS (e.g. Mozilla Firefox, Zotero)	Open source software (OSS) is a development methodology which offers practical accessibility to a product's source (goods and knowledge) to study, change and distribute the software to anyone and for any purpose (Chiang et al., 2009).
P2P (e.g. BitTorrent)	Peer-to-peer (P2P) is a computing or networking distributed application architecture that partitions tasks or workloads among peers rather than on a few dedicated servers for its service (Chiang et al., 2009; Gao et al., 2010).
Podcast	Podcast is a series of digital-media (audio or video) files which are distributed over the Internet using syndication feeds for playback on mobile devices (MP3 players or iPods) and computers (Bajt, 2011; Chiang et al., 2009; Pearce & Scutter, 2010).
RSS (e.g. Great News, Google Reader)	Really Simple Syndication (RSS) is a format (based on XML) for syndicating content such as blog entries, news headlines, and podcasts in a standardized format (Chiang et al., 2009; Virkus, 2008). Users can subscribe to the site's RSS feed and get a notification every time new information is posted to the website (Render, 2010; Virkus, 2008).
Social Networking (e.g.	Social networking sites (SNS) are member-based Internet

Facebook, MySpace)	communities that allow users to post information, to communicate, connect and interact with others on a particular subject (Boyd & Ellison, 2008; Pempek, Yermolayeva & Calvert, 2009). SNS provide users with a variety of resources and services communication tool such as messaging, blogging, sharing photos, audios and videos, group discussion, and others.
Social Bookmarking (Digg, Del.icio.us, CiteULike)	Social bookmarking is a way for Internet users to store, organize, search, and manage bookmarks of web pages on the Internet with the help of meta-data (Baltaci-Goktalay & Ozdilek, 2010; Chiang et al., 2009).
Tag cloud (e.g. Del.icio.us)	Tag cloud (or weighted list in visual design) is a cloudlike illustration representing the most frequent words as visually larger and bolder to describe the content of websites (Chiang et al., 2009; Greenhow et al., 2009.

Note. Also see "Glossary of terms"

In a very short period of time, mobile communication (mobile telephony, tablets, and other hand-held devices) has experienced unprecedented growth in users and technological advances (Bakke, 2010; Wei, 2013). Over the last decade, digital technology, particularly mobile devices such as tablets, e-readers, compact laptops and smart phones, have made knowledge accessible and learning portable. The digital era presents challenges and transformations in education systems (institutions, teachers, students, family), but simultaneously offers new opportunities for teaching, learning and pedagogy (Battro & Fischer, 2012).

The term mobile technology, as used in this study, includes mobile computers (such as laptops), mobile devices (also referred to as hand-held devices) and wireless communication tools. People often think mobile or wireless technologies are the same as mobile wireless technologies however mobile wireless technologies are different from mobile or wireless technologies because not all mobile technologies are wireless nor are all wireless technologies mobile (Al-Fahad, 2009).

For the purpose of the study, mobile communication technology is defined as "devices and services that supported mediated social connectivity while the user is in physical motion" (Campbell, 2013, p. 9). Mobile social media is defined as "software, applications, or services accessed through mobile devices that allow users to connect with other people and to share information, news, and content "(Humphreys, 2013, p. 21). Mobile social media has different kinds of services such as (micro) blogs (e.g. Twitter), social network sites

(e.g. Facebook, Tuenti), wikis (e.g. Wikipedia), video or photo sharing services (e.g. YouTube and Flickr), recommendation services (e.g. Yelp), and location-sharing services (e.g. Foursquare) (Humphreys, 2013).

Mobile devices are the only technologies that can be with us everywhere and at all times giving us immediate and individual access to a wide range of different communication media (Helles, 2013; Özdemir, 2010). Mobile phone is a technology that is widely accessed by a broader group of users provides them with access to communication channels, video and audio technologies, Internet access and text messages (Duncan-Howell & Lee, 2007). Originally intended for voice-based communication, mobile phones now often include text messaging capabilities that facilitate new forms of social interactions (Mahatanankoon & O'Sullivan, 2008). Communication on mobile devices could be in six ways. Table 2 presents an overview of six communication practices of current mobile broadband devices.

Table 2. Communication Practices

Communication	Asynchronous	Synchronous
One-to-one	Short Message Service (SMS), Multimedia Messaging Service (MMS), e-mail	Voice calls/chat, video chat, instant messenger
One-to-many	'Web 1.0' web pages, download repositories, e-books	Broadcast radio and television
Many-to-many	'Web 2.0' sites, wiki, blog, social network services	Online chatrooms, multi-way chat (e.g. on Facebook).

Note. Adapted from "Mobile communication and intermediality", by R. Helles, 2013, p. 17.

Young people's use of technology to communicate with one another is certainly nothing new; however, what has changed is the form that communication takes, for example, text-based technologies are picking up where phones left off (Bryant, Sanders-Jackson & Smallwood, 2006). Nowadays, due to the rise of online communities, communication has shifted away from traditional face-to-face relationships, to a more digital approach to maintaining and establishing relationships (Hoffman, 2008; Moorman & Bowker, 2011) that "is both fostered and mediated by the communicative tool - the computer" (Hoffman, 2008, p. 5).

University students are often forerunners in the adoption of new communication technologies (Quan-Haase, 2007), and most recently, the popularization of online social networking sites (SNS) has changed this landscape even further (Lewis, Kaufman & Christakis, 2008; Junco, 2012a). Since their introduction in the past decade, SNS such as MySpace, Orkut, Facebook, Friendster, Cyworld, and Bebo, have attracted millions of users (Ellison, Steinfield & Lampe, 2007; Boyd & Ellison, 2008; Greenhow & Robelia, 2009; Peluchette & Karl, 2010; Dubrofsky, 2011) and are gaining rapid popularity, especially amongst groups of young people (Littlejohn, Margaryan & Vojt, 2010).

A "social network is a configuration of people connected to one another through interpersonal means, such as friendship, common interests, or ideas" (Coyle & Vaughn, 2008, p. 13). Since their introduction in the past decade, social networking sites (e.g. Facebook, MySpace and others), have attracted millions of users (Boyd & Ellison, 2008; Peluchette & Karl, 2010); have the potential to facilitate interaction, communication, and collaboration (Veletsianos & Navarrete, 2012); and, are increasingly popular, especially amongst groups of young people (Littlejohn, Margaryan & Vojt, 2010). According to Boyd and Ellison (2007, p. 211), "SNS is as web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system". The nature and nomenclature of these connections may vary from site to site (Boyd & Ellison, 2008) and do not all offer the exact same services or have the same focus (Hughes, Rowe, Batey & Lee, 2012).

The use of social network sites is increasing daily and they have become powerful communication platforms (Hilton III & Plummer, 2012). While recent reports (Schwartz, 2011; Kanalley, 2013) have shown a slight drop in the number of users, Facebook is one of the most popular social networking sites (Ross, Orr, Sisic, Arseneault, Simmering & Orr, 2009; Bicen & Cavus, 2011), with more than 727 million daily active users on average (Facebook, 2014). Facebook is popular with all Internet users and is the leading site for college students (Peluchette & Karl, 2010; Junco, 2013) but there are still persistent differences along gender, racial, and socioeconomic lines in technology adoption and use (Junco, 2012a). Twitter, a microblogging service and social networking platform that allows users to post short statements limited to 140 characters (Huberman, Romero & Wu,

2009; Bicen & Cavus, 2012), has more than 40 million users (Twitter, 2014). Twitter users follow others or are followed, and the relationship of following and being followed requires no reciprocation: a user can follow any other user, and the user being followed need not follow back (Kwak, Lee, Park & Moon, 2010).

Socially interactive technologies, such as instant messaging (IM) and text messaging (or short-message-service/SMS), are beginning to redefine the social networks of today's youth by offering fast-paced and inexpensive online communication (Bryant, Sanders-Jackson & Smallwood, 2006). Short Message Service (SMS), one of the world's most popular mobile applications, is a text-messaging cell phone technology where messages can be sent and received instantly in SMS form through a mobile phone, a fixed line phone, and over the Internet (Mahatanankoon & O'Sullivan, 2008). Instant messaging (IM) is one of the most popular applications of the Internet and allows people to have real-time private text-based conversations on the Internet (Boneva, Quinn, Kraut, Kiesler & Shklovski, 2006).

2.3. New Generation of Students: Integrative Literature Review

New and emerging technologies (i.e. digital games, Web 2.0, etc.) offer the potential to transform classrooms into more engaging, collaborative and productive learning environments in which learning can be customized to student's specific needs, interests and learning preferences. Social media and other collaborative online technologies have the potential to redefine the way educators teach as well as the role educators serve – from being the sole source of information to being a guide, facilitator and coach in the learning process.

In the developed world students who have grown up in the digital age are coming to our educational institutions with skills and experiences using a variety of digital technologies. Emerging technologies require new skills and strategies on the part of the students such as online-library search, basic computer skills, inquiry and critical thinking skills, correctly analyze and efficient use of online resources and digital tools. Moreover, schools and universities are increasingly concerned with developing digital literacy and 21st-century skills among all students, for example capacity for creativity, collaborative problem

solving, research, digital information literacy, and citizenship (Greenhow, Walker & Kim, 2009).

In most developed countries students use digital technologies and the Internet in all facets of their daily life (school, work and leisure) (Kolikant, 2010; see also Levin & Arafeh, 2002). Most of these students, who were born roughly between 1980 and 1994 represent the first generations to grow up with this new technology and have been characterized by their familiarity and confidence with respect to ICT. They have spent most of their lives surrounded by digital communication technology. They use the Internet, text messaging, and social networking, but they are using these technologies primarily for social and entertainment purposes. According to Gibbons (2007), they communicate differently (e.g., text messaging and instant message), use a different written language (e.g., text messaging), interact and socialize differently (e.g., via avatars in online games and Facebook), and have a different sense of authorship (e.g., Flickr and personal blogs).

The "digital native" discourse emerged in the early part of this century and has its origins in the work of Tapscott (1998, 2009) and Prensky (2001a, 2001b). Until recently the notion that there is a generation of digital learners with distinct skills and characteristics attributable to the exposure to digital technology had been accepted uncritically by many educators. Despite the considerable attention focused on "digital natives" (Prensky's argument applies to developing countries), remarkably few studies carefully investigated the characteristics of this group. Moreover, the concept emerged from developed world contexts (primarily the US and Canada but also Australia, the United Kingdom, Western Europe and Japan). We know little about how relevant this is in developing world contexts where access to advanced technology is limited (Malhotra, Ahouilihoua, Eshmambetova, Kirungi, et al., 2008).

Most of the studies that were used to support the digital native concept were either methodologically suspect or relied excessively on anecdotal data. Moreover, little empirical evidence had been provided to support claims made about the presumed "digital natives" and their implications for higher education (Bullen, Morgan & Qayyum, 2011a). This changed in 2007 as researchers began to take a more critical look at this issue and a number of methodologically sound studies were published (Kennedy, Dalgarno, Gray, Judd, Waycott, Bennet et al., 2007; Kennedy, Krause, Judd, Churchward & Gray, 2008;

Bennett, Maton & Kervin, 2008; Nicholas, Rowlands & Huntington, 2007; Rapetti & Cantoni, 2010b; Bullen, Morgan & Qayyum, 2011a; Lai & Hong, 2014). Despite this, the concept of the digital native remains ambiguous and ill-defined.

Method

To address the research aim an integrative literature review was performed. Compared with other types of reviews, this method "reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated" (Torraco, 2005, p. 356). To Hamilton & Torraco (2013, p. 311), "this methodology is particularly appropriate when existing research is scattered across disparate areas and has not been systematically analysed and integrated". There is a misconception with respect to literature reviews that integrative literature reviews are less rigorous or easier to write than other types of research articles (for example quantitative meta-analyses). On the contrary, the integrative literature review "is a sophisticated form of research that requires a great deal of research skill and insight" (Torraco, 2005, p. 356). This is consistent with the aim of the study to examine the literature as a way of providing researchers and educators with new ways of thinking about this topic (Hamilton & Torraco, 2013).

The review used inclusion and exclusion criteria to focus on the problem. The inclusion criteria were: (a) empirical and research-based publications; (b) qualitative, quantitative, and mixed research studies; (c) specialized textbooks and peer-reviewed journal articles; (d) only full-text articles; (e) reports commissioned by international organizations; (f); literature reviews (including unpublished/grey literature: government reports, policy statements, conference proceedings, theses, dissertations, and research reports); (g) English language only; and (h) published between January 1991 and December 2013. It must be highlighted that that the author selected 1991 as the starting point, as the first term to refer to students in the digital era was proposed by Howe and Strauss in 1991. The exclusion criteria were: (a) no access to full-text articles; (b) opinion and working papers; (c) best practice reports; and (d) articles that did not focus on the aim of this study.

Using Torraco's (2005) framework as a guide, the first step was the selection of relevant literature. The review spanned a wide range of empirical and theoretical research-based

articles, books, journals, reports and grey literature (e.g., conference website and published proceedings) in an electronic search using various databases. Online electronic databases such ISI Web of Knowledge, ERIC, Social Sciences Citation Index®, ScienceDirect, SAGE Publications, Wiley Online Library, Taylor & Francis Online, Emerald Group Publishing, UNESDOC Database and Google Scholar, were systematically searched using the combination of following keywords: digital natives, generation Net, Millennials and Generation Y. During the search, if a new term or conceptually similar word appears, it was added to the list.

To conduct the most comprehensive search, reference lists of searched articles were examined for articles that may not have been found by electronic databases. By setting up alert notifications using the keywords on the aforementioned databases, the researcher identified newly published articles. An online thesaurus (found at some electronic databases) was a helpful tool to consult because provides a selection of related, narrower, or broader terms for the topic. To facilitate the access to and recovery of information, all the documents were organized using reference management software such as Mendeley that was a great organization tool for keeping track of which articles need to be read and which are most important. The choice of this software was grounded because Mendeley (2013) is a free reference manager and academic social network that help the researcher organize the research, collaborate with others online, and discover the latest research.

The search strategy identified 2500 publications potentially relevant sources of evidence. Consequently, a staged review - an initial review of abstracts, then an in-depth review (Torraco, 2005) - was employed to review the 2500 publications and identify relevant articles. Titles and abstracts of the papers scrutinised independently by two reviewers. Publications were screened for purposeful, representative and relevant validity criteria (Torraco, 2005; Yorks, 2008; Rocco & Plakhotnik, 2009). Following this process, 355 met the inclusion criteria, corresponded to the aim of this review, and were analysed.

To provide knowledge and understanding of the phenomenon under study, thematic analysis - clustering texts into themes and combinations of categories - was employed to analyse the semi-structured interviews as outlined by Braun and Clarke (2006). Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data

that minimally organizes and describes the data set in (rich) detail (Braun & Clarke, 2006; Cohen, Manion, & Morrison, 2007; Guest, MacQueen & Namey, 2012; Vaismoradi, Turunen & Bondas, 2013). Thematic analysis "move beyond counting explicit words or phrases and focus on identifying and describing both implicit and explicit ideas within the data, that is, themes" (Guest, MacQueen, & Namey, 2012, p. 10).

The themes emerged through several readings and a theoretical or deductive ("top down" way) process of condensing identified key concepts into major categories by determining the main contribution of the literature source to what is known about new generations of students. In the final stage of the review, the literature was further sorted into major categories by determining the main contribution of each publication in relation to what is known about students in the digital era. The publications were categorized along the three views suggested by Rapetti (2012) – enthusiast, concerned ones, and critic (see Table 3 for a detailed description) – to understand how authors perceive and define learners' use of ICT. Additionally, the publications were categorized along (a) country of origin, (b) design of study, and (c) source. Finally, the researcher reviewed each article in each category multiple times to identify information that could be compared, contrasted, discussed, critiqued and synthesized.

Table 3. Three Different Views to Understand How Authors and Scholars Perceive and Define Learners Using ICT

View	Description
Enthusiasts	These authors are firmly convinced that digital technologies contribute a specific set of skills to learners. Three approaches can be distinguished: a) The historic-sociological approach, which stresses the differences between the current generation and the previous one(s) (e.g., Howe & Strauss, 1991); b) The psycho-cognitive approach, which claims that everyday use of ICTs has changed the cognitive abilities of young people (e.g., Prensky, 2001); c) The socio-pedagogical approach, which demands – based on the paradox "everywhere ICTs, except at schools" – a reform/revolution in school and university systems (e.g., Oblinger & Oblinger, 2005).
Concerned ones	These authors accept the idea of a digitalized generation of learners, but focus on the potential dangerous effects, such as violence, dumbness, harassment, addiction, etc. (e.g., Bauerlein, 2008).
Critics	These authors question the idea of characterizing the set of skills of the younger generation simply as a function of ICTs' use, criticize overgeneralizations, and request more in-depth studies and localized analyses (e.g., Bullen et al., 2009).

Note. Adapted from "LoDE: Learners of Digital Era", by E. Rapetti, 2012, p. 144.

Trustworthiness

The researcher tried to design research which is auditable i.e. transparent and assuming the possibility of replication; if another researcher can clearly follow the decision trail used by the researcher in the study, then the results should be the same over time and over instruments (Koch, 2006; Cohen et al., 2007). Audit procedure (also known as audit trails) was conducted to ascertain if the study meet the criterion of reliability. According to Akkerman, Admiraal, Brekelmans and Oost (2008), this procedure is "the most developed and useful tool for maintaining and evaluating the quality of research that involves complex analyses" (p. 261). According to Koch (2006) the audit trail concept is based on the idea of the fiscal audit which requires the auditor to authenticate the accounts of a business excluding the possibility of error or fraud. All phases of this study were subject to scrutiny by an external auditor who is experienced in qualitative research methods (Creswell, 2003). Audit trails document the course of development of the completed analysis. Table 4 provides an account of all research decisions and activities throughout the study.

Table 4. Stages of the Audit Procedure

Stage	Description
Orientation to the audit procedure	Both the researcher (the auditee) and the evaluator of the quality of the study (the auditor) negotiate and agree upon goals, roles and rules of the audit.
Orientation to the study	The researcher arranged a meeting and explained the audit trail to the evaluator to become familiar with the study. The evaluator looked in detail in all the materials provided in the audit trail.
Determination of the auditability of the study	The evaluator determined the completeness, comprehensibility and utility of the audit trail. Both the researcher and the evaluator discussed the auditability.
Negotiation of the contract	The researcher and the evaluator established timeline, determined goals, specified roles, arranged logistics, determined outcomes and format, and identified renegotiation criteria.
Assessment	Based on the audit trail, the evaluator assessed the research process in terms of the specific quality criteria.
Renegotiation	The evaluator presented findings. The researcher assessed the accuracy of the evaluator claims and adherence to the agreement.
Final auditor report	The evaluator wrote a substantiated assessment on the trustworthiness of the study.

Note. Adapted from "Auditing quality of research in social sciences", by Akkerman et al., 2008, p. 263.

According to Miles and Huberman (1994), validating themes in the early and late stages of data analysis is essential. For that reason, the researcher asked several senior researchers

and experts from Commonwealth of Learning (Canada), Rovira i Virigili University of Tarragona (Spain) and Ludwig Maximilian University of Munich (Germany) to conduct a thorough review of the study and report back; to generate peer support, and to find better connections between categories in progress (Creswell, 2003; Saldaña, 2009).

Many Terms to Characterize Learners in the Digital Era

The literature review revealed 47 terms related to the notion of this supposedly "new generation" of students in the digital era with a high affinity and tendency to use digital technology, of which the term "digital natives" has been the most prominent in the past decade. Whatever the terminology, the argument that students who nowadays enter higher education have been exposed to a wide range of digital technologies which did not previously exist is accurate (Brown & Czerniewicz, 2010). To Jones, Ramanau, Cross and Healing (2010) these terms are used interchangeably. According to the literature, the three most common terms in circulation are: digital natives, Net generation and Millennials (Jones & Czerniewicz, 2010; Jones et al., 2010), which will be explained in more detail. Table 5 provides an overview of the wide variety of concepts/terms derived from the literature review used to describe these students. Additionally, we emphasize that the organization of articles in chronological order allows for knowledge about the historical evolution of the phenomenon or problem studied (Torraco, 2005).

The term "Net Generation" (also called Net Gen) was originally coined by Tapscott (Tapscott, 1998) and includes those born between 1977 and 1997 (Tapscott, 2009). According to Tapscott (2009), the defining characteristic of this generation is that they were the first to be "growing up digital" (p. 2) and "the first generation to be bathed in bits" (Tapscott, 2009, p. 17). The general claim, made in the Net Generation discourse, is around young people developing a natural aptitude and high skill levels in relation to new technologies for formal and informal learning purposes (Jones, 2010b; Jones & Czerniewicz, 2010; Rapetti & Cantoni, 2010b). According to Rapetti and Cantoni (2012), this concept focuses the attention on the main supposed difference of this "new" generation, that is, the frequency and the ability in using internet for formal and informal learning purposes.

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Table 5. Terms Used to Characterize Students in the Digital Era

Term	Reference	View	Design	Source	Country	Year
Generation Y	Howe & Strauss*	Enthusiast	Theoretical	Book	USA	1991
	Lancaster & Stillman	Enthusiast	Empirical	Book	USA	2002
	Jorgensen	Critic	Theoretical	Journal	Australia	2003
	Oblinger & Oblinger	Enthusiast	Theoretical	Journal	USA	2005
	Weiler	Critic	Theoretical	Journal	USA	2005
	Cantoni & Tardini	Critic	Theoretical	Journal	Switzerland	2010
	Djamasbi et al.	Enthusiast	Empirical	Journal	USA	2010
Millennials	Howe & Strauss*	Enthusiast	Theoretical	Book	USA	1991
	Howe & Strauss	Enthusiast	Theoretical	Book	USA	2000
	Lancaster & Stillman	Enthusiast	Empirical	Book	USA	2002
	Martin & Tulgan	Enthusiast	Theoretical	Book	USA	2002
	Coomes & DeBard	Concerned	Theoretical	Journal	USA	2004
	McMahon & Pospisil	Enthusiast	Empirical	Conference	Australia	2005
	Oblinger & Oblinger	Enthusiast	Theoretical	Journal	USA	2005
	Downing	Enthusiast	Theoretical	Journal	USA	2006
	Simoneaux & Stroud	Enthusiast	Empirical	Journal	USA	2010
	Taylor & Keeter	Enthusiast	Empirical	Report	USA	2010
	Bajt	Enthusiast	Theoretical	Journal	USA	2011
	DiLullo, McGee & Kriebel	Critic	Empirical	Journal	USA	2011
	Koeller	Enthusiast	Theoretical	Journal	USA	2012
Net-agers	Howe & Strauss	Enthusiast	Theoretical	Book	USA	1991
Next Great Generation	Howe & Strauss	Enthusiast	Theoretical	Book	USA	1991
Nintendo generation	Soloway*	Enthusiast	Theoretical	Journal	USA	1991
	Green, Reid, & Bigum	Critic	Empirical	Book chapter	Australia	1998
	Guzdial & Soloway	Enthusiast	Empirical	Journal	USA	2002
Grasshopper minds	Papert*	Enthusiast	Theoretical	Book	USA	1993
Clickerati	Harel*	Enthusiast	Theoretical	Journal	USA	1997

Digital generation	Tapscott	Enthusiast	Empirical	Book	USA	1998
Net Generation	Tapscott*	Enthusiast	Empirical	Book	USA	1998
	Cameron	Critic	Empirical	Conference	Australia	2005
	Oblinger & Oblinger	Enthusiast	Theoretical	Journal	USA	2005
	Kennedy et al.	Critic	Empirical	Conference	Australia	2007
	Guitert et al.	Critic	Theoretical	Conference	Spain	2008
	Kennedy et al.	Critic	Empirical	Book	Australia	2009
	Tapscott	Enthusiast	Empirical	Book	USA	2009
	Hosein, Ramanau & Jones	Critic	Empirical	Journal	UK	2010
	Hosein, Ramanau & Jones	Critic	Empirical	Conference	UK	2010
	Jones & Czerniewicz	Critic	Theoretical	Journal	UK/South Africa	2010
	Jones	Critic	Theoretical	Conference	UK	2010
	Jones et al.	Critic	Empirical	Journal	UK	2010
	Ramanau, Hosein & Jones	Critic	Empirical	Conference	UK	2010
	Schulmeister	Critic	Theoretical	Journal	Germany	2010
	Sánchez et al.	Critic	Empirical	Journal	Chile	2011
	Gros, García & Escofet	Critic	Empirical	Journal	Spain	2012
	Romero et al.	Critic	Empirical	Journal	Spain	2013
	Lai & Hong	Critic	Empirical	Journal	New Zeland	2014
Boomer babies	Howe & Strauss	Enthusiast	Theoretical	Book	USA	2000
Boomlets	Howe & Strauss	Enthusiast	Theoretical	Book	USA	2000
Digital Learners	Brown*	Enthusiast	Theoretical	Journal	USA	2000
	Bullen et al.	Critic	Empirical	Journal	Canada	2008
	Qayyum et al.	Critic	Empirical	Journal	Canada	2008
	Bullen et al.	Critic	Empirical	Journal	Canada	2009
	Cantoni & Tardini	Critic	Theoretical	Journal	Switzerland	2010
	Bullen & Morgan	Critic	Empirical	Journal	Canada	2011
	Bullen, Morgan & Qayyum	Critic	Empirical	Journal	Canada	2011

	Romero et al.	Critic	Empirical	Journal	Spain	2012
	Morgan & Bullen	Critic	Empirical	Journal	Canada	2013
	Romero et al.	Critic	Empirical	Journal	Spain	2013
Gen.com	Howe & Strauss	Enthusiast	Theoretical	Book	USA	2000
Generation Next	Howe & Strauss	Enthusiast	Theoretical	Book	USA	2000
	Tapscott	Enthusiast	Empirical	Book	USA	2009
Generation Tech	Howe & Strauss	Enthusiast	Theoretical	Book	USA	2000
Generation Why	Howe & Strauss	Enthusiast	Theoretical	Book	USA	2000
Generation XX	Howe & Strauss	Enthusiast	Theoretical	Book	USA	2000
Generation 2000	Howe & Strauss	Enthusiast	Theoretical	Book	USA	2000
Nexters	Zemke, Raines & Filipczak	Concerned	Theoretical	Book	USA	2000
Cyberkid	Holloway & Valentine*	Concerned	Theoretical	Book	UK	2001
	Valentine & Holloway	Concerned	Empirical	Journal	UK	2002
	Holloway & Valentine	Concerned	Theoretical	Book	UK	2003
	Holmes	Critic	Empirical	Journal	UK	2011
Digital natives and digital immigrants	Prensky*	Enthusiast	Theoretical	Journal	USA	2001
	Carlson	Concerned	Empirical	Journal	USA	2005
	Gaston	Enthusiast	Empirical	Journal	USA	2006
	Prensky	Enthusiast	Theoretical	Journal	USA	2006
	Prensky	Enthusiast	Theoretical	Report	USA	2007
	Bennett, Maton & Kervin	Critic	Theoretical	Journal	Australia	2008
	Kennedy et al.	Critic	Empirical	Conference	Australia	2008
	Kennedy et al.	Critic	Empirical	Journal	Australia	2008
	Palfrey & Gasser	Enthusiast	Empirical	Journal	USA	2008
	Maclean & Elwood	Critic	Empirical	Book Chapter	Japan	2009
	Bennett & Maton	Critic	Theoretical	Journal	Australia	2010
	Brown & Czerniewicz	Critic	Empirical	Journal	South Africa	2010
	Czerniewicz & Brown	Critic	Empirical	Conference	South Africa	2010
	Helsper & Eynon	Critic	Theoretical	Journal	UK	2010

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	Kennedy et al.	Critic	Theoretical	Journal	Australia	2010
	Kolikant	Critic	Empirical	Journal	Israel	2010
	Li & Ranieri	Critic	Empirical	Journal	China	2010
	Prensky	Enthusiast	Theoretical	Book	USA	2010
	Selwyn	Critic	Theoretical	Journal	UK	2010
	Thinyane	Critic	Empirical	Journal	South Africa	2010
	Koutropoulos	Critic	Theoretical	Journal	USA	2011
	Margaryan, Littlejohn & Vojt	Critic	Empirical	Journal	UK	2011
	Thomas	Critic	Empirical	Book	Australia	2011
	Smith	Critic	Theoretical	Journal	Canada	2012
	Lai & Hong	Critic	Empirical	Journal	New Zeland	2014
Instant-Message generation	Lenhart, Rainie & Lewis	Enthusiast	Empirical	Report	USA	2001
Generation mix (Gen Mixers)	Martin & Tulgan	Enthusiast	Theoretical	Book	USA	2002
	Martin & Tulgan	Enthusiast	Theoretical	Book	USA	2006
Internet-savvy students	Levin & Arafeh	Enthusiast	Empirical	Report	USA	2002
MTV generation	Guzdial & Soloway	Enthusiast	Empirical	Journal	USA	2002
Homo zappiens	Veen*	Enthusiast	Theoretical	Journal	Netherlands	2003
	Veen & Vrakking	Enthusiast	Theoretical	Book	Netherlands	2006
	Veen	Enthusiast	Theoretical	Conference	Netherlands	2007
Gamer generation	Carstens & Beck	Enthusiast	Empirical	Journal	USA	2005
Generation M (media)	Roberts, Foehr & Rideout*	Enthusiast	Empirical	Report	USA	2005
	Rideout, Foehr & Roberts	Enthusiast	Empirical	Report	USA	2010
Generation Me	Twenge*	Concerned	Theoretical	Book	USA	2006
	Twenge	Concerned	Theoretical	Journal	USA	2009
	Tapscott	Enthusiast	Empirical	Book	USA	2009
New millennial learners	Pedró*	Critic	Empirical	Report	France	2006
	Pedro	Critic	Empirical	Conference	Belgium	2009
Clicking replaces thinking	Brabazon*	Concerned	Theoretical	Book	Australia	2007
Generation C	Duncan-Howell & Lee*	Enthusiast	Theoretical	Conference	Australia	2007

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Google generation	Nicholas, Rowlands & Huntington*	Critics	Empirical	Report	UK	2007
	Rowlands et al.	Critics	Empirical	Conference	UK	2008
MySpace generation	Rosen	Concerned	Empirical	Book	USA	2007
Born digital	Palfrey & Gasser*	Enthusiast	Empirical	Book	USA	2008
Digital settlers	Weinberger*	Critics	Theoretical	Journal	USA	2008
	Palfrey & Gasser	Enthusiast	Empirical	Book	USA	2008
Dumbest generation	Bauerlein	Concerned	Empirical	Book	USA	2008
Facebook generation	Kitsis*	Enthusiast	Empirical	Journal	USA	2008
Digital melting pot	Stoerger*	Critic	Theoretical	Journal	USA	2009
Digital wisdom	Prensky*	Enthusiast	Theoretical	Book chapter	USA	2009
	Skiba	Enthusiast	Theoretical	Journal	USA	2010
	Prensky	Enthusiast			USA	2011
Visitors and Residents	White* & Le Cornu	Critic	Empirical	Journal	USA	2011
	Connaway, White & Lanclos	Critic	Empirical	Journal	USA	2011
Digitizen	Brown & Czerniewicz*	Critic	Empirical	Journal	South Africa	2010
e-generation	Liu	Critic	Empirical	Journal	China/Norway	2010
i-Generation	Rosen, Carrier & Cheever*	Concerned	Empirical	Book	USA	2010
Learners of Digital Era	Rapetti & Cantoni*	Critic	Empirical	Conference	Switzerland	2010
	Rapetti	Critic	Empirical	Thesis	Switzerland	2012
	Rapetti & Cantoni	Critic	Empirical	Conference	Switzerland	2013
Digital nerds and digital normal	Thirunarayanan et al.*	Critic	Empirical	Journal	USA	2011
App Generation	Gardner & Davis	Concerned	Empirical	Book	USA	2013

Note: Personal compilation, *who coined the term

The term "Digital Native" was coined by Prensky (2001a, 2001b), but "Prensky is not specific about the dates that define this new generation" (Jones & Czerniewicz, 2010, p. 317). Prensky uses the terms "digital native" and "digital immigrant" to distinguish between those who were not born into the digital world (Prensky, 2001a) and those who have grown up familiar with multiple technologies, but Prensky is using generational categorisation (students born roughly between 1980 and 1994) to over-determine student characteristics and relations to technology. Prensky's main point is that this new group of students who entered the universities is essentially different than previous generations because of their constant and frequent use of digital technologies. According to Prensky, today's students are all "native speakers" of the digital language of computers, video games and the Internet (Prensky, 2001a). These students, like all "natives", adapt quickly to changes in their environment and look for new ways to incorporate the latest technology into their fast-paced lives. They use these tools as extensions of their bodies and minds, fluidly incorporating them into their daily routines (Prensky, 2006). Prensky (2004) discusses the emerging online life of the digital natives that "has become an entire strategy for how to live, survive and thrive in the 21st century, where cyberspace is a part of everyday life" (p. 2). Rather than calling "digital natives" a generation, Palfrey and Gasser (2008) prefer to think of them as a population, i.e. a social group with common characteristics. Like Prensky, Palfrey and Gasser (2008) use the term "digital native" to describe advanced users of technology who were born after 1980. Digital immigrants—as opposed to digital natives—are not people who were born digital and/or live a digital life in any substantial way, but rather people who are finding their way in a digital world. Palfrey and Gasser concede that there is a huge digital divide – between those with access to digital technology and those without access – which makes it difficult to define a generation of young people by their immersion into digital technologies and innate skills for using them.

Millennial generation, also known as Generation Y, is the largest generation since the baby boom generation (Howe and Strauss, 2000; Coomes & DeBard, 2004; Norum, 2008). Howe and Strauss (2000) refer to Millennials (students born after 1980 to 2000), as the first generation to grow up surrounded by digital media, and much of their activity involving peer-to-peer communication and knowledge management is mediated by these technologies. Oblinger and Oblinger (2005) date the Millenials from those born between

the years 1982-1991. They are "the largest, healthiest, and most cared-for generation in American history" (Howe and Strauss, 2000: 76). Millennials are characterized as special, sheltered, confident, conventional, team-oriented, achieving and pressured (Howe & Strauss, 2000). According to Djamasbi, Siegel and Tullis (2010), Millennials are a "very large and economically powerful generation" (p. 307) and "is one of the first generations to have technology and the Internet from a very early age – they are significantly more likely than older internet users to create blogs, download music, instant message, and play online games" (p. 309). Millennials have been defined by Carlson (2005) as smart but impatient, expecting immediate results, and they expect to be able to choose what kind of education they buy, and what, where, and how they learn. To Pedró (2006), they are thought to be adept with computers, creative with technology and, above all, highly skilled at multitasking in a world where ubiquitous connections are taken for granted. Millennials are described as having a focus on social interaction and "connectedness", via instant messenger, cellular conversations or text messaging, with friends, family and colleagues, and preferring group-based approaches to study and social activities (McMahon & Pospisil, 2005; Pedró, 2006). According to Weiler (2005) members of this generation are currently on college campuses and have grown up in front of electronic screens: television, movies, video games, computer monitors.

Each "enthusiast" author (from the above Table 6) has proposed his/her own list of the characteristics they believe define the new student generation in higher education. Table 6 summarize the major claims (characterizations/definitions) made about the "digital native" discourse.

Table 6. Key Claims about "Digital Native" Discourse

Key claim	Author
Want to get along by being team-oriented and desire to cooperate and be perceived as being cooperative.	Downing, 2006; Howe & Strauss, 1991; 2000; Lancaster & Stillman, 2002; Martin & Tulgan, 2002, 2006; Oblinger, 2003; Oblinger & Hawkins, 2005; Oblinger & Oblinger, 2005; Prensky, 2010; Tapscott, 1998; 2009
Marked ability to multitask with a variety of digital technologies.	Frand, 2000; Lancaster & Stillman, 2002; Gaston, 2006; Oblinger, 2003; Oblinger & Hawkins, 2005; Prensky, 2001b; Rosen, 2010; Simoneaux & Stroud, 2010; Tapscott, 1998; 2009; Zemke, Raines & Filipczak, 2000

Need to acknowledge and to drive a digital revolution transforming society. Need to think in terms of transforming the educational experience.	Frand, 2000; Howe & Strauss, 1991; 2000; Oblinger, 2003; Oblinger & Hawkins, 2005; Oblinger & Oblinger, 2005; Prensky, 2001a; Tapscott, 1998; 2009
Seen as innately or inherently tech-savvy as opposed to older generations.	Oblinger, 2003; Oblinger & Hawkins, 2005; Oblinger & Oblinger, 2005; Prensky, 2010; Tapscott, 1998; 2009
Need for achievement and detailed instructions/guidelines for assignments.	DeBard, 2004; Howe & Strauss, 2000; Martin & Tulgan, 2002, 2006
Possess new learning styles or different ways of knowing and being.	Brown, 2000; Frand, 2000; Howe & Strauss, 1991; 2000; Oblinger, 2003; Oblinger & Hawkins, 2005; Oblinger & Oblinger, 2005; Prensky, 2001a
Need for constant connectivity; being in touch with friends and family at any time and from any place.	Frand 2000; Oblinger & Oblinger, 2005; Prensky, 2001b, 2006; Rosen, 2010
Purported as native speakers of computers, video games and the Internet.	Brown, 2002; Prensky, 2001a; Prensky, 2010
Preference for online/offline games and interactive simulations to serious work.	Downing, 2006; Frand, 2000; Oblinger, 2003; Prensky, 2001a; Tapscott, 1998; 2009
Marked preference for image over text based content.	Prensky, 2001a , 2001b; Tapscott, 2009
Confident in the knowledge that they have in their use of technologies. Optimistic about their future.	Downing, 2006; Howe & Strauss, 2000; Martin & Tulgan, 2002, 2006; Taylor & Keeter, 2010

Beyond Digital Natives' Arguments

The concept of "digital natives" hinges on the assumption that students born roughly between 1980 and 1994 are proficient users of digital communication technologies because they have grown up in an age when computers, mobile phones and the Internet are part of mainstream culture and society. Other authors (Corrin, Lockyer & Bennett, 2010; Helsper & Eynon, 2010; Kennedy, Judd, Dalgarnot & Waycott, 2010; Bullen & Morgan, 2011; Thirunarayanan, Lezcano, McKee & Roque, 2011) have argued that this new generation of learners who are entering the higher education system have grown up in a technologically enhanced environment that has fundamentally influenced their preferences and skills in a number of key areas related to education.

As mentioned earlier, until recently this view had been accepted rather uncritically by many educators and used to justify educational decisions. Such generalizations do not sit comfortably with many researchers (Kennedy et al., 2008; Bennett et al., 2008; Nicholas et al., 2007; Corrin, Lockyer & Bennett, 2010; Helsper & Eynon, 2010; Kennedy et al., 2010; Bullen, Morgan & Qayyum, 2011a; Bullen & Morgan, 2011; Thirunarayanan et al., 2011).

> The untested assumption is that this generation is somehow qualitatively 'different' from what went before: that they have different aptitudes, attitudes, expectations and even different communication and information 'literacies'… (Nicholas et al., 2007, p. 5)

There is a growing body of academic research that questions the validity of the generational assumption included in the digital native concept: "Contrary to the argument put forward by proponents of the digital native concept, generation alone does not adequately define if someone is a digital native or not" (Helsper & Eynon, 2010, p. 515). Research conducted in Switzerland concludes that it is unrealistic to attribute behaviors and characteristics simplistically basing them on generational "virtues" (Rapetti & Cantoni, 2010a). Through the analysis of a nationally representative survey in UK, Helsper and Eynon (2010) conclude that their analysis does not support the view that there are unbridgeable differences between those who can be classified as digital natives or digital immigrants based on when they were born. A research project run at the Open campus of the University of the West Indies concludes that the quantitative and qualitative data do not reveal the expected enthusiastic appreciation. Their results evidence that "the age factor has a discrete impact on certain aspects (e.g., the familiarity with the new digital devices), but cannot be considered as the variable explaining how current learners face ICTs" (Rapetti & Marshall, 2010, p. 78). A research project of South African higher education students' access to and use of ICTs, showed that age is not a determining factor in students' digital lives (Brown & Czerniewicz, 2010). Brown and Czerniewicz (2010) demonstrated that being a "digital native" was not about age but about experience, access and opportunity (Brown & Czerniewicz, 2010; Czerniewicz & Brown, 2010); that the term was inaccurate and could only be applied to a small and elite group of students (Brown & Czerniewicz, 2009; Czerniewicz & Brown, 2010).

To Kennedy et al. (2008), arguments about digital natives also warrant closer examination: "These arguments are predicated on a general assumption that students coming into universities have had a comparatively universal and uniform digital upbringing" (p. 109). Their study highlights the lack of homogeneity in the incoming first year Australian university students' population with regards to technology. They found that undergraduates were highly proficient at using digital technologies, but when one moved beyond

entrenched technologies and tools (e.g., computers, mobile phones, email), "the proficiency and confidence in a range of other technologies that are commonly used in schools show considerable variation" (Kennedy et al., 2008, p. 117).

Despite perpetuating the digital native rhetoric in their book, "Born digital: Understanding the first generation of digital natives", Palfrey and colleagues consider digital native an "awkward term" (Palfrey, Gasser, Simun, & Barnes, 2009), however, they embrace it "because of its cultural resonance with the parents, teachers, and policymakers" (Palfrey et al., 2009, p. 83). Brown and Czerniewicz (2010) find the concept of the "digital native" especially problematic, both empirically and conceptually, and likely to be offensive as a term. This term sets up a binary opposition between those who are "natives" and those who are not, the so-called "digital immigrants", and "this polarization makes the concept less flexible and more determinist in that it implies that if a person falls into one category, they cannot exhibit characteristics of the other category" (Brown & Czerniewicz, 2010, p. 357).

Salajan, Schönwetter and Cleghorn (2010) who analyzed the digital native–digital immigrant dichotomy based on the results of a small-scale study conducted at the University of Toronto, conclude that this duality is somewhat problematic, arbitrary and misleading. Their results suggest that there are age-related differences in how the so-called digital natives and digital immigrants interface with digital technologies, but these differences are minimal, with no universal applicability (Salajan et al., 2010). In addition, Prensky who coined the term "digital natives and digital immigrants", has even suggested this distinction may no longer be relevant and now talks instead about digital wisdom and highlights the necessity of cultivating digital wisdom (Prensky, 2009; 2012) for the profit of enhancing natural human intellectual capacities through digital technology. In his defence, Prensky (2011, p. 29) mentions that many people have been interpreting "very literally – rather than *metaphorically* – what a 'Digital Native' was".

> Digital wisdom is a twofold concept, referring both to wisdom arising from the use of digital technology to access cognitive power beyond our innate capacity and to wisdom in the prudent use of technology to enhance our capabilities (Prensky, 2009, p. 1).

A research project conducted by the University College London (UCL) commissioned by the Joint Information Systems Committee (JISC) and the British Library to investigate how the Google generation searches for information, revealed considerable research evidence

that learners' ICT skills are less advanced than educators tend to think (Nicholas et al., 2007) and that the characterization of young people as 'digital natives' hides many contradictions in their experiences (Luckin, Clark, Logan, Graber, Oliver & Mee, 2009; Littlejohn & Margaryan, 2010; Littlejohn, Beetham & McGill, 2012).

In the literature students are sometimes assumed to feel empowered with respect to learning because of their familiarity with and access to ICT (Kolikant, 2010). This topic has generated controversy in the literature. On the one hand, some argue that "digital natives" are sophisticated users of the new technologies who critically analyse the information they access online (Frand, 2000; Levin & Arafeh, 2002; Gaston, 2006). According to Virkus (2008) these new students are: better at taking in information, making decisions quickly, multi-tasking, parallel processing and thinking graphically rather than textually; assume connectivity and see the world through the lens of games and play; have a diversity of experiences and needs, and they are expecting instant responses and feedback; and, are goal and achievement oriented. On the other hand, most of the academic research on this topic (Kennedy et al., 2008; Bennett et al., 2008; Brown & Czerniewicz, 2010, Li & Ranieri, 2010) shows that "digital natives", in fact, appear to have a superficial understanding of the new technologies, use the new technologies for very limited and specific purposes, and have superficial information-seeking and analysis skills. In recent years, empirical research into Net Generation students' use of, and preferences for, technologies in higher education revealed "that while most students regularly use established technologies such as email and Web searching, only a small subset of students use more advanced or newer tools and technologies" (Kennedy et al., 2010, p. 333).

A more extensive empirical study (Kennedy et al. 2007; Kennedy et al. 2008), conducted in 2006 with more than 2,000 incoming first year Australian university students, has compared digital natives and immigrants with regard to technology use. The study examined what tools were used and how frequently. This research showed there is no fundamental difference between digital natives and immigrants and suggested that the digital native characteristics can be found only among a minority of students. A study among first-year students across seven faculties of an Australian university, has demonstrated that there is enough diversity in ability, access and use of technology by the students to suggest that a technological homogenous group of students cannot be assumed (Corrin, Lockyer & Bennett, 2010). A meta-analysis of learners' experiences of e-learning

by Sharpe (2010) confirmed that we should not make assumptions about learners' digital competencies and literacies when they enter higher education.

A study relating to the activities and perceptions of learning with Web 2.0 technologies of students aged between 11 and 16 years in 27 UK secondary schools confirms that these learners had high levels of access to Web 2.0 technologies and that Web 2.0 activities were prolific (Luckin, et al., 2009). In a more recent study conducted in two UK universities, Margaryan, Littlejohn and Vojt (2011, p. 439) suggest that "decisions surrounding the use of technologies for learning should not only be based around students' preferences and current practices, but on a deep understanding of what the educational value of these technologies is and how they improve the process and the outcomes of learning". Salomon (2000) eloquently summarized this in his call to "let technology show us what can be done, and let educational considerations determine what will be done" (If it ain't technology, what is it then?, para. 5).

Research exploring new generation learners and their relationship to technology has also been undertaken outside of the advanced industrial countries (Jones et al., 2010). A survey conducted in 2007 of 3533 students regarding ICT use in six higher education institutions in five South African provinces, confirmed that new technologies are infrequently used despite the hype associated with Web 2.0 technologies (Brown & Czerniewicz, 2008). To Brown and Czerniewicz (2008), these findings were similar to findings in the UK and US. Another study conducted in 2009 of more than 290 first year students at two South African universities about their access to and use of technology revealed that the students did not appear not to use such technologies, and were not interested in using them in their studies with the exception of tasks involving the mobile phone (Thinyane, 2010). Also, this study concluded that there are dissimilarities between students' experiences in developed and developing countries, such as South Africa, Mexico, and Brazil (Thinyane, 2010).

The so called "Digital Natives" perspective seems to be inappropriate or insufficient to describe the population of current learners, because some features of the widespread expression "digital natives" and many associated assumptions are still to be demonstrated and have not resulted in robust conclusions (Rapetti & Marshall, 2010; Rapetti & Cantoni, 2010a). Bennett and Maton (2010) also refute the notion of the digital native because of its widespread popularity on the basis of claims rather than evidence and highlight the

complexities of young people's technology experiences. To Thirunarayanan et al. (2011), the idea that there are digital natives and digital immigrants is yet to be proven by research. Findings of their study reveal that some of the assumptions made by Prensky (2001a; 2001b) are definitely not valid. For example, Prensky (2001a, p. 1) states: "Our students today are all 'native speakers' of the digital language of computers, video games and the Internet", but data from their study do not support such enthusiasm or optimism and also suggests that not all students use all the digital tools available for study and/or in society (Thirunarayanan et al., 2011).

Despite the widespread acceptance of the concept of the "digital native", the key claims of this discourse are not based on empirical research. In fact in the paper "Digital natives, digital immigrants" in which Prensky proposes these terms, he does not cite any research to support his ideas. Instead, the key claims are found in popular and quasi-academic literature and tend to be informed by anecdotal research and proprietary research funded by and conducted for private business (Bullen, Morgan & Qayyum, 2011a; Bullen & Morgan, 2011).

The international research project "Digital Learners in Higher Education" (http://digitallearners.ca) that is investigating how postsecondary learners in different institutional contexts and cultures think about technology and how they use it in their social and educational lives, found that there is no empirically-sound basis for most of the claims that have been made about the Net generation (Bullen, Morgan & Qayyum, 2011a). The study suggests that there are no meaningful differences between net generation and non-net generation students at this institution in terms of their use of technology, or in their behavioural characteristics and learning preferences. The research shows today's learners, regardless of age, are on a continuum of technological access, skill, use and comfort. They have differing views about the integration of social and academic uses and are not generally challenging the dominant academic paradigm (Bullen & Morgan, 2011). In sum, there is little evidence "to support a claim that digital literacy, connectedness, a need for immediacy, and a preference for experiential learner were characteristics of a particular generation of learners" (Bullen et al., 2009, p. 10).

Digital Learners, Not Digital Natives

Bullen and colleagues, who supported the term "digital learner", reviewed the research on "digital natives" conducted in six different countries and at a range of different institutions, and concluded that there is no empirical basis for the notion of digital native. They argue that it is a social and not a generational issue and that the implications for education are far from clear (Bullen, Morgan, Belfer & Qayyum, 2008; Bullen & Morgan, 2011; Bullen, Morgan & Qayyum, 2011a). The assumption that students – born roughly between 1980 and 1994 – have natural digital skills, is not commonly-accepted. Generalizations based on "generational differences" are not useful for discussions concerning teaching and learning. How learners use digital technologies is a complex issue that goes much deeper than age. We also need to take into account young people with less skills in the use of technologies, the conditions of access and use of information, the neglect of the impact of contextual, economic, political, social, historical and cultural factors that increase the so-called "digital gap" between those who have access to the information and those who do not. Factors such as gender, education, experience, social inclusion and exclusion, culture, institutional context, subject discipline, learning design, and the socio-economic background of students are far more important and researchers have only begun to examine them (Kennedy et al., 2010; Margaryan et al., 2011). Hence, "It is time to put the digital natives discourse to rest and focus on digital learners" (Bullen & Morgan, 2011, p. 66).

According to Rapetti (2012, p. 39), the expression digital learners "is meant to refer generically (and synthetically) to all those labels (Digital Natives, Generation Y, Net generation, etc.) assuming that the current generation of learners has been so deeply affected by ICTs to the extent we must consider them as 'digital'". In addition, Rapetti and Cantoni (2010b) coined a new term "Learners of Digital Era" (L.o.D.E.) and suggest that age is not the sole factor to be considered. The LoDE perspective is summarized by the following facets (Rapetti & Cantoni, 2010b, p. 5):

- The focus is on persons, so the first word refers to them.
- The perspective is anthropological-pedagogical, so the chosen word is 'learning'.
- Not only young people learn though ICTs in the Knowledge Society.

- The lesson learnt from the "digital natives" label: the pervasion of digital technologies in everyday life has a great impact on learning experiences, but we should refuse to apply the "digital" adjective to people and imply generational divides.

We do not think there is very much difference between LoDE and digital learner. Like us, Rapetti and Cantoni (2010b) reject terms that are based on age or generation and we think their term is just a different way of making the same point. Yet, we find the term "digital learner" simpler because: (a) it offers a more global vision of the 21st century student in the digital age (i.e., not assuming that leaners can use digital technologies by default and automatically want to study with digital tools; to focus on how to apply/ implement digital tools that assist learners with their learning); (b) it is more readily suited/usable in practice; and, (c) it is substantially enriched by the misunderstandings, myths and fallacies highlighted by all the critics views. Table 7 summarizes characteristics of the "digital leaner" proposal as a unifying concept.

Table 7. Digital Learner Proposal

Digital Learner
a) focuses on "learners" rather than "persons", who should realize the possibilities and potentials of digital technologies in their environments and recognize the value of technology and the opportunity it presents the learner in his/her daily life,
b) argues that learners are not merely users or consumers of technology,
c) highlights the complexities of learner's technology experiences,
d) rejects the generational boundary and any chronological generations that exclude other types of actors who share similar practices (accept all learners),
e) does not assume any pre-defined learner characteristics, and
f) adopts a socio-cultural, anthropological, communicational and pedagogical approach from the learners' perspective.

2.4. Summary

This literature review has provided a comprehensive examination of a wide range of relevant literature on "digital technology" and the "new generation of students. An overview of the terms related to the new generation of students was also highlighted. Each of these themes was addressed in accordance with the realm of higher education. We also have demonstrated the importance of realise integrative literature review. The next chapter will present the research paradigm that informed the research design and data collection instruments.

CHAPTER 3

Introduction

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Chapter 3: Research Design

3.1. Introduction

The purpose of this chapter is to present the philosophical assumptions underpinning this research, as well as to introduce the research context and strategy, the empirical techniques applied and the methods chosen for data collection, analysis and interpretation. This chapter begins with a discussion of common philosophical assumptions, focusing on the reasons for choosing particular paradigm over others. The philosophical assumptions underlying this research come from the interpretive tradition. Also, the chapter discusses the context within which the study is located, the research methodologies, and design used in the study including strategies, instruments, and data collection and analysis methods, while explaining the stages and processes involved in the study. To address the aim of this study, the researcher developed a mixed-method research strategy. Options for data collection will be examined and decisions documented. The main data collection techniques used in this research study are integrative literature review, online questionnaires and semi-structured interviews. Finally, the methods used to determine the trustworthiness of the research (inter-coder agreement, peer reviews and triangulation) are discussed as are the ethical procedures used. The figure 1 provides an overview of the research design process.

3.2. Aim and Research Question

The central aim of the study is to understand how university learners use digital technologies and what are the implications of their use for Higher Education.

The study was guided by the following research questions:

- Do postsecondary students distinguish between their social and educational use of ICTs?
- What impact does students' social use of ICTs have on postsecondary learning environments?
- What is the relationship between social and educational uses of ICTs in postsecondary education?
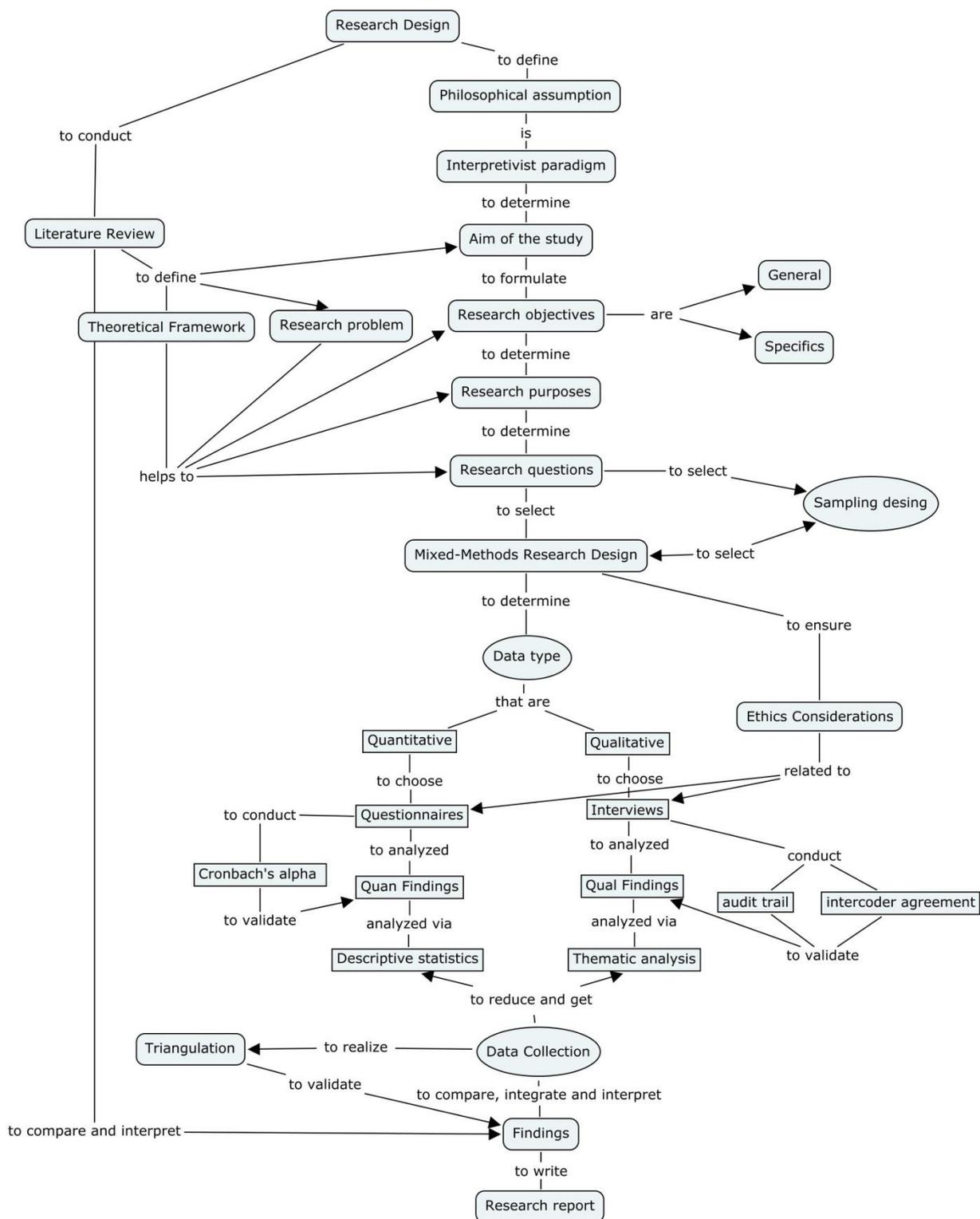
Figure 1. Overview of the research design process.

3.3. Philosophical Assumptions

According to Creswell (2007, p. 15), "the research design process in qualitative research begins with philosophical assumptions that the inquirers make in deciding to undertake a qualitative study". Philosophical assumptions are also known as paradigms (Kunh, 1968; Lincoln & Guba, 1985) or world views (Creswell, 2009). The term *paradigm* was initially developed and popularized by historian and a philosopher of science Thomas Kunh in his book, *The Structure of Scientific Revolutions*.

Patton (2002) defined a paradigm as "a worldview –a way of thinking about and make sense of the complexities of the real world" (p. 69). Paradigms serve as a means to understand different types of scientific activity and beliefs; and influences what should be studied, why to study, how research should be done, and how results should be interpreted (Bryman & Bell, 2003; Bryman, 2004; Daly, 2007; Della Porta & Keating, 2008).

Nowadays, in the social sciences, there are several competing paradigms. Some discussions are organized and presented in a rhetorical form based upon a dualist opposition of two paradigms: positivistic versus humanist, postpositivism versus naturalist (also known as social constructivism/interpretivism), or quantitative versus qualitative (Lincoln & Guba, 1985; Patton, 1990; Cresswell, 1994; Daly, 2007; Willis, 2007; Della Porta & Keating, 2008; Given, 2008).The exact number of paradigms and the names associated with a particular paradigm vary from author to author; however, "there is no legitimate way of asserting with absolute confidence that one paradigm is better than another" (Willis, 2007, p. 21). The generally accepted list includes four paradigms - positivism, postpositivism, critical theory and interpretivism (Table 8) – that are the dominant guiding frameworks in the research literature in the social sciences (Willis, 2007).

Table 8. Differences between Positivism, Postpositivism, Critical Theory and Interpretivism

Axioms	Empiricism or Positivism	Postempiricism or Postpositivism	Critical Theory	Interpretivism
Nature of reality	External to human mind	Material and external to human mind	Material and external to human mind	Socially constructed
Purpose of research	Find universals	Find universals	Uncover local instances of	Reflect understanding

			universal power relationships and empower the oppressed	
Acceptable methods and data	▪ Scientific method ▪ Objective data	▪ Scientific method ▪ Objective data	Subjective inquiry based on ideology and values; both quantitative and qualitative data are acceptable	Subjective and objective research methods are acceptable
Meaning of data	▪ Mirror to reality ▪ Use to develop theory	▪ Falsification ▪ Use to test theory	Interpreted through ideology; used to enlighten and emancipate	▪ Understanding is contextual ▪ Universals are deemphasized
Relationship of research to practice	▪ Separate activities ▪ Research guides practice	▪ Separate activities ▪ Research guides practice	▪ Integrated activities ▪ Research guides practice	▪ Integrated activities ▪ Both guide and become the other

Note. Personal compilation from "Foundations of qualitative research: Interpretive and critical approaches", by J. W. Willis, 2007.

To understand the assumptions of each paradigm (see Table 9), researchers have contrasted them on several dimensions. The most common are: (a) the existence of a real and objective world (ontology); (b) how the researcher knows what he/she knows (epistemology); (c) the methods and technical instruments used in the process (methodology) (Willis, 2007; Della Porta & Keating, 2008); besides, Creswell (1994; 1998; 2007) includes two more: (d) the role of values in the research (axiology); and, (e) the language of research (rhetoric).

Table 9. Quantitative and Qualitative Paradigms Assumptions

Assumption	Question	Quantitative	Qualitative
Ontological	What is the nature of reality?	Reality is objective and singular, apart from the researcher	Reality is subjective and multiple as seen by participants in a study
Epistemological	What is the relationship between the researcher and that being researched?	Researcher is independent from that being researched	Researcher interacts with that being researched
Axiological	What is the role of values?	Value-free and unbiased	Value-laden and biased
Rhetorical	What is the language of research?	Formal Based on set definitions Impersonal voice Use of accepted quantitative words	Informal Evolving decisions Personal voice Accepted qualitative words

Methodological	What is the process of research?	Deductive process Cause and effect Static design – categories isolated before study Context-free Generalizations leading to prediction, explanation, and understanding Accurate and reliable through validity and reliability	Inductive process Mutual simultaneous shaping of factors Emerging design-categories identified during research process Context-bound Patterns, theories developed for understanding Accurate and reliable through verification

Note. Adapted from "Research design: Qualitative & quantitative approaches", by J. W. Creswell, 1994, p. 5.

3.4. Research Design

The current research is positioned in the interpretive paradigm in contrast the positivism paradigm. Both terms positivism and interpretivist will be explained and explored in detail to justify the chosen option.

Interpretivism

Interpretivism is a term given to a contrasting epistemology to positivism (Bryman & E. Bell, 2003; Bryman, 2004). Scientist and philosophers have some deferent views of just "what positivism implied, and on what ground it stood" (Lincoln & Guba, 1985). Positivism is defined by Reese (as cited in Lincoln & Guba, 1985, p. 19) as "a family of philosophies characterized by an extremely positive evaluation of science and scientific method". Positivism "asserted that only verifiable claims based directly on experience could be considered genuine knowledge" (Patton, 2002, p.92). Positivism is built on the epistemology of objectivism that advocates the application of the methods of the natural sciences to the study of social reality and beyond, also known as realism (Bryman & Bell, 2003; Bryman, 2004; Daly, 2007). Positivists seek to describe, analyze and measure of reality with precision (Daly, 2007; Della Porta & Keating, 2008). In other words, the source of truth is in reality. The role of the researcher is to test theories and to provide material for the development of facts (Bryman & Bell, 2003; Daly, 2007). In this tradition, proper applications of empirical methods are essential to producing knowledge and empirical methods for the process of verification should be employed because these methods are objective and do not influence what is being investigated (Kim, 2003).

Interpretivism is often linked to the notion of Max Weber (1864-1920), "who suggests that in the human sciences we are concerned with *Verstehen* (understanding)" (Crotty, 1998, p. 67). Weber's definition embraces both explanation and understanding of a social action in order to arrive at a casual explanation of its course and effects (Bryman & E. Bell, 2003). This process of interpreting or understanding requires that one interpret in a particular way what the actors are doing (Schwandt, 2000). From an interpretivist point of view, human (actors) action is meaningful; so scholars must aim at discovering the meanings that motivate their actions rather than relying on universal laws external to the actors (Schwandt, 2000; Della Porta & Keating, 2008).

It is rooted in a belief that all reality is subjectively perceived and understood from the perspective of the observer (Daly, 2007; Della Porta & Keating, 2008) and is characterized as "the belief that 'facts' are not things out in some objective world waiting to be discovered, but, rather, are the social constructions of humans who apprehend the world through interpretive activity" (Ferguson, 1993, p. 36). Unlike positivism, interpretivist approach seeks to understand values, beliefs, and meanings of social phenomena, thereby obtaining a deep and sympathetic understanding of human social and cultural activities and experiences (Kim, 2003).

This paradigm "rejects the positivist idea that the same research methods can be used to study human behavior as are successfully used in fields such as chemistry and physics" (Willis, 2007, p. 6). Into the interpretivist approach, ontologies and epistemologies shade, where objective and subjective meanings are deeply intertwined (Della Porta & Keating, 2008). As an epistemological framework, "it has been used widely across the social and human sciences, especially anthropology, sociology, communication, cultural studies, social work and education" (Given, 2008, p. 464). Interpretivists "favor qualitative methods such as case studies, interviews, and observation because those methods are better ways of getting at how humans interpret the world around them" (Willis, 2007).

According to Patton (2002), there are 12 major themes or principles that together, constitute a comprehensive and coherent strategic framework for interpretivist (also known naturalistic) inquiry. Table 10 summarizes those themes in three basic strategies, including fundamental assumptions and epistemological ideals.

Table 10. Themes of Interpretivist Inquiry

Design strategies	
Naturalistic inquiry	Studying real-world situations as they unfold naturally; nonmanipulative and noncontrolling; openness to whatever emerges (lack of predetermined constraints on findings).
Emergent design flexibility	Openness to adapting inquiry as understanding deepens and/or situations change; the researcher avoids getting locked into rigid designs that eliminate responsiveness and pursues new paths of discovery as they emerge.
Purposeful sampling	Cases for study (e.g., people, organizations, communities, cultures, events) are selected because they are "information rich". They offer useful manifestations of the phenomenon of interest; sampling, then, is aimed at insight about the phenomenon, not empirical generalization from a sample to a population
Data collection and fieldwork strategies	
Qualitative data	Observations that yield detailed, thick description; inquiry in depth; interviews that capture direct quotations about people's personal perspectives and experiences; case studies; careful document review.
Personal experience and engagement	The researcher has direct contact with and gets close to the people, situation, and phenomenon under study. The researcher's personal experiences and insights are an important part of the inquiry and critical to understanding the phenomenon.
Empathic neutrality	An empathic stance in interviewing seeks vicarious under-standing without judgment (neutrality) by showing openness, sensitivity, respect, awareness, and responsiveness.
Dynamic systems	Attention to process; assumes change as ongoing whether focus is on an individual, an organization, a community, or an entire culture; therefore, mindful of and attentive to system and situation dynamics.
Analysis strategies	
Unique case orientation	Assumes each case is special and unique; the first level of analysis is being true to, respecting, and capturing the details of the individual cases being studied; cross-case analysis follows from and depends on the quality of individual case studies.
Inductive analysis and creative synthesis	Immersion in the details and specifics of the data to discover important patterns, themes, and interrelationships; begins by exploring, then confirming; guided by analytical principles rather than rules; ends with a creative synthesis.
Holistic perspective	The whole phenomenon under study is understood as a complex system; focus on complex interdependencies and system dynamics that cannot meaning-fully be reduced to a few discrete variables and linear, cause-effect relationships.

Context sensitivity	Places findings in a social, historical, and temporal context; careful about, even dubious of, the possibility or meaningfulness of generalizations across time and space; emphasizes instead careful comparative case analyses and extrapolating patterns for possible transferability and adaptation in new settings.
Voice, perspective, and reflexivity	The qualitative analyst owns and is reflective about her or his own voice and perspective; a credible voice conveys authenticity and trustworthiness; complete objectivity being impossible and pure subjectivity undermining credibility, the researcher's focus becomes balance—understanding and depicting the world authentically in all its complexity while being self-analytical, politically aware, and reflexive in consciousness.

Note. Adapted from "Qualitative research and evaluation methods", by M. Q. Patton, 2002, pp. 40-41.

3.5. Research Method

Having discussed the philosophical assumption of this research, we will now focus on the selected research methods. It is important to clarify the terminology used in association with research method, particularly since "method" is often assumed to have the same meaning as "methodology". Research methodology "consists of the assumptions, postulates, rules, and methods- the blueprint of roadmap- that researchers employ to render their work open to analysis, critique, replication, repetition, and/or adaptation and to choose research methods" (Given, 2008, p. 516). This term is often used interchangeably with research methods, but for the purpose of this study we will refer to research methods as the tools or techniques with which researchers collect their data (Given, 2008).

It is useful to consider the method for data collection and analysis to be associated with the paradigms. Various methods across disciplines are used in conducting interpretive research, including a variety of ethnographic methods, grounded theory, classic traditional interviews, case studies, focus groups, observational studies, phenomenological research, narrative research and analyses of cultural records, archival documents, artifacts, visual materials, multimedia texts, or personal experiences (Creswell, 2007; Given, 2008). Mixed methods strategies are quite widely used and attempt to bring together methods from both the qualitative and quantitative research traditions (Creswell, 2007; Tashakkori & Teddlie, 2003).

The research is designed as a mixed methods study. In order to explore the research objectives fully, a mixture of both quantitative and qualitative research has to be undertaken.

Mixed Method Research

Mixed methods research originated in the early 1990s in the fields of evaluation, sociology, education, and management (Creswell, 2009; Creswell & Zhang, 2009), and has gained visibility within the last two decades, emerging as a separate orientation from qualitative and quantitative traditions (González Castro, Kellison, Boyd & Kopak, 2010; Tashakkori & Teddlie, 2003). With the publication of the "Handbook of mixed methods in social and behavior research" by Tashakkori and Teddlie (2003), "the term *mixed methods* became standardized because of the mixing or integrating of both quantitative and qualitative data rather than keeping the data strands separate as in multiple method or multi method research" (Creswell, & Zhang, 2009, p. 613), and has provided researchers with some theoretical and practical tools for conducting mixed-methods research (Collins, Onwuegbuzie & Sutton, 2006).

What is mixed methods research? Several definitions for mixed methods have emerged over the years that incorporate various elements of methods, research processes, philosophy, and research design (Creswell & Piano Clark, 2011). Because the concept of mixed methods research has been defined in a number of ways, I felt that it was important to examine some definitions. To Tashakkori & Teddlie (2003), this approach use QUAL [qualitative] and QUAN [quantitative] data collection and analysis techniques in either parallel or sequential phases. Tashakkori & Creswell (2007, p. 4) defined "mixed methods as research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry".

In 2007, Johnson, Onwuegbuzie and Turner analyzed 19 definitions of mixed methods provided by 21 prominent mixed methods research methodologists. After analyzing all these definitions, the authors defined mixed methods research as "the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of

understanding and corroboration" (Johnson et al., 2007, p. 123). In their definition, Johnson et al., (2007) view mixed methods research as an intellectual and practical synthesis based on qualitative and quantitative research.

Exploring the pertinent literature on mixed methods research, the field is still developing and researchers hold differing perspectives on fundamental definitions, because definitions usually change over time as the approach or "research paradigm" continues to grow. It is still controversial area in mixed methods research (and research methodology, in general) and researchers believe that it is essential to keep the discussion open about the definition of mixed methods (Tashakkori & Creswell, 2007; Tashakkori & Teddlie, 2010; Creswell, 2011).

Why undertake mixed method research? According to Tashakkori & Creswell (2008), mixed methods researchers come from diverse disciplines, geographic areas, research traditions, epistemological orientations, and sociopolitical backgrounds. To Collins and colleagues (2006) frameworks for conducting mixed-methods research have been developed for many disciplines in the health or social and behavioral science fields, including education, psychology, nursing, sociology, health sciences, management and organizational research, library and information science research, counseling, counseling psychology, school psychology, law, primary care, family research, and program evaluation.

Creswell and Plano Clark, (2007, 2011) refer to it as a research design with philosophical assumptions as well as quantitative and qualitative methods. As a philosophical assumption (Creswell & Plano Clark, 2007 p. 5), "it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process". However, for the purpose of this study, we use it as a method to focus "on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies" (Creswell & Plano Clark, 2007, p. 5).

From a method perspective, mixed methods research has several essential characteristics (Creswell & Zhang, 2009). First, "it involves the collection and analysis of both quantitative and qualitative data" (Creswell & Zhang, 2009, p. 613). For example, instrument data with closed-ended response categories would clearly be quantitative data;

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in contrast, qualitative data consists of open-ended information that the researcher gathers through interviews with participants (Creswell & Plano Clark, 2007; Creswell, 2009; Creswell & Zhang, 2009). Second, "the quantitative and qualitative data collection must be rigorous and follow procedures for good research designs, such as selection criteria, sampling, sample size, multiple sources of data, and other concerns such as fidelity of procedures, and access and permissions" (Creswell & Zhang, 2009, p. 613). Third, the mixing of data is a central component of mixed methods research (Creswell & Zhang, 2009). By mixing the datasets, the researcher "provides a better understanding of the problem" (Creswell & Plano Clark, 2007, p. 7). Fourth, the implementation of the two databases as a result of mixing the databases (Creswell & Zhang, 2009).

Sequential Explanatory Mixed Methods Design

Several authors have developed typologies of mixed methods research designs, the most standardized classification was developed by Creswell, Plano Clark, Gutmann and & Hanson (2003). According to Creswell et al. (2003), there are six primary types of designs as depicted in Table 11: three sequential (explanatory, exploratory, and transformative) when the researcher uses different methods to collect data for a study at different times; and three concurrent (triangulation, nested, and transformative) when the researcher gathers data using both quantitative and qualitative methods at the same time (Creswell et al., 2003; Hanson, Creswell, Plano Clark, Petska & Creswell, 2005).

Table 11. Types of Designs

Design Type	Description
Sequential explanatory	Quantitative data are collected and analyzed, followed by qualitative data. Priority is usually unequal and given to the quantitative data. Data analysis is usually connected, and the two methods are integrated during the interpretation phase of the study.
Sequential explanatory	Qualitative followed by quantitative. Priority is usually unequal and given to the qualitative aspect of the study. Data analysis is usually connected, and integration usually occurs at the data interpretation stage and in the discussion.
Sequential transformative	Either method may be used first (quantitative or qualitative), and the priority may be given to either the quantitative or the qualitative phase (or even to both if sufficient resources are available). Data analysis is usually connected, and integration usually occurs at the data interpretation stage and in the discussion. Its purpose is to employ the methods that will best serve the theoretical perspective of the researcher.

Concurrent triangulation	Quantitative and qualitative data are collected and analyzed at the same time, during one phase of the research study. Priority is usually equal and given to both forms of data. Data analysis is usually separate, and integration usually occurs at the data interpretation stage.
Concurrent nested	Quantitative and qualitative data are collected and analyzed simultaneously; however, priority is given to one of the two forms of data. Data analysis usually involves transforming the data, and integration usually occurs during the analysis phase of the study.
Concurrent transformative	Quantitative and qualitative data are collected at the same time during one data collection phase and may have equal or unequal priority. Data analysis is usually separate, and integration usually occurs at the data interpretation stage or, if transformed, during data analysis.

Note. Personal compilation from "An Expanded Typology for Classifying Mixed Methods Research Into Designs", by V. L. P. Clark et al., 2008, and "Mixed Methods Research Designs in Counseling Psychology", by W. E. Hanson et al., 2005, *Journal of Counseling Psychology*, *52*(2).

This study used a sequential transformative mixed methods design as depicted in Figure 2, consisting of two distinct phases: in the first phase, the quantitative data is collected and analyzed first to provide a general understanding of the research problem and to identify information about students' communication and study habits. In the second phase, the qualitative data and its analysis refined and explained those statistical results by exploring the participants' views regarding in more depth. By using a sequential transformative the researcher may "be able to give voice to diverse perspectives, to better advocate for participants, or to better understand a phenomenon or process that is changing as a result of being studied" (Creswell et al., 2003, p. 228).
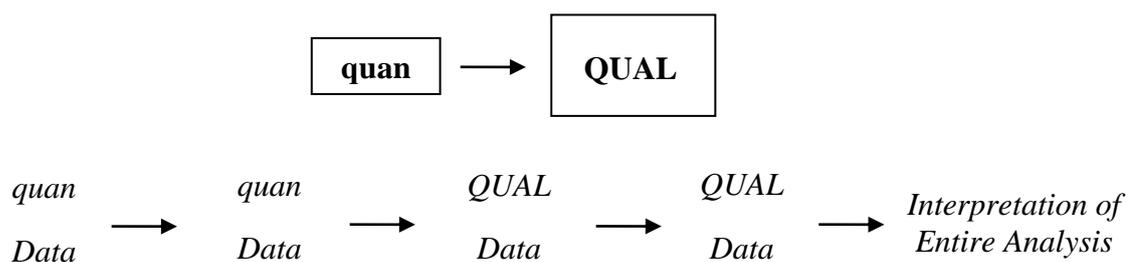
Figure 2. Sequential transformative design. QUAL = qualitative data was prioritized; quan = lower priority given to the qualitative data. Adapted from "Advanced mixed methods research designs", by Creswell et al., 2003, p. 225.
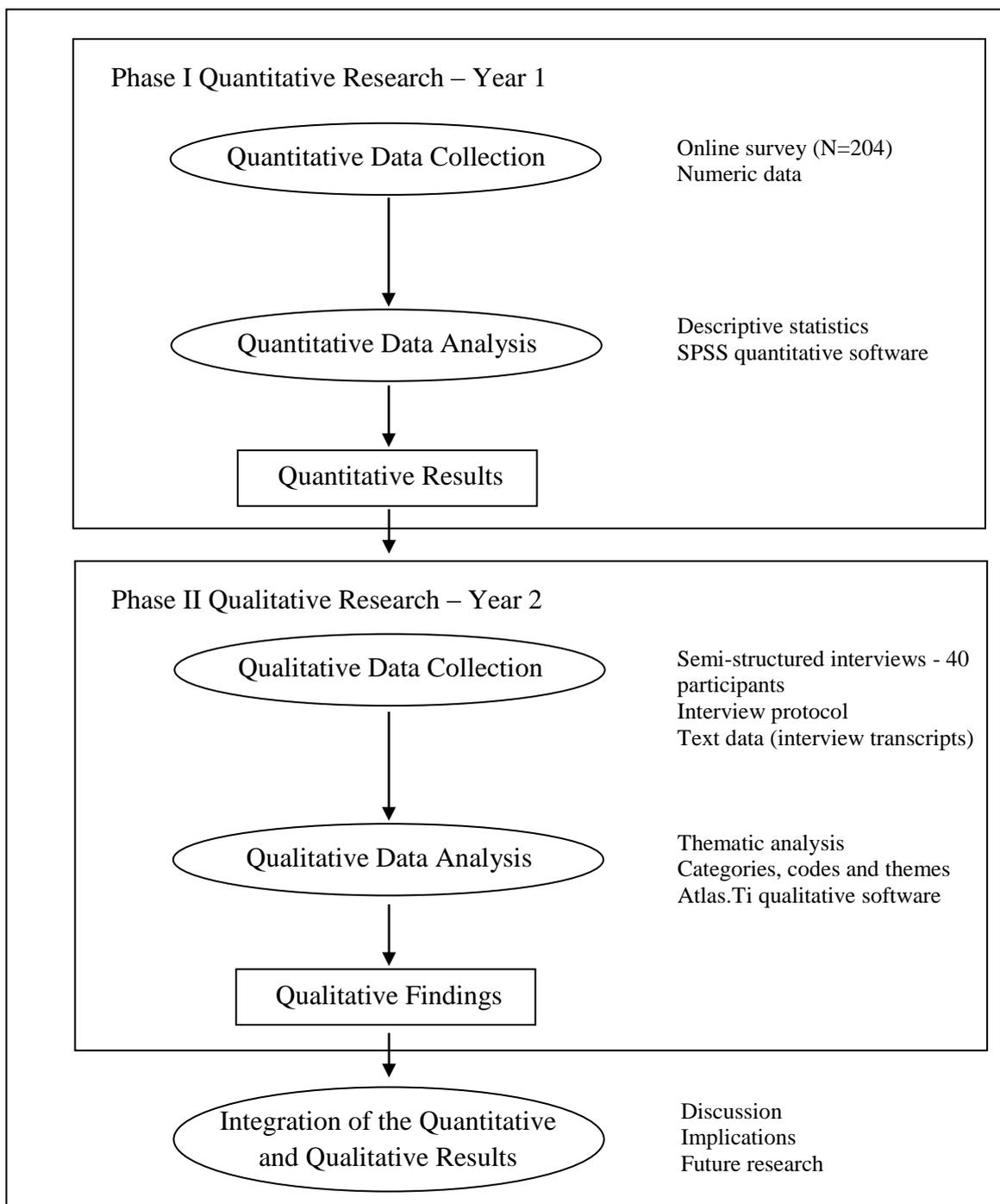
Figure 3. Visual model of sequential explanatory mixed methods design. Adapted from "Advanced mixed methods research designs", by Creswell et al., 2003, p. 235-236.

In the study, the priority was given to the qualitative aspect of the study (Creswell et al., 2003), because it focused on in-depth explanations of the results obtained in both phases. The quantitative and qualitative phases were connected when selecting the participants for the survey and the interviews (Hanson et al., 2005). Also, the results of both phases were

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integrated during the discussion of the findings of the entire study (Hanson et al., 2005) (see Figure 3).

3.6. Research Setting

This research investigated how learners in a public Catalonian university use digital technologies and the implications of their use for Higher Education. To conduct this study, we adopted an interpretivist approach and mixed methods. This study was conducted in the Faculty of Educational Sciences and Psychology at the Rovira i Virgili University (URV) in Tarragona, Spain.

European education system

Higher education is one of the primary policy responsibilities of European nation-states and it is significantly influenced by two European-level policy developments: (1) the higher education reforms initiated by the Bologna Process, and, (2) the research aspects of the European Union's Lisbon Strategy for jobs and growth (Keeling, 2006).

The Bologna Process, launched with the Bologna Declaration (EHEA, 1999), of 1999, is one of the main voluntary processes at European level, as it is nowadays implemented in 47 states, which define the European Higher Education Area (EHEA). The Bologna process was designed to introduce a system of academic degrees that are easily recognisable and comparable, promote the mobility of students, teachers and researchers, ensure high quality teaching and incorporate the European dimension into higher education (EHEA, 2009, 2014). The reforms are based on ten higher education priorities which governments and institutions are currently implementing: (1) social dimension: equitable access and completion; (2) lifelong learning; (3) employability; (4) student-centered learning and the teaching mission of higher education; (5) education, research and innovation; (6) international openness; (7) mobility; (8) data collection; (9) multidimensional transparency tools; and, (10) funding (EHEA, 2009). The EHEA aims are: (a) to promote the mobility of students, graduates and academics from Europe as well as from other parts of the world; (b) to enable new graduates to become part of a unified European labour market, and (c) to provide students with the knowledge and the strategies they need for lifelong learning (EHEA, 2009, URV, 2014).

As a result of the Bologna Process the educational systems in all European countries are in the process of reforming (Keeling, 2006; EHEA, 2014). This is the direct effect of the political decision to converge the different national systems in Europe. For Higher Education institutions these reforms mean the actual starting point for another discussion: the comparability of curricula in terms of structures, programmes and actual teaching. On the basis of the Bologna Declaration, most European countries have been modified the undergraduate/postgraduate degree structure into a three-cycle system (Bachelor's, Master's and Doctoral degrees), which now includes the concept of qualifications frameworks, with an emphasis on learning outcomes (EHEA, 2014). The concept of social dimension of higher education has been introduced -including action plans and measures to evaluate their effectiveness- and recognition of qualifications is now perceived as central to the European higher education policies (EHEA, 2009, 2014).

Spanish Education System

The legislative framework that governs and guides the Spanish education system comprises the Spanish Constitution of 1978 and a series of Acts which develop the principles established there in. In terms of University education, the constitutional provisions are manifested also in different Acts such as "Ley Orgánica de Universidades (LOU)", "Ley Orgánica por la que se modifica la LOU" and the Royal Decree (2007) which together establish the new organisation of official University studies (Coba Arango, Grañeras Pastrana, Vásquez Aguilar, Brioso Valcárcel, Gil Novoa, Alarcón Pérez, et al., 2010). These legislative innovations are the result of the process of adaptation by Spanish universities to the European Higher Education Area (EHEA), which was launched with the Bologna Declaration, of 1999 (Coba Arango et al., 2010; EHEA, 2014).

The structure of university education in Spain is organised on the basis of three institutional axes: the State, the Autonomous Communities and the universities (Coba Arango et al., 2010; EURYDICE, 2010). There are 17 autonomous communities (Iberian Peninsula) and 2 autonomous cities of Ceuta and Melilla (on the northern coast of Africa) (Coba Arango et al., 2010; EURYDICE, 2010). The Spanish is the official language of Spain and, therefore, certain Autonomous Communities have a co-official language: Aranese, Catalan, Valencian, Galician (all Romance languages deriving from Latin) and Basque.

Rovira i Virgili University

Rovira i Virgili University is located in Catalonia. Catalonia comprises four provinces: Barcelona, Girona, Lleida, and Tarragona. The capital and largest city is Barcelona, the second largest city in Spain (Generalitat de Catalunya, 2014). Tarragona is a province of eastern Spain, in the southern part of the autonomous community of Catalonia. Catalan is spoken in Catalonia and the Balearic Islands, as well as in parts of Aragon and the Principality of Andorra (Generalitat de Catalunya, 2014).

Rovira i Virgili University (in Catalan, Universitat Rovira i Virgili - URV) was created in 1991 by the Parliament of Catalonia (published in the Catalan Government's official gazette on 15th January 1992) from the already existing university faculties and schools in Reus and Tarragona (URV, 2014). In this way the Tarragona University of the 16th century was recovered and restored. Its name is in honour to Antoni Rovira i Virgili, a writer, historian and politician of Catalonia's national cause. At Tarragona, the university education data from the 16th century when Cardinal Gaspar Cervantes de Gatea founded the university "Universitas Tarraconensis" to teach Grammar, Arts and Theology (URV, 2014). This University was practically wiped out after the War of Succession and the university education did not return until the second half of the 20th century, when three different roads converged to form the Rovira i Virgili University: The Universitat Laboral (Technical College), The University of Barcelona and The University School of Industrial Engineering (URV, 2014).

URV consists of 12 faculties and schools in which over 1500 lecturers and researchers provide quality degrees to 11600 undergraduates and 1842 master's-degree and 1032 doctoral students, who attend courses in all knowledge areas: the sciences, health sciences, social and legal sciences, engineering and architecture, arts and humanities, all adapted to the European Higher Education Area (URV, 2013). It is a multi-campus system located in the cities of Tarragona, Reus, Vila-Seca, Tortosa and El Vendrell. There is a large cross section of lectures, professors and researchers of all ages, both male and female, and the students come from a variety of backgrounds (cultural, social and economic) within Spain and across the world.

Within the framework of the European Higher Education Area, Bologna Declaration and URV's new legal framework, the URV is organised in three cycles, Degree (1st cycle), Master (2nd cycle) and Doctorate (3rd cycle) (URV, 2003, 2014). It aim is to provide top quality education that focuses on the acquisition of knowledge and competencies that guarantee success in the professional world. URV has begun to implement new degree courses with new teaching and learning methodologies where the student is the centre of academic activity (URV, 2003, 2014). The URV considers that all aspects related to teaching improvement are of strategic importance. This commitment to excellence in teaching-learning processes can be seen in the Strategic Teaching Plan (URV, 2003), a technical document whose main aims are: (a) to implement a learning- and student-centred teaching model; (b) to increase the efficiency and efficacy of the URV in student education, and (c) to ensure that the URV becomes part of the process of European harmonization.

As a result of Bologna Declaration, all the university is structure and organise in terms of teaching. Also, this is organised into two areas:
1) The course training project, which defines the professional and academic profile of each programme of study, taking into account their specific competencies and skills. This means that URV has designed the curricula and its training activities in the following areas: (a) professional and academic profile; (b) academic objects based on learning results, (c) design of the ECTS-credit curriculum[1]; (d) methodological proposal; and, (e) follow-up plan and evaluation.
2) The URV training project, which defines the transversal competencies and skills that are specific to each programme of study that all URV students must have (called URV's nuclear curriculum) (URV, 2003).

The information and communication technologies (ICT) play, in general, a fundamental role in the URV context, and teaching and learning in particular. For that reason, the URV had implemented new teaching methods, based on ICT, provides students, teachers and the institution itself with new challenges with, the aim to facilitates the evolution from face-to-face teaching models (in both initial and continuous training) to more flexible and

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[1] European Credit Transfer System (ECTS) is the unit to measure academic achievement that represents the amount of work that students need to carry out in order to attain the objectives proposed in the programme of studies (Coba Arango et al., 2010). At URV each credit represents 25 hours of student work (URV, 2014).

individualised student-centred models (URV, 2003, 2014). According to their website (URV, 2014), the URV has excellent infrastructure featuring the latest multimedia equipment, including video conferencing and interpreting services, Wi-Fi, recording and reproduction, exhibition areas, libraries, gardens and outdoor spaces, and parking.

The Rovira i Virgili University has signed two bilateral agreements: (1) with the Department of Education of the Government of Catalonia for its collaboration in educational innovation programmes and projects, and (2) with the company Smart Technologies for its collaboration in lifelong learning and the professional development of URV students (Palau Martín, Marquès Molias & Holgado García, 2012). URV had an interactive whiteboard installed in some classrooms and in the CRAI. The Learning and Research Resource Centre (CRAI, according to its initials in Spanish) offers a range of services like general information, library and document Service, computer resources, educational, and keep up to date on educational innovations. Also, all the classrooms at the Faculty of Educational Sciences and Psychology have equipped with wireless network, a desktop computer, a projector, a TV-monitor and some rooms have also interactive whiteboards.

The Faculty of Educational Sciences and Psychology

The Faculty of Educational Sciences and Psychology offers five degree programs: Pedagogy, Social Education, Early Education, Primary Education and Psychology. The Faculty embraces two departments: Pedagogy and Psychology, located in the cities of Tarragona, Tortosa and El Vendrell. The departments are the basic structures that organize the activity of the teaching and research staff. Among their duties is the management of the human, material and economic resources that they have been assigned.

The Department of Psychology provides teaching and the basic training for future psychologists for understanding both individual and group behaviour, for conducting applied research and for the fundamental activities performed by psychologists. The department coordinates both the Bachelor's degree programs in Psychology and three Master's and Doctoral degree programs. The research interest of the Department of Psychology focuses on the following applied fields: school psychology, neurotoxicology, psychiatry, behaviour assessment, mental and emotional disorders; mental health.

The Department of Pedagogy provides teaching and conducts research in the fields of pedagogy and educational science. Their activities and the design process of the curricula are in accordance with the Bologna educational programs. The department coordinates Bachelor's degree programs of study in Pedagogy, Early and Primary Education, Social Education, and Master's and Doctorate's degree programs in Educational Technology: e-Learning and Knowledge Management.

The academics programs of Pedagogy, Social Education, Early Education and Primary Education promote active learning, cooperative group work, autonomous student work, the use of collaboration tools, used to develop communication, meta-cognition, and interpersonal skills in students (e.g. blogs, communities of practice, e-portfolios, LMS). These skills are highly relevant to a graduate of URV institution, because of the structure of URV programs and the adoption of the Bologna Declaration principles. In this educative context centred on students' learning achievements, diverse digital technologies (e.g. e-portfolios, interactive whiteboards) were implemented by the academic program as a pedagogical strategy based on monitoring students' competencies in order to accredit learning.

3.7. Population and Sampling

Various suggestions have been made for sampling decision in the research process. According to Collins et al. (2006), there are 24 major sampling schemes in both quantitative and qualitative studies. For the purpose of the study, "homogeneous" and "convenience" samples were used; settings, groups and/or individuals are chosen based on similar or specific characteristics (homogeneous) (Miles & Huberman, 1994; Collins, Onwuegbuzie & Jiao, 2006) and are available and willing to participate in the study (convenience) (Collins et al., 2006; Creswell, 2003).

The purpose of homogeneous sample was to describe some particular group in depth (Patton 2002), e.g. first-year university students of the degrees of Pedagogy, Social Education, Early Education and Primary Education. Given that the research was taking place in an educational environment, the researcher was specifically interested in exploring students' opinions and experiences of academic and social purposes of digital technologies. Convenience sampling was the best option when "it is extremely difficult (sometimes even impossible) to select either a random or a systematic nonrandom sample" (Fraenkel &

Wallen, 2009, p. 98). Only convenience sample was possible taking into consideration time and cost (Patton, 2002). Also, it is useful when investigating a problem in a specific context. In general, convenience samples cannot be considered representative of any population, for that reason the researcher should be especially careful to include information on demographic and other characteristics of the sample studied (Fraenkel & Wallen, 2009).

3.8. Research Phases

The research was conducted in two main phases. In the first phase, the quantitative data was collected via an online questionnaire. The goal of this phase was to provide a general picture into how first-university students communicate with peers and professors after entering university and their general study habits and to examine the possible relationship between students' use of ICTs and communication and study habits. The focus was on the analysis of students' habits and usage of some communication features and possible reasons behind. In the second phase, the qualitative data was collected via semi-structured interviews with a sample of 40 students who participated in the first phase of the study. The goal of this phase was to delve deeply into students' use of digital technology for academic and social purposes, and to understand interviewees' views on their situations, experiences and lives as expressed in their own words.

Each phase was designed to exploit its potential for gaining reliable, valid, rich and insightful data that would assist in answering the aim of the research study. Collecting both quantitative and qualitative data within a single research study helps neutralize the limitations of each method by highlighting the strengths of the other method (e.g., the detail of qualitative data can provide insights not available through the quantitative surveys) (Creswell et al., 2003; Creswell & Plano Clark, 2007).

I Phase

The universe of the present study was the first year university students of the Faculty of Educational Sciences and Psychology - of the degrees of Pedagogy, Social Education, Early Education and Primary Education. All the first-year students (457) were invited to participate to this international study in the 2012-2013 academic year (Table 12).

Table 12. Population and Sampling

Programs	Campus					
	Tarragona		Tortosa		El Vendrell	
	U	S	U	S	U	S
Early education	122	62	40	15	40	9
Primary Education	120	71	40	7	0	1
Social Education	53	22	0	0	0	0
Pedagogy	42	17	0	0	0	0
Totals	**337**	**172**	**80**	**22**	**40**	**10**

Note. Universe (U); Sampling (S). Universe 457 students; Sampling 204 students.

II Phase

All the students of second-year - who previously answered the "Survey of Student Communication & Study Habits" - of the degrees of Pedagogy, Social education, Early education and Primary education (Campus Tarragona, El Vendrell and Tortosa), were invited to participate to this international study in the 2012-2013 academic year. The sample consisted of 40 students (see Table 15).

3.9. Data Collection

The interpretive paradigm employs different knowledge claims, strategies of inquiry, and methods of data collection and analysis. In the interpretive paradigm, researchers look for involvement of their participants in data collection and seek to build rapport and credibility with the individuals in the study (Creswell, 2003). The main data collection techniques used in this research study were the literature reviews, interviews and questionnaires. The data collection started in February 2012 and was completed in March 2013.

Literature Review

The first stage of the research design took into account the review of the research literature in order to provide information relating to the general background and context of the study. In the literature review, we explored the definitions of digital technologies (software and devices); their uses for academic and social purposes; and, the terms, concepts and characteristics of the students in the digital era. Such work provided the theoretical starting point for the thesis and the broad area from which the research questions have emerged. This overview of literature on conceptions of terms attempts to highlight the similarities and variations in the findings from previous investigations in this area (see Chapter 2).

Questionnaire

The first major method of data collection is the use of questionnaires for collecting survey information, providing structured, often numerical data, being able to be administered without the presence of the researcher, and often being comparatively straightforward to analyse (Cohen et al., 2007; Tashakkori & Teddlie, 2003).

The survey instrument employed was online questionnaire - adapted from a "Survey of Student Communication & Study Habits" that was developed by Bullen et al. (2008). The purpose of the questionnaire was to gain insights into how first-year university students communicate and their general study habits. The questionnaire was adapted and translated to Spanish by experts from the Open University of Catalonia (UOC), a Spanish open online university (see Romero et al., 2013). However, the terminology was adapted to the URV's educational model, by some members of the Applied Research Group in Education and Technology (ARGET) from URV, a face-to-face university. They gave their expert advice in respect of the language level, the appropriateness and the overall face validity of the questionnaire. For the purpose of the study we prefer to use the term "test adaptation" over "translation". The term test adaptation is broader and more reflective because consider cultural, idiomatic, linguistic and contextual aspects concerning (Borsa, Damásio & Bandeira, 2012; Hambleton & Patsula, 1998). Test translation is merely the first stage of the adaptation process (Hambleton & Patsula, 1998). By adapting an instrument, the researcher is able to compare data from different samples and from different backgrounds, to generalize and to investigate differences within an increasingly diverse population (Borsa, Damásio & Bandeira, 2012).

The survey is uses a Likert-type scale of four choices (from "never" to "always"; "strongly disagree" to "strongly agree") with 78 item questionnaire (see Appendix B), in four sections: a) section 1 which deals with the demographic information data of the subjects, b) section 2 deals with whom the students turn to for help, c) section 3 deals on how and where the students communicates with peers and professors, and d) the last section deals with study and communication habits with classmates and professors. The majority of questions were closed-ended items followed by a list of options, "enable respondents to select the response that most closely represents their view" (Cohen et al., 2007, p. 324).

The "other" option and the open-ended questions enable respondents to write a free response in their own terms/words (Cohen et al., 2007; Tashakkori & Teddlie, 2003).

All the 457 students of first-year of the degrees of Pedagogy, Social education, Early education and Primary education, where invited to participate to this international study. The instrument was distributed by institutional e-mail (see Appendix A) and through the institutional learning management system (URV Moodle) requesting participation and providing a link to the online questionnaire (http://late-dpedago.urv.cat/habitos_estudio/). Students were asked to volunteer to do the online survey anonymously. All participants were informed of the nature of the survey and of their voluntary and confidential participation. The average completion time of the survey was approximately 20 minutes. The administration of the questionnaires took place over three months from February to April 2012.

Interview

The instrument designed for the purposes of data gathering is consistent with the interpretivist paradigm: semi-structured interviews were the primary source of data collection for the study. The qualitative interview is a specific form of conversation with the emphasis on researchers asking questions and listening, and respondents answering (Kvale, 1996; Warren, 2001). The main types of interviews are unstructured, semi-structured and structured. There are various forms of interview design to obtain thick and rich data (a) informal conversational interview, (b) general interview guide approach, and (c) standardized open-ended interview.

Semi-structured interview with open-ended questions was selected as the means of data collection because of some considerations. First, it is a widely used research instrument for interpretivist/qualitative research and can occur either with an individual or in groups (Grindsted, 2005; Dicicco-Bloom & Crabtree, 2006). Second, its aim is to gain insight into how people attribute meaning to their worlds in social interaction with respect to interpretation of their meaning (Grindsted, 2005; Kvale, 1996). Third, it is well suited for the exploration of the perceptions, opinions, experiences and viewpoints of respondents regarding complex and sometimes sensitive issues and enable probing for more information and clarification of answers (Barriball & While, 1994; Turner, 2010).

Interview Process

For the theoretical background of framing our research, we used Kvale's (1996) seven stages of conducting qualitative interviews in order to organize the empirical work of the project in a more precise way (see Table 13).

Table 13. Stages of an Interview Investigation

Stage	Descriptions
Thematizing	Refers to a conceptual clarification and a theoretical analysis of the theme investigated, and the formulation of research questions. Formulate the purpose of an investigation and describe the concept of the topic to be investigated before the interviews start. The *why* and *what* of the investigation should be clarified before the question of *how* – method – is posed.
Designing	Plan the design of the study, taking into consideration all seven stages of the investigation, before the interviewing starts. Designing the study with the regard to obtaining the intended *knowledge* and taking into account the moral implications of the study.
Interviewing	Conduct the interviews based on an interview guide and with a reflective approach to the knowledge sought and the interpersonal relation of the interview situation.
Transcribing	Prepare the interview material for analysis, which includes a transcription of interviews.
Analyzing	Decide, on the basis of the purpose and the aim of the study, and on the nature of the interview material, which methods of analysis are appropriate for the interviews.
Verifying	Ascertain the generalizability, reliability and validity (trustworthiness) of the interview findings. *Reliability* refers to how consistent the results are, and *validity* means whether an interview study investigates what is intended to be investigated.
Reporting	Communicate the findings of the study and the methods applied taking in consideration the ethical aspects of the research.

Note. Adapted from "Interviews: An introduction to qualitative research interviewing", by S. Kvale, 1996, p. 88.

We conducted face-to-face interviews and the process was flexible with emphasis on explaining and understanding events, patterns, and forms of behaviour of the students. The instrument employed was adapted to the URV's educational model from an interview guide that developed by Bullen, Morgan, Belfer & Qayyum (2008) and its Spanish version that was translated by experts from the Universitat Oberta de Catalunya (UOC). The interview guide (see Appendix C) contained 13 open-ended questions about their use of ICT at the university and their overall perception about technology (Bullen, Morgan &

Qayyum, 2011a; Bullen, Morgan, Romero, Sangrà & Guitert, 2011; Romero et al., 2013). This technique allows students to be asked the same questions within a flexible framework, to gather more detailed information and to reveal their perspectives of the situation under the study (Cohen et al., 2007; Bryman & Bell, 2003; Onwuegbuzie et al., 2012).

Questions centred on how and where students use digital technology for academic and social purposes; how they decide which technologies to use at campus, home and work; if they belong to a generation that born and grow up with digital technology and how they feel about their affinity and tendency to use it. The research questions and the interview guide have guided the analysis of the interviews in order to elicit important concepts, themes and categories from the learner's perceptions, experiences and reflections.

The semi-structured interviews took place over a period of five months at the convenience of the interviewees. Twenty semi-structured interviews were conducted in Tarragona, 10 in El Vendrell and 10 in Tortosa Campus of Rovira and Virgili University. To Cohen, Manion & Morrison (2007, p. 361) the interviewer need "to establish an appropriate atmosphere such that the participant can feel secure to talk freely". For that reason, the location for an interview was organised in advance and was in a quiet place (classrooms, computer lab) of the university so that the interviewee can concentrate on the questions.

The interviewer's job was (a) to establish an atmosphere in which the student feels safe enough to talk freely about his/her experiences and fillings (Kvale, 1996); and (b) to bring the student's full attention to the task and to encourage him/her to answer honestly without influence the responses (Gubrium & Holstein, 2001). Prior to formally commencing the interview, the interviewer/researcher introduced herself, thanked the student for his/her participation, offered him/her a non-alcoholic beverage, reassured them about confidentiality, requested his/her verbal permission to record the interview, explained the overall purpose of the research, and requested that he/she could ask for clarification if they found any questions unclear.

The interviewer/researcher transcribed all the recorded data in their entirety using the system of transcription developed by Poland (2001) and Warren (2001) (see Table 14). To ensure that the transcripts provided the best representation of the student's speech as possible, verbatim transcriptions include translation of the spoken word into an acceptable

written format while maintaining the participant's general modes of expression (Kvale, 1996). This process involves close observation of data through repeated careful listening and was very detailed to capture crucial features for interpreting data such as emphasis, speed, tone of voice, timing and pauses (Bailey, 2008). Transcribing demanded much attention, concentration, effort and long time-consuming (from April to October 2013). Although this was a time consuming process, the richness of many of the interviews warranted such an effort. This ensured confidentiality and also allowed the interviewer to familiarise herself with the data at a very intimate level. Transcribing was itself part of the data analysis process.

Table 14. Conventions of Transcription

Symbol	Meaning
[	Speaker's talk is overlapped by another's talk
-	Interruption: Speaker speech is broken off
(…)	Short pauses during the talking.
(xxx)	Talk too obscure to transcribe or cannot be deciphered at all
(( ))	Interviewer's descriptions rather than transcription
" "	Speaker is said or expressing an inner voice or paraphrasing others
.,!?	Punctuation indicates speaker's intonation
mmm	Repeated vowels/consonants indicate prolongation of the sound. The length of the row of vowels/consonants indicates the length of the prolongation
word	Italics to denote a word from another language (Catalan or English)
PALABRA	Mayúsculas indican una subida marcada de entonación.

Note. Adapted from "Transcription Quality", by B. D. Poland, 2001, and "Qualitative interviewing", by C. A. B. Warren, 2001.

All the interviews were recorded using a digital audio-recording device. Recording an interview gives an exact record of what was said during each interview and allows the researcher to focus solely on the interview process, concentrate on the topic and the dynamics of the interview, pay more attention to nonverbal communication and ask relevant supplementary questions (Basit, 2010; Kvale, 1996, 2011). In total more than nine hours of interview data were recorded and transcribed fully with the gathered material being considered confidential (Table 15).

Table 15. Interview Information

N°	Date	Gender	Age	Program	Campus	Length
01	29/11/2012	Female	58	Pedagogy	Tarragona	00:42:34
02	29/11/2012	Female	31	Primary education	Tarragona	00:11:38
03	14/12/2012	Female	29	Early education	Tarragona	00:19:29

04	17/12/2012	Female	21	Social education	Tarragona	00:13:09
05	17/12/2012	Female	50	Social education	Tarragona	00:11:29
06	17/12/2012	Male	22	Social education	Tarragona	00:17:25
07	17/12/2012	Male	25	Social education	Tarragona	00:11:55
08	17/12/2012	Male	24	Social education	Tarragona	00:14:36
09	21/12/2012	Female	34	Social education	Tarragona	00:12:20
10	21/12/2012	Female	26	Pedagogy	Tarragona	00:09:49
11	21/12/2012	Female	19	Social education	Tarragona	00:11:07
12	16/10/2013	Female	24	Early education	El Vendrell	00:13:57
13	16/10/2013	Female	23	Early education	El Vendrell	00:10:31
14	16/10/2013	Female	22	Early education	El Vendrell	00:11:01
15	16/10/2013	Female	45	Early education	El Vendrell	00:10:58
16	16/10/2013	Female	24	Early education	El Vendrell	00:09:59
17	16/10/2013	Female	22	Early education	El Vendrell	00:09:36
18	16/10/2013	Male	20	Early education	El Vendrell	00:13:26
19	16/10/2013	Female	24	Early education	El Vendrell	00:11:21
20	16/10/2013	Female	20	Early education	El Vendrell	00:13:05
21	16/10/2013	Female	19	Early education	El Vendrell	00:09:07
22	29/01/2013	Female	26	Pedagogy	Tarragona	00:20:39
23	29/01/2013	Male	24	Pedagogy	Tarragona	00:14:47
24	29/01/2013	Male	22	Pedagogy	Tarragona	00:14:22
25	29/01/2013	Female	29	Pedagogy	Tarragona	00:15:33
26	05/02/2013	Female	29	Pedagogy	Tarragona	00:10:21
27	05/02/2013	Male	27	Pedagogy	Tarragona	00:15:47
28	18/02/2013	Female	20	Pedagogy	Tarragona	00:13:34
29	19/02/2013	Male	20	Primary education	Tortosa	00:15:09
30	19/02/2013	Male	26	Primary education	Tortosa	00:15:24
31	19/02/2013	Male	19	Primary education	Tortosa	00:16:30
32	19/02/2013	Female	21	Primary education	Tortosa	00:12:00
33	19/02/2013	Female	25	Primary education	Tortosa	00:09:53
34	19/02/2013	Female	21	Primary education	Tortosa	00:11:55
35	19/02/2013	Male	19	Primary education	Tortosa	00:11:07
36	19/02/2013	Female	23	Primary education	Tortosa	00:15:58
37	19/02/2013	Female	45	Primary education	Tortosa	00:17:35
38	19/02/2013	Female	23	Primary education	Tortosa	00:16:01
39	05/02/2013	Female	24	Pedagogy	Tarragona	00:11:09
40	04/03/2013	Female	24	Pedagogy	Tarragona	00:15:08

3.9. Data Analysis Procedures

Miles and Huberman (1994, p. 10) defined qualitative analysis as "consisting of three concurrent flows of activity: data reduction, data display, and conclusion drawing/verification". The process of data analysis involves "preparing the data for analysis, moving deeper and deeper into understanding the data, representing the data, and making an interpretation of the larger meaning of the data" (Creswell, 2003; p. 190). The

process of data analysis occurs both within the quantitative (descriptive analysis) phase and the qualitative (description and thematic analysis) phase.

Data Analysis of Questionnaire

A descriptive statistical method was used to analyze, describe and present the quantitative data from the "Survey of Student Communication & Study Habits" (Creswell, 2003; Cohen et al., 2007; Creswell & Plano Clark, 2011). Descriptive techniques intend to summarise numeric data in tables, graphs or representations of scores/percentage (Cohen et al., 2007). Descriptive statistics seeks to support researchers in understanding the data, detecting patterns and better communicating the results (Tashakkori & Teddlie, 2003). A statistical software program, SPSS (Statistical Package for Social Sciences) - the most widely used statistical package for social sciences (Cohen et al., 2007) - was used for in-depth data analyses. Results were recorded in a spreadsheet and transferred to SPSS for statistical analysis.

Data Analysis of Interviews

The qualitative software Atlas.ti 7.1.7 was used to import the transcription of the interview and to code each response. During data analysis, the interviewer/researcher immerses herself in all the material, working with all the interview transcriptions. It was conducted following the three-phase procedure described by Miles and Huberman (1994).

Data reduction is the first step of qualitative data analysis and involved the process of selecting, simplifying, abstracting and extracting themes and patterns from transcripts. The aim of this reduction is to organize data in such way that final conclusions can be drawn and verified (also known as data condensation) (Miles & Huberman, 1994).

To accomplish this task, *thematic analysis* was employed to analyse the semi-structured interviews as outlined by Braun and Clarke (2006) (Table 16). Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data that minimally organizes and describes the data set in (rich) detail (Braun & Clarke, 2006). By using thematic analysis, there is the possibility to link the various concepts and opinions of the learners and compare these with the data that has been gathered during the literature review. The process consists of reading through textual data, identifying themes, coding, and interpreting the structure and content of the themes (Guest, Namey & Mitchell, 2013).

Table 16. Phases of Thematic Analysis

Phase	Description of the process
Familiarizing yourself with your data	Transcribing data, reading and re-reading the data, noting down initial ideas.
Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
Reviewing themes	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Note. From "Using thematic analysis in psychology", by V. Braun & V. Clarke, 2006, *Qualitative Research in Psychology*, *3*(2)*, p 87.

Data reduction began with reading and re-reading the transcribed data. The themes began to emerge with the initial reading of each transcript. According to Miles and Huberman (1994, p. 56), codes are defined as "tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study''. Coding is the first step of data analysis by indexing or categorizing the text in order to establish a framework of thematic ideas about it (Strauss & Corbin, 1990; Gibbs, 2007). Interview transcripts were imported into Atlas.ti for analysis and *in vivo codes* - assigning a label to a section of data using a word or short phrase taken from the transcripts (Given, 2008) - were generated. The transcriptions were analysed using open, axial and selective coding strategy (Strauss & Corbin, 1990). In open coding, interviewer/researcher immerses herself in the data through line-by-line analysis, coding the data in as many ways as possible into themes and categories (Strauss & Corbin, 1990; Miles & Huberman, 1994; Cohen et al., 2007). According to Gibbs (2007, p. 52), line-by-line coding forces the researcher "to pay close attention to what the respondent is actually saying and to construct codes that reflect their experience of the world". In axial coding, the categories are "refined, developed and related or interconnected" (Gibbs, 2007, p. 50). During axial coding, the researcher works to understand categories in relationship to other categories and their subcategories. During selective coding, the core category is identified, selected and related, in a systematic way, to the other categories uncovered in the research (Strauss & Corbin, 1990; Gibbs, 2007).

Analysis was a highly iterative process involving successively reading, coding, reviewing, and re-coding the data into categories or "families" (family: term used within Atlas.ti to refer to thematic categories) because they share some characteristic (Creswell, 2003; Fereday, 2006; Saldaña, 2009). This process uses inductive reasoning, by which categories and codes, supported by quotations, emerge from the data through the researcher's careful examination and constant comparison. Code names were assigned to those themes that were detected and then organized into categories (sub-categories) of related topics, patterns, concepts, and ideas that emerged from learners' perspectives.
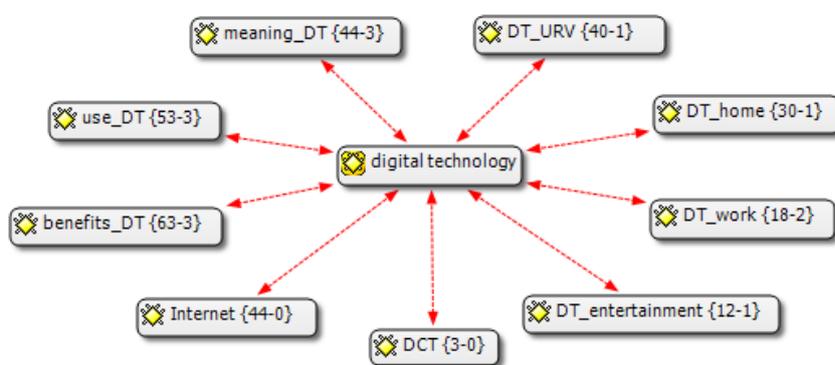
Figure 4. Digital technology theme.
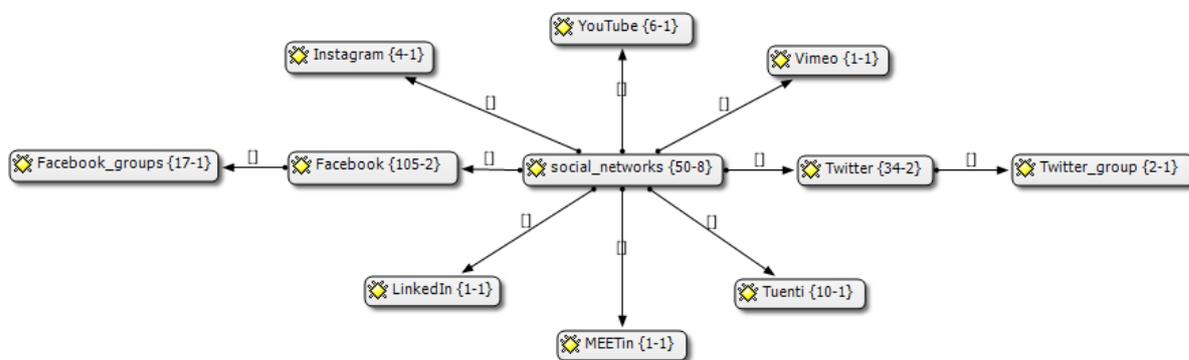
Figure 5. Sample of category, sub-categories and codes.

Overall, the process of coding produced two themes (digital technology and generation of students), twelve categories, several of which included smaller subcategories and 145 codes. In regard to "digital technology", these categories consisted of (1) meaning (software and device), (2) benefits (social and academic purposes; disadvantages), (3) use (frequency: low, moderate and high; social and academic purposes), (4) for university (URV resources, used at URV, used by professors), (5) for home, (6) for work, (7) for

entertainment, (8) digital communication technologies (software and device), and (9) Internet (daily use, frequency and connection). In "generation of students", these categories consisted of (10) terms, (11) identification and (12) factor. A detailed list of categories and codes can be found in Appendix D. Figures 4 shows the digital technology theme and its categories; and Figure 5 shows a sample of category, sub-categories and codes.

Data display is the second step and is used to incorporate information into an accessible summary to facilitate later conclusion-drawing that include matrices (see Appendix D) and networks (see Figure 4) (Miles & Huberman, 1994). Matrices are rows and columns of data that have been extracted from coded transcripts and are organized according to themes. Networks are charts that summarize information by providing a picture of reduced data.

Conclusion-drawing and verification is the final step of data analysis and consists of drawing initial conclusions (Miles & Huberman, 1994). The results are verified and deemed appropriate by evaluating their trustworthiness.

Instrumentation: Choosing Qualitative Data Analysis Software

All the interviews were transcribed, analysed and coded using Atlas.ti (Figure 6), a computer-assisted qualitative data analysis (QDA) software, and user friendly application. According to Dicicco-Bloom and Crabtree (2006, p. 315) "using a computer to facilitate analysis can save time, make procedures more systematic, reinforce completeness and permit flexibility with revision of analysis processes". The choice of this qualitative data analysis software was grounded in a number of reasons: (a) for its capacity to handle and organise the large amounts of data that was collected throughout this study, "by allowing the researcher to concentrate on conceptual issues, without having to worry about storage and retrieval of information" (Attride-Stirling, 2001, p. 403); (b) enable the researcher to associate codes or labels with chunks of text, sounds, pictures, video and other digital media formats that cannot be meaningfully analysed by formal, statistical approaches; (c) to search these codes for patterns; and (d) to construct classifications of codes that reflect testable models of the conceptual structure of the underlying data (Lewis, 2004; Hwang, 2008).
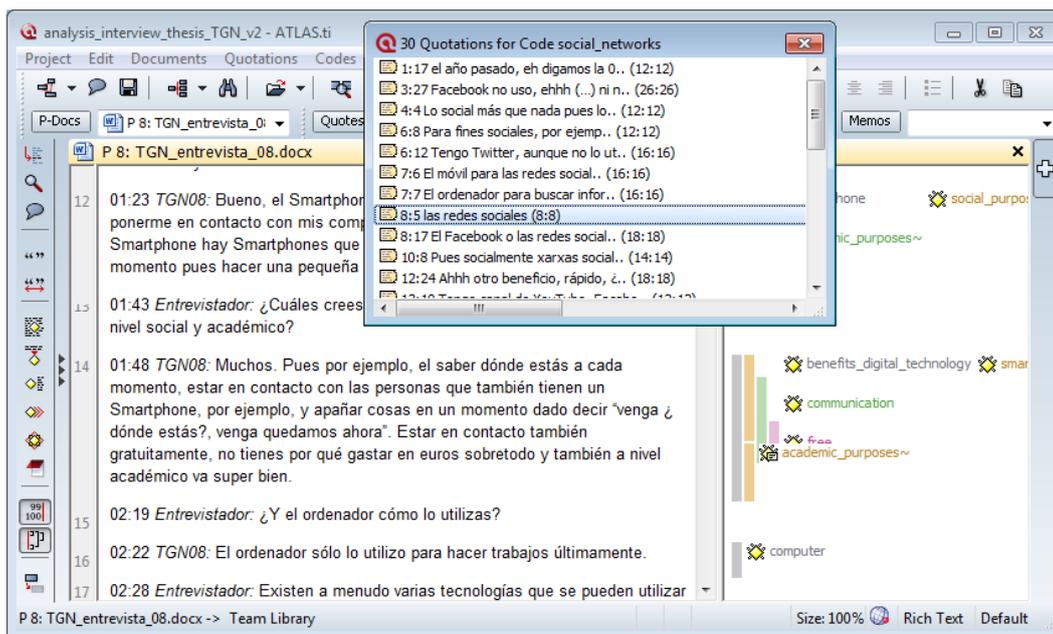
Figure 6. Sample of analysis process in Atlas.ti.

The use of the Atlas.ti software has significantly facilitated the process of organising, re-arranging and managing the considerable amount of data. For example, after coding the interviews, all passages assigned to a specific code could be viewed on screen and printed. Figure 6 illustrate one interview with all relevant codes that was being displayed on the right hand side enabling ease of navigation. Different sets of interviews were assigned with different colours for easy distinction.

Integration of Quantitative and Qualitative Data

Creswell (2003, p. 212) suggests that integration of two types of data might "occur at several stages in the research process". It could occur during data collection, analysis, interpretation, or in some combination of these stages. In this study, integration of qualitative and quantitative data occurred largely at the interpretation stage and in the final discussion.

3.10. Trustworthiness

Validity and reliability are terms from the quantitative/positivist paradigm (Denzin & Lincoln, 2000) and are very important concepts to take into consideration when carrying out quantitative research since they help to determine the objectivity of the research. Validity in interpretivist research has to do with description and explanation and whether

or not the explanation fits the description. In other words, the researcher determines and checks the accuracy or credibility of the findings through strategies or procedures (Creswell, 2003, 2008). Reliability referred to the stability of findings, whereas validity represented the truthfulness of findings (Whittemore, Chase & Mandle, 2001). The term is particularly at issue in connection with the quantitative research rather than qualitative (Bryman & Bell, 2003). In quantitative research, reliability is "essentially a synonym for dependability, consistency and replicability over time, over instruments and over groups of respondents" (Cohen et al., 2007, p. 146).

The positivist viewpoint of reliability, validity and the canons of rigor of quantitative research are not applicable to qualitative research (Denzin & Lincoln, 2000; Maxwell, 1992; Whittemore et al., 2001). To solve this dilemma, qualitative researchers have developed measurement concepts in line with the qualitative paradigm. Lincoln and Guba (1985; see also Schwandt, Lincoln & Guba, 2007) suggested the term "trustworthiness" that is defined in terms of credibility (internal validity), transferability (external validity), dependability (reliability) and confirmability (objectivity). Maxwell (1992) developed five categories to judge the validity of qualitative research: descriptive validity, interpretive validity, theoretical validity, generalizability, and evaluative validity (Table 17).

Table 17. Types of Validity in Qualitative Research

Categories	Descriptions
Descriptive validity	Refers to the accuracy of the data that must accurately reflect what the participant has said or done. Two types: a) Primary descriptive validity: "the descriptive validity of what the researcher reports having seen or heard (or touched, smelled, and so on)" (p. 286). b) Secondary descriptive validity: "the validity of accounts of things that could in principle be observed, but that were inferred from other data" (p. 286). The omission of things that participants in the discussion feel are significant to the account threatens the descriptive validity of that account. "For example, a verbatim interview transcript might be descriptively invalid in omitting features of the informant's speech, such as stress and pitch, that are essential to the understanding of the interview" (p. 287). All observation and description are based on theory.

Interpretive validity	Captures how well the researcher reports the participants' meaning of events, objects and/or behaviours. To Maxwell, the term "meaning" include intention, cognition, affect, belief, evaluation, and anything else that could be encompassed by what is broadly termed the "participants' perspective" (also conscious and unconscious concepts of participants), as well as communicative meaning in a narrower sense. "Interpretive accounts are grounded in the language of the people studied and rely as much as possible on their own words and concepts" (p. 289).
Theoretical validity	"Goes beyond concrete description and interpretation and explicitly addresses the theoretical constructions that the researcher brings to, or develops during, the study" (p. 291). This theory can refer to either physical events or mental constructions. It can also incorporate participants' concepts and theories, but its purpose goes beyond simply describing these participants' perspectives. Two aspects: "the validity of the concepts themselves as they are applied to the phenomena, and the validity of the postulated relationships among the concepts" (p. 291). What counts "depends on whether there is consensus within the community concerned with the research about the terms used to characterize the phenomena" (p. 292).
Generalizability	Refers to the ability to extend the account of a particular persons or situations studied to other persons, times, or settings, but also shows how the same process, in different situations, can lead to different results. Two aspects of generalizability: a) Internal: "generalizing within the community, group, or institution studied to persons, events, and settings that were not directly observed or interviewed" (p. 293). b) External: "generalizing to other communities, groups, or institutions" (p. 293).
Evaluative validity	"Involves the application of an evaluative framework to the objects of study, rather than a descriptive, interpretive, or explanatory one" (p. 295). This validity is "not as central to qualitative research as are descriptive, interpretive and theoretical validity" (p. 295).

Note. Adapted from "Understanding and validity in qualitative research", by J. A. Maxwell, 1992, *Harvard Educational Review*, 62(3).

Given the interpretative nature of the study, we prefer to use the term "trustworthiness". To make sure that data are collected and analysed appropriately - in other words that they have "interpretative validity - we used the following evaluation criteria features to maintain the *trustworthiness*: (a) credibility (How accurate or "truthful" are the findings of this study?); (b) transferability (How applicable might these findings be to other groups or settings?); (c) dependability (If we were to replicate this study with the same participants would we obtain the same outcome?), and (d) confirmability (How do we know the findings represent the viewpoints of the respondents and conditions of the inquiry are not representative of the researchers' viewpoints, motivations, interests, or perspectives? (Lincoln & Guba, 1985; Walsh, 2003).

a) Credibility

Assuring credibility refers to the conscious effort to establish confidence in an accurate interpretation of the meaning of the data (Whittemore et al., 2001). As regards credibility, the research process has been rigorous, detailed and thorough. This was achieved by prolonged engagement with participants (Schwandt et al., 2007) and with "rigorous methods for doing fieldwork that yield high-quality data that are analysed systematically with attention to issues of credibility" (Patton, 2002, p. 552).

In an attempt to establish the credibility of the adapted online questionnaire and interview guide, experts who were researchers in this area scrutinized the contents of the instruments. For that reason, the interviewer solicited feedback about the research, the lists of categories and coding with the principal investigator of the project and several senior researchers and experts from URV (Spain) and LMU Munich (Germany). According to Saldaña (2009, p. 28) "sharing coded field note excerpts and discussing your 'dilemmas' about coding and analysis generate peer support and may even help you and others find better connections between categories in progress". This process allowed us to establish the robustness of coding.

We also relied on triangulation to enhance credibility. Triangulation is a powerful technique of improving and demonstrating that findings and interpretations will be found credible, particularly in qualitative research (Lincoln & Guba, 1985; Cohen et al., 2007). Triangulation is the corroboration of results with alternative sources of data to build a coherent justification (Lincoln & Guba, 1985; Creswell, 2009). In this study, triangulation attempts to explain more fully, the richness and complexity of student's behavior, viewpoints, and experiences by studying it from more than one standpoint and, in so doing, by making use of both quantitative and qualitative data (Cohen et al., 2007). In 1970, Denzin (Denzin & Lincoln, 2000; Lincoln & Guba, 1985; Patton 2002) identified four types of triangulation: (a) data triangulation: using a variety of data sources in a study; (b) investigator triangulation: using several researchers or evaluators; (c) theory triangulation: using multiple perspectives to interpret the data; and (d) methodological triangulation: using multiple methods to study a single problem.

This study employed the data triangulation and methodological triangulation approaches that involved comparing and integrating data collected through different data collection

modes (questionnaires and interviews) at different times. By comparing and contrasting results from a variety of case data, the researcher was able to eliminate errors and to identify omissions caused by her own perceptions. Besides, triangulation using both quantitative and qualitative techniques not only brings confidence to researchers on their research findings, but also increases the validity of theoretical development and generation.

b) *Transferability*

The transferability seeks to determine if the findings to other contexts can be transferred to other situations (Lincoln & Guba, 1985; Miles & Huberman, 1994) and was enhanced by detailed and rich descriptions of questionnaire and interview findings to provide the reader with sufficient information to be able to judge the applicability of the findings to other settings that he/she know. The transferability of the interviews was made possible by detailed documentation of the data processing in a codebook (Zhang & Wildemuth, 2009). A codebook, also called a coding frame, is a tool for the development and evolution of a coding system and is an important means for documenting the codes and the procedures for applying them (Weston, Gandell, Beauchamp, McAlpine, Wiseman & Beauchamp, 2001).

To ensure the consistency of coding, the interviewer developed a codebook (see Appendix D) consisting of a set of categories/codes names, definitions for assigning codes, and representative examples of quotes from interviews (DeCuir-Gunby, Marshall & McCulloch, 2010; Weston, et al., 2001). The codebook was developed through an iterative process that necessitates revising the definitions several times as the researcher gain clearer insights about the interview data. The codebook structure includes the following three basic components: category/code name, a definition of category/code and representative examples of quotes from interviews.

c) *Dependability*

The notion of reliability is construed as dependability by Lincoln and Guba (1985). In the questionnaire, the reliability of all items used was checked with Cronbach's alpha coefficient, the most popular coefficient reported to support the reliability of a scale based on its internal consistency (Cronbach & Shavelson, 2004; Cohen et al., 2007; Yang & Green, 2011). The reliability analysis results were an alpha of 0.924 which demonstrates a high level of agreement between participants (Table 18).

Table 18. Cronbach's Alpha Coefficient

Scale	N° of items	Alpha coefficient
Who do you turn to for help with your courses?	17	0,845
How and where do you communicate with peers and professors?	26	0,880
Your study and communication habits with classmates and professors	31	0,891
All items	**78**	**0,924**

Content validity of the original questionnaire was made by five researchers and practitioners in educational technology in Canada. Detailed information can be found at Qayyum (2010). Content validity of the adapted version of the questionnaire and interview guide was reviewed by the principal investigator of the project from Canada and three experts from the UOC (Spain). Detailed information on content criteria validation can be found at Romero, Guitert, Sangrà and Bullen, (2013). However, the terminology was adapted to the URV's educational model, by three members of ARGET Group from URV.
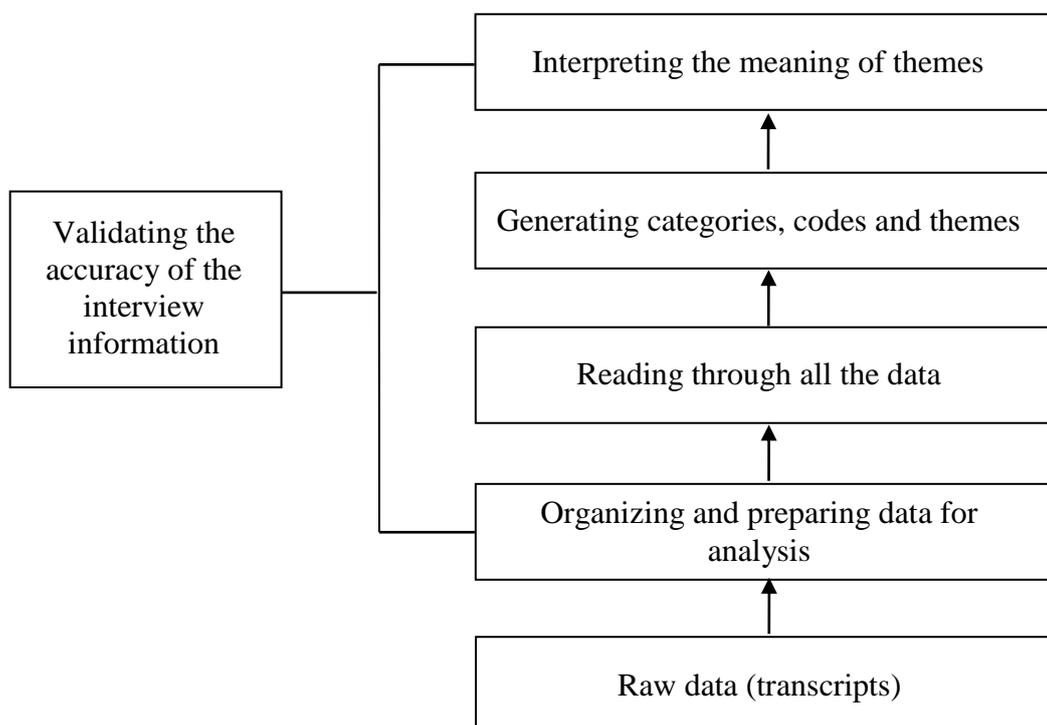
Figure 7. Validation process of the interview information. Adapted from "Research design: Qualitative, quantitative, and mixed method approaches", by J. W. Creswell, 2009, p. 185.

The dependability of the interview findings was established by the transparent coding process (see figure 7) and inter-coder verification. Eight iterations of coding, recoding and

refinement of categories, definitions and examples preceded the final version of the coding scheme. The final version was used to determine intercoder reliability and agreement. This is a very important tool for enhancing reliability, as coding proceeds and enables other users of the data to understand where relevant material may be located in the transcripts (Campbell, Quincy, Osserman & Pedersen, 2013).

To maintain rigor, strategies for monitoring and improving intercoder agreement, and therefore reliability, were implemented in the analytic process in which one coder independently classifies material in the same way as the interviewer to reduce the error and bias generated during processing the voluminous amount of text-based data generated (Hruschka, Schwartz, St.John, Picone-Decaro, Jenkins & Carey, 2004; Vaismoradi, Turunen & Bondas, 2013).

There is little agreement as to how large a sample of texts is appropriate. According to Krippendorff (2013), it is acceptable to assess intercoder reliability on a sample of the texts to be analysed, especially when costs prohibit multiple codings of every text. Some researchers (Campbell et al., 2013) recommend using 10 percent of the set of documents while Miles & Huberman (1994) argue that as few as 5 to 10 pages of one set of transcribed field notes is sufficient.

To test the clarity and consistency of the category definitions, 4 interviews (10 percent of interview transcript) were selected at random and coded by the interviewer. After the sample was coded, the set of interviews plus the validation protocol were given to two independently researchers (PHDs in Education) who were not involved in the international project. The coding consistency was checked through an assessment of inter-coder agreement (Weston et al., 2001; Zhang & Wildemuth, 2009). The inter-coder reliability was calculated using the formula from Miles and Huberman (1994): [agreement/agreement+ disagreement] x 100. Miles and Huberman (1994) do not specify a particular intercoder measure, but they do suggest that "intercoder reliability should be up in the 90% range" (p. 64). The results for the two coders were 100% and 96% agreements (Table 19), which were above the acceptable levels mentioned earlier. Finally, the coding rules were applied to the remaining interviews (Zhang & Wildemuth, 2009).

Table 19. Inter-coder Reliability

Interview	Coder A			Coder B		
	Agreements	Disagreements	Reliability	Agreements	Disagreements	Reliability
A	61	0	100%	60	1	98%
B	73	0	100%	70	3	96%
C	79	0	100%	77	2	97%
D	54	0	100%	50	4	93%
Total	**267**	**0**	**100%**	**257**	**10**	**96%**

d) *Confirmability*

According to Lincoln and Guba (1985), the major technique for establishing confirmability is by audit trail of the research processes and findings. Audit trails document the course of development of the completed analysis and enable the research to address the issue of confirmability of results (Cohen et al., 2007). This was enhanced by carefully traced through audit trails kept during the study and presentation of verbatim data. In developing an audit trail, a researcher provides an account of all research decisions and activities throughout the study (see Table 20).

Table 20. Audit Trail Process

Classification	Evidence
raw data	digital recorded interviews field notes: transcriptions completed surveys and interviews surveys and interviews results
data reduction and analysis products	write-ups of field notes: descriptions computer analyses: survey (SPSS) and interviews (Atlas.ti) summaries: quantitative (survey) and qualitative (interview) research notes, concepts and themes
data reconstruction and synthesis	categorical structure: themes, definitions, relationships findings and conclusions: interpretations and inferences final report: connections to existing literature and integration of concepts, relationships and interpretations
process notes	methodological notes: procedures, decisions, strategies trustworthiness notes: credibility, dependability, confirmability
intentions and disposition	proposal: aim, objectives and research questions; intended methodology, relevant literature and information on current theory expectations: future research
instrument development	survey interview guide

Note. Adapted from "Naturalistic inquiry", by Y. S. Lincoln and E. G. Guba, 1985, p. 382-384.

3.11. Ethical Considerations

To ensure ethical considerations, we consider four ethical issues related to the interview process:

a) *Informed consent:* The research process was explained to all students taking part in the study (e-mail, in person). They were also informed that all information obtained was confidential and verbal consent was given before starting interview with them (Miles & Huberman, 1994; Cohen et al., 2007; Kvale, 2007).

b) *Privacy, confidentiality and anonymity:* Participant identification was kept confidential (Miles & Huberman, 1994; Dicicco-Bloom & Crabtree, 2006; Kvale, 2007). Also, care has been taken to store recordings and transcripts of the interviews in a secure place (Creswell, 1998; Cohen et al., 2007). Anonymity of participants was protected by coding numerically (e.g. TGNstudentF01; VDLLstudentM10). "TGN" (Tarragona), "VDLL" (El Vendrell) indicate the Campus; "M" indicates males and "F" stands for female followed by the number of P131_F.

c) *Transcription:* The interviewer ensured that the transcription of interviews was faithful to the original and was sure that this did not break any confidentiality without affecting the content (Gibbs, 2007; Kvale, 2007).

d) *Reporting*: The researcher aim to communicate the findings "in a form that is both scientifically sound and readable" (Kvale, 2007, p. 259) and be in line with the ethical guidelines mention above.

To avoid any potential conflict of interest, all participants were fully informed in advance of the interviewer identity and background, therefore allowing them to choose not to participate if they felt that there might have been a conflict of interest (Cohen et al., 2007).

3.12. Summarize

The purpose of this Chapter was to outline the different research approaches available for a social inquiry and describe the research design chosen for this study. Interpretive research approach was adopted in this study (a) to achieve its aim and research questions. We have chosen this approach because mixed methods and interpretivism complement each other. Following Lincoln and Guba (1985), this study addressed quality in terms of trustworthiness (see Table 21).

Table 21. Trustworthiness' Criteria

Criteria	Technique
Credibility	prolonged engagement, triangulation (methods and data), consultation with experts
Transferability	thick description, providing rich detail of the context of the study
Dependability	Cronbach's alpha coefficient, inter-coder agreement and reliability, codebook
Confirmability	audit trail

CHAPTER 4

Introduction

Chapter 4: Findings: Student Communication and Study Habits

This chapter provides the findings of the online survey "Student communication and study habits" administered to first year university students of the Faculty of Educational Sciences and Psychology - of the degrees of Pedagogy, Social Education, Early Education and Primary Education - in February to April 2012 at Rovira i Virgili University (Tarragona, Spain) for the academic year 2011-2012. This chapter gives an overview how students interact with classmates and professors outside of class. The chapter also covers students' habits (communication and study). Finally, respondents' views are used to draw a profile of a digital learner.

On-line questionnaires were administered to 457 students and 204 students answered the questionnaires. The findings are hereby presented in descriptive statistics and thematic narrative form. The researcher uses descriptive statistical technique to calculate the frequencies, means and standard deviations of the collected data. These findings are presented in four sections according to the questionnaire. The first section gives demographic information of the respondents and the rest three are in line with the research questions.

4.1. Section 1: Demographic Information of Students

The demographic information of students included year of birth, gender, student status, campus, program of study, year they started the studies, hours of classes attend, hours they are on campus, and hours they work at a job as shown in Table 22. Respondents were all first-year part and full-time students of the Department of Pedagogy of the Faculty of Education Sciences and Psychology. This Department offers the following undergraduate degrees: Pedagogy, Social Education, Early Education and Primary Education.

Table 22. Demographic Information of Students

Variable	Category	Frequency	Percent
Year of birth	1957 – 1979	12	5.9
	1980 – 1985	16	7.4
	1986 – 1990	59	28.9
	1991	16	7.8

	1992	25	12.3
	1993	75	36.8
	Missing value	1	0.5
Gender	Female	177	86.8
	Male	27	13.2
Student status	Full-time student	192	94.1
	Part-time student	11	5.4
	Other	1	0.5
Campus	Tarragona	172	84.3
	Tortosa	22	10.8
	El Vendrell	10	4.9
Started studies (year)	2008	1	0.5
	2009	6	2.9
	2010	10	4.9
	2011	178	87.3
	2012	9	4.4
Program	Pedagogy	17	8.3
	Social education	22	10.8
	Early education	86	42.2
	Primary education	79	38.7
Hours of classes attend per week	1-5 hours/week	2	1.0
	6-10 hours/week	8	3.9
	11-15 hours/week	66	32.4
	16-20 hours/week	121	59.3
	21-25 hours/week	5	2.5
	26-30 hours/week	2	1.0
Hours on campus each week	1-10 hours/week	3	1.5
	11-20 hours/week	107	52.5
	21-30 hours/week	85	41.7
	31-40 hours/week	5	2.5
	51-60 hours/week	3	1.5
	+61 hours/week	1	0.5
Hours of work at a job each week	No job	111	54.4
	1-10 hours/week	42	20.6
	11-20 hours/week	29	14.2
	21-30 hours/week	8	3.9
	31-40 hours/week	10	4.9
	41-50 hours/week	3	1.5
	+50 hours/week	1	0.5

The vast majority were 'young' rather than mature-age, and more women than men answered the questionnaire. The majority of the respondents were female (86.8%).

Students' ages ranged from 18 to 54 with a mean of 21.44 and a standard deviation of 5.355, and 70.4% were less than 21 years of age. The majority of the students were between the ages of 18 (37.3%) – 21 (12.7%). Most students were enrolled as full-time status (94.1%), while students enrolled part-time made up 5.4% of the respondents. Eighty-four percent of students had attended classes at Tarragona campus, and majority of the respondents started their studies in 2011. 42.2 % of the students are enrolled in Early Education program and 38.7% in Primary education.
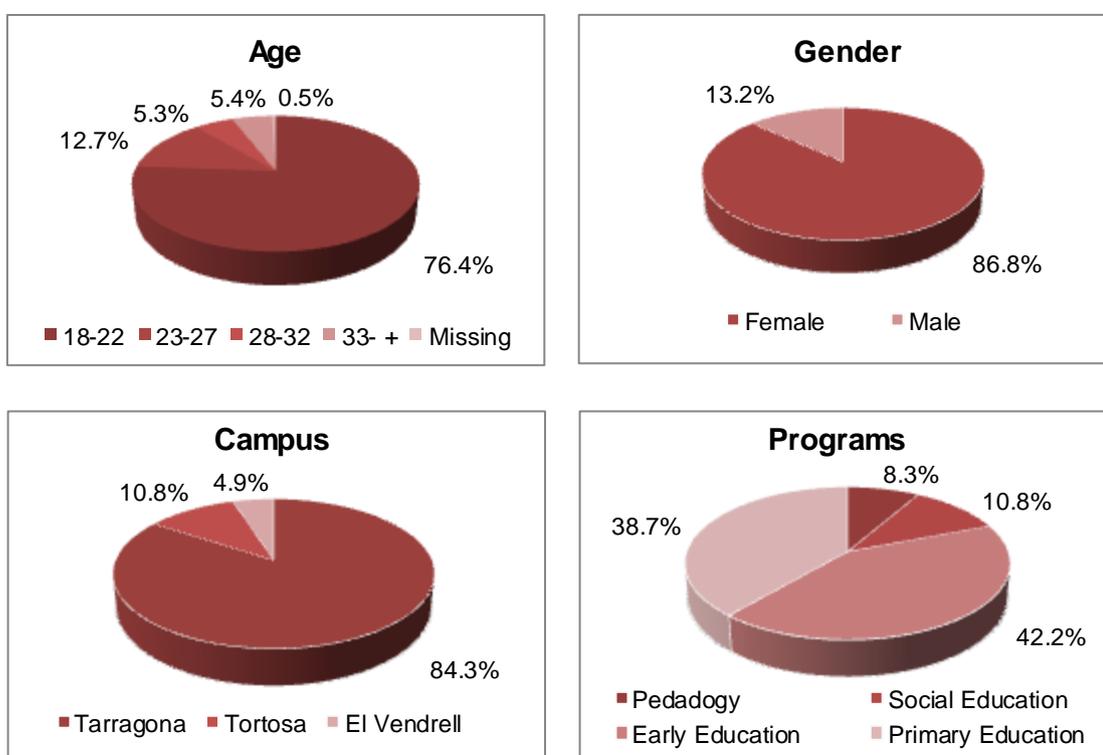
Figure 8. Demographics variables (age, gender, campus and academic programs).

To know about how many hours students "spent studying or working on class projects, we asked the question in three settings: hours of classes attend per week (Mean=16.07) (see Figure 9); hours on campus each week (Mean=22.43) (see Figure 10) and hours of work at a job each week (Mean=7.57) (see Figure 11). The average of hours of classes attend per week was 16.07 hours (standard deviation of 3.511), and most students (59.3%) occupied between 16 and 20 hours each week. The average of hours that students were on campus

each week (including class and non-class time) was 22.43 hours (standard deviation 8.794). The majority of students (93.7%) are between 11 to 30 hours a week on campus.
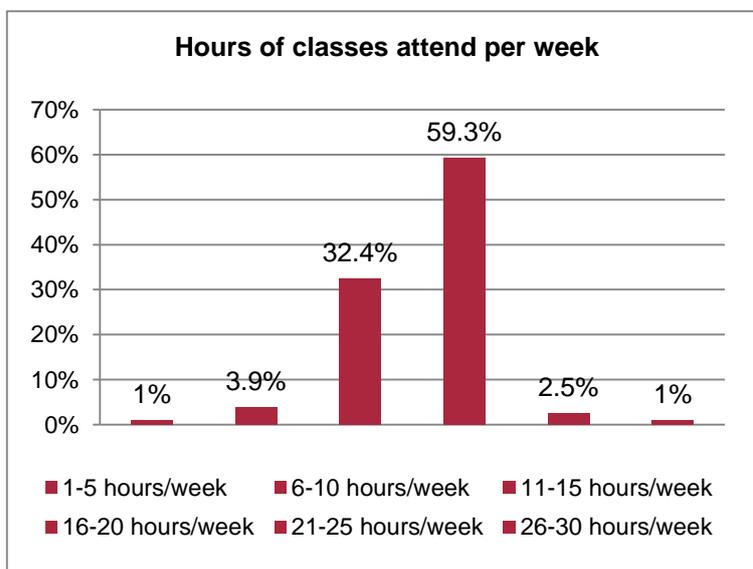
Figure 9. Hours of classes attend per week.
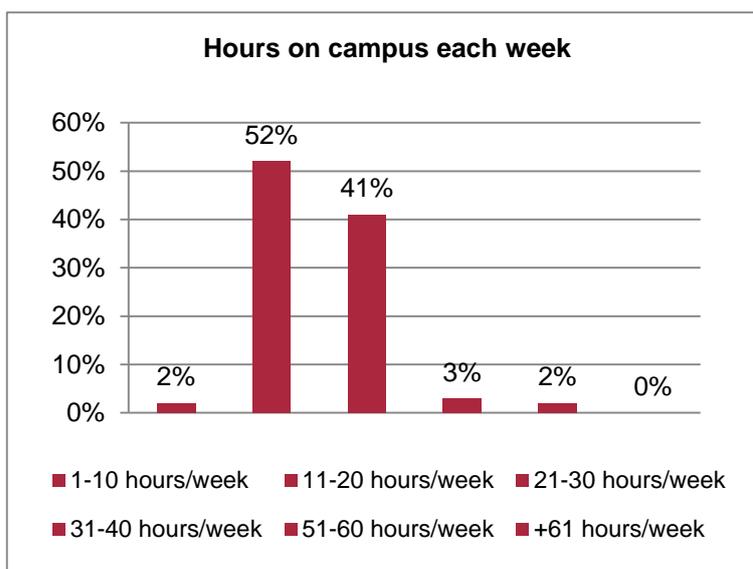
Figure 10. Hours on campus each week.

About the question "On average, how many hours do you work at a job each week (whether you work for an employer or are self-employed)? Responses are 20.6% 1-10 hours/week; 14.2% 11-20 hours/week; 3.9% 21-30 hours/week; 6.9% 31-88 hours/week. Just over half of the students (54.4%) stated that they do not have a job during their

studies. The average working week was 7.57 hours (standard deviation 12.664), although variations were quite wide, with the shortest reported working week standing at two hours and the longest at 90.
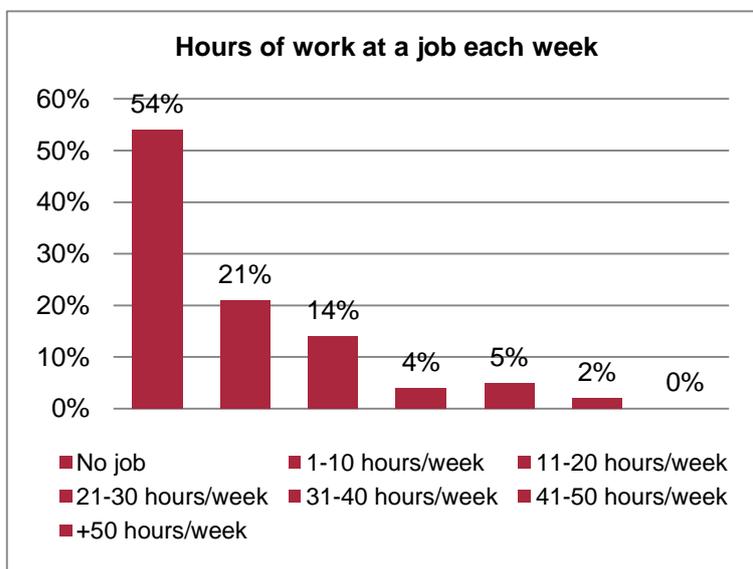
Figure 11. Hours of work at a job each week.

4.2. Section 2: Who do you turn to for help with your courses?

Students were asked to indicate on a four-point scale ranging from Never (1) to Always (4) their views about what they do when they have a doubt about their courses' content (Table 23) and what they do when they have an administrative question about a course or the program (Table 24).

Table 23. What Students Do When They Have a Question Course's Content

Items	N (%)	S (%)	O (%)	A (%)	M (%)	Mean	Std. Dev.
a. Talk to a professor	5.9	46.1	32.4	7.8	7.8	2.26	0.972
b. Talk to a classmate	0	1	26.5	64.2	8.3	3.38	1.123
c. Talk to a tutor, coordinator, etc.	56.9	24.5	8.8	1.0	8.8	1.36	0.804
d. Talk to others students not in the program	30.4	34.3	19.6	6.4	9.3	1.83	1.051
e. Talk to another person	17.6	38.7	19.1	15.2	9.3	2.13	1.156
f. Go to URV support centre	77.5	8.8	3.9	0.5	9.3	1.09	0.614
g. Search online	1.5	29.4	43.1	17.6	8.3	2.60	1.062
h. Talk to a work colleague	52.5	11.8	13.7	12.7	9.3	1.68	1.204
i. Try to address it on my own	1.0	14.7	45.1	29.9	9.3	2.85	1.144

Scale: N=Never; S=Seldom; O=Often; A=Always; M=Missing values
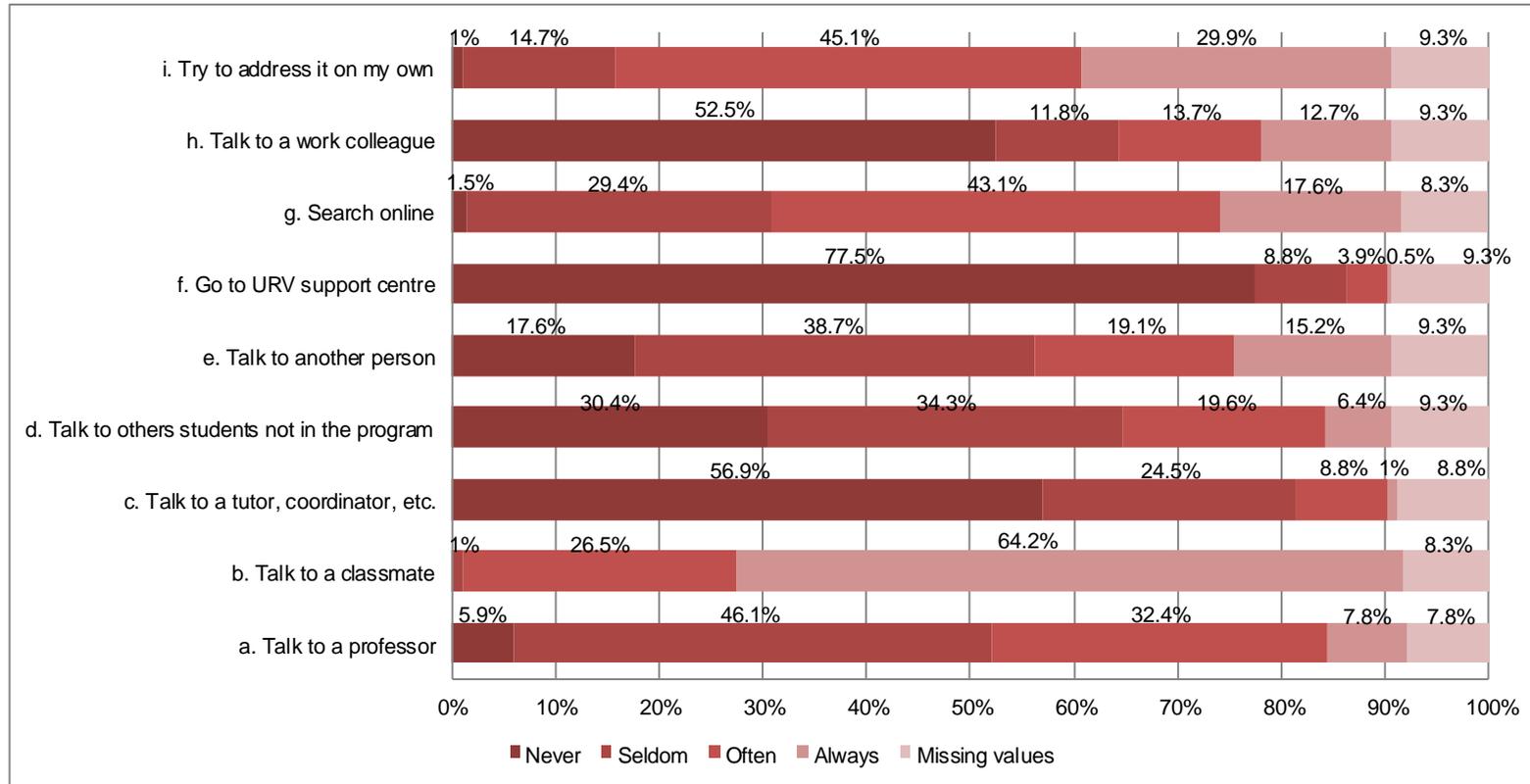
Figure 12. What students do when they have a doubt about their courses' content.

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Students were asked to indicate on a four-point scale ranging from Never (1) to Always (4) their views about what they do when they have a doubt about their courses' content (Figure 12). According to their responses, students seldom talk to a professor (also includes lecturer, assistant and associate professor). Most students are reluctant: (a) to talk to a tutor, coordinator (81.4%); (b) to talk to others students not in the program (64.7%), and (c) to go to the institutional support centre (86.3%). Their responses evidence that over half (60.7%) of the students prefer search online. Almost all respondents (90.7%) prefer personal communication with their classmates. Over half (64.3%) of students never talk to a work colleague and a majority (75%) of them try to address it on their own.

Table 24. What Students Do When They Have an Administrative Question

Items	N (%)	S (%)	O (%)	A (%)	M (%)	Mean	Std. Dev.
a. Talk to a professor	33.8	33.8	25.5	5.4	1.5	2.02	0.908
b. Talk to a classmate	0.5	13.2	42.6	41.2	2.5	3.28	0.710
c. Talk to a tutor, coordinator, etc.	35.3	32.4	21.6	8.3	2.5	2.03	0.964
d. Talk to others students not in the program	34.3	35.8	21.6	5.9	2.5	1.99	0.904
e. Talk to the program head	44.6	28.9	15.7	8.3	2.5	1.87	0.974
f. Talk to administrative staff	12.3	19.6	26.5	39.2	2.5	2.95	1.053
g. Search URV's website	7.4	28.4	40.7	21.6	2	2.78	0.875
h. Try to address it on my own	13.7	33.8	31.4	18.6	2.5	2.56	0.956

Note. Scale: N=Never; S=Seldom; O=Often; A=Always; M=Missing values

In regards to the question what students do when they have an administrative question about a course or the program (see Table 24, Figure 13), most students are reluctant: (a) to talk to a professor (67.6%); (b) to a tutor/coordinator (67.7%); (c) to others students not in the program (70.1%); and, (d) to the program head (73.5%). However, they prefer to talk to administrative staff (65.7%) rather than the program head. As well as the question course content, students prefer personal communication with their classmates (83.8%). Their responses evidence that over half of respondents prefer search URV's website (62.3%) and half (50%) of the students in the survey stated that they try to address it on their own.
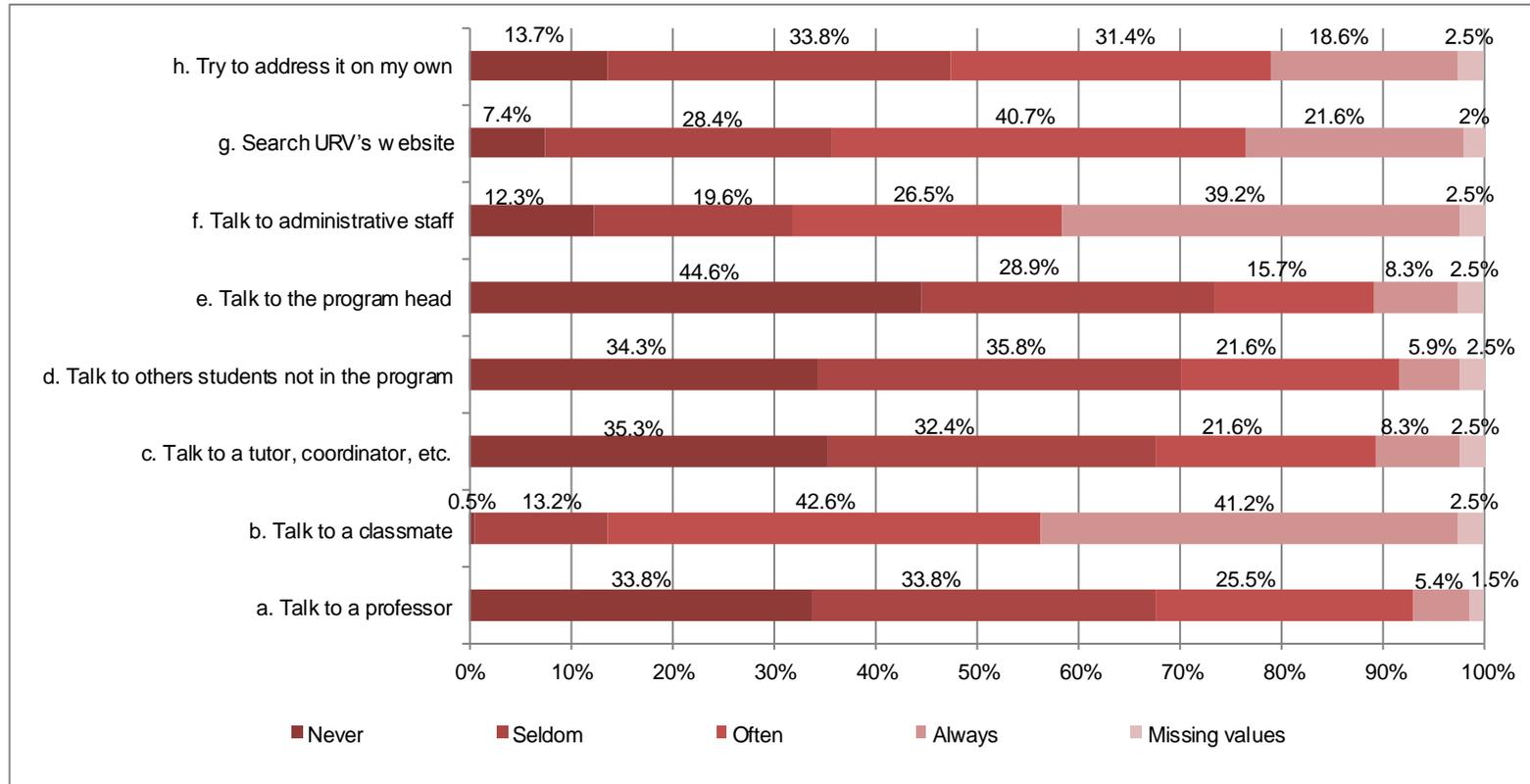
Figure 13. What students do when they have an administrative question.

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4.3. Section 3: How and where do you communicate with peers and professors?

In this section, students were asked to indicate on a four-point scale ranging Never (0), Seldom (1 to 4 times per month), Often (5 to 10 times per month) and Always (More than 10 times per month) how and where they communicate with peers and professors. Students were asked to indicate on a four-point scale ranging how often students use each technology (e-mail, instant messaging, text message, social networks, videoconference, mobile phone and Moodle) to communicate with classmates and professors about courses (see Table 25, Figure 14). Moodle is the Learning Management System (LMS) that has been adopted by this university. According to the findings, the vast majority of students still preferred face-to-face discussions with classmates (86%) and professors (79%). To communicate with their professors, 83.3% of students preferred institutional e-mail. To communicate with classmates, personal e-mail (e.g. Hotmail, Gmail, etc.) was preferred for messages, the second favourite option was text-messaging (or short-message-service/SMS) via mobile phone and the third one was instant messaging (or Internet Messaging/IM) over the Internet.

Table 25. Students' Preferences to Communicate with Classmates and Professors

Preferences	Type	N (%)	S (%)	O (%)	A (%)	M (%)	Mean	Std. Dev.
a. URV e-mail account	Classmates	25	34.3	20.6	10.8	9.3	2.19	0.974
	Professors	1	12.7	30.4	52.9	2.9	3.39	0.752
b. Personal e-mail account	Classmates	1.5	13.2	27.9	48	9.3	3.35	0.788
	Professors	66.2	15.7	9.8	4.9	3.4	1.52	0.872
c. Instant messaging	Classmates	14.7	15.7	25.5	34.3	9.8	2.88	1.095
	Professors	91.7	2.9	1.5	1.5	2.5	1.11	0.465
d. Text message via cellphones	Classmates	7.8	21.1	31.9	29.9	9.3	2.92	0.953
	Professors	92.2	2	1.5	2	2.5	1.11	0.500
e. Facebook / MySpace	Classmates	2.9	4.4	11.8	70.6	10.3	3.67	0.720
	Professors	86.8	6.9	0.5	2.5	3.4	1.16	0.545
f. Videoconferencing systems	Classmates	70.1	13.7	5.9	1.0	9.3	1.31	0.642
	Professors	93.6	3.9	0	0	2.5	1.04	0.197
g. Talking via phone	Classmates	7.8	27.5	30.9	24.5	9.3	2.79	0.939
	Professors	87.7	5.9	2	1.5	2.9	1.15	0.508
h. Talking in person	Classmates	0	3.4	20.1	65.7	10.8	3.70	0.538
	Professors	5.4	12.7	33.8	45.1	2.9	3.22	0.879
i. Moodle URV (forum)	Classmates	29.4	37.7	16.7	6.4	9.8	2	0.893
	Professors	18.1	32.4	32.4	14.2	2.9	2.44	0.958
j. Moodle URV (wiki)	Classmates	47.1	27	11.3	4.9	9.8	1.71	0.886
	Professors	48.5	21.6	19.6	6.4	3.9	1.83	0.975

Note. Scale: N=Never (0 times/month); S=Seldom (1-4 times/month); O=Often (5-10 times/month); A=Always (More than 10 times/month)
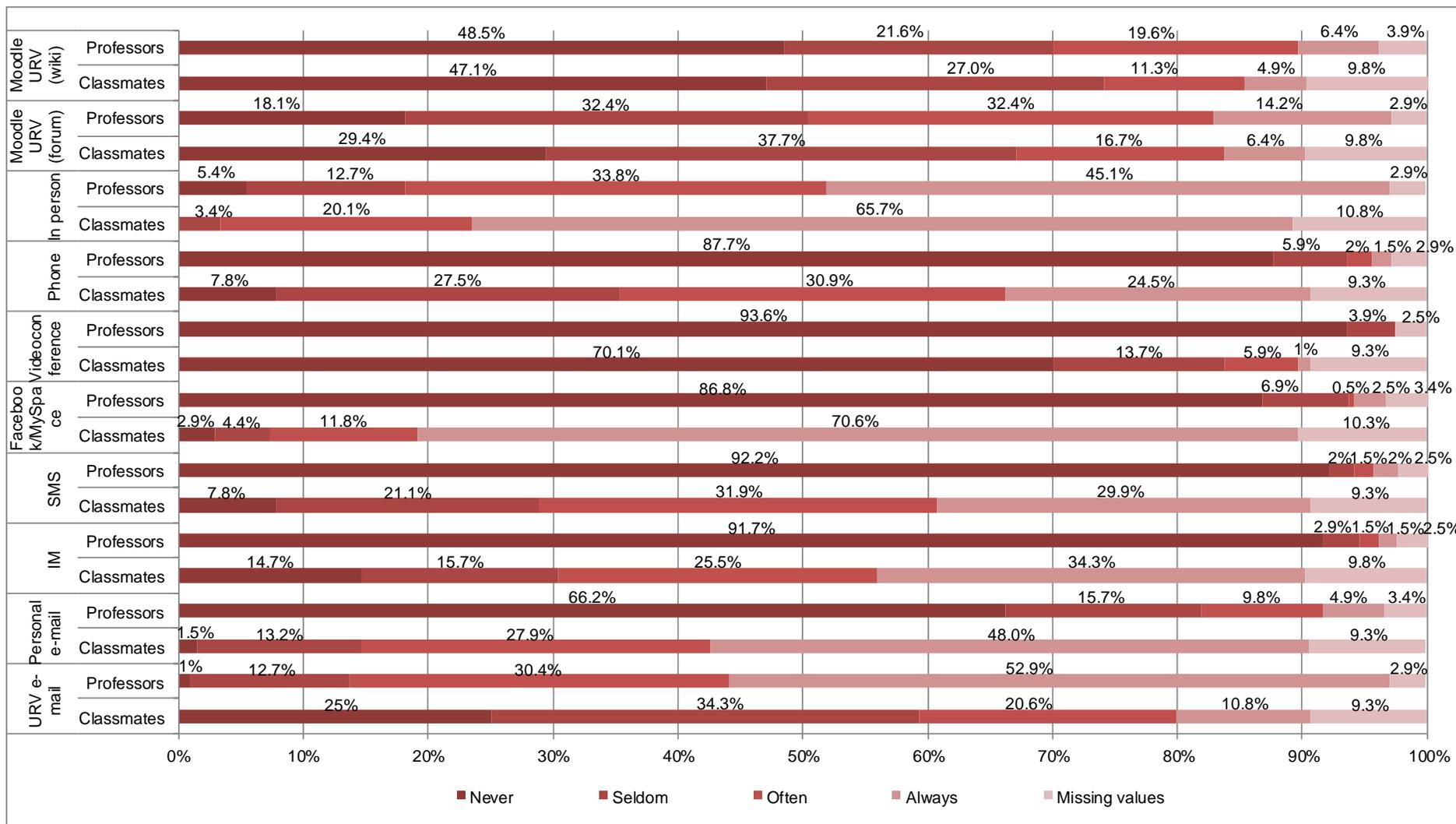
Figure 14. Students' preferences to communicate with classmates and professors.

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As regards the use of IM, the vast majority reported they did not use it to communicate with professors. In addition some students particularly mention "WhatsApp" (a real-time cross-platform mobile messaging system which allows users, as long as they have a smartphone and data connection, to send messages for free) as a method of communicating with classmates. Over half (55.4%) of the students prefer to communicate with their classmates via phone, but the vast majority (87.7%) never communicate with their professors this way. Results also indicate that 82.4% of the students use Facebook/MySpace to communicate with classmates; the majority never (86.8%) use it to communicate with professors. Videoconferencing is also never used to communicate with professors (93.6%). Nearly three-quarters of students report never use videoconferencing systems (e.g., Skype, traditional conference calls or some other platform) to communicate with classmates. Regarding Moodle Forum, most students prefer not to use it to communicate with their classmates (67.1%) and professors (50.5%). In regard to Moodle Wiki, the majority of them prefer not to use it to communicate with their classmates (74.1%) and professors (70.1%).

Students were also asked to indicate how often they study or work on assignments in different places outside of regular class time (see Table 26, Figure 15). According to their responses, time spent studying outside the classroom is usually at home, often in the library, seldom in social spaces around campus (e.g. auditorium, cafeterias), never in a lab, workshop, studio, at work and in transit (e.g. bus, train).

Table 26. How often Students Study or Work on Assignments in Different Places Outside of Regular Class Time

Places	N (%)	S (%)	O (%)	A (%)	M (%)	Mean	Std. Dev.
a. In a lab, workshop or studio	51	28.4	15.2	3.4	2	1.71	0.855
b. In the library	3.4	26	43.1	26	1.5	2.93	0.816
c. In social spaces around campus	16.2	36.8	34.8	10.8	1.5	2.41	0.890
d. At home	3.4	15.7	0	78.9	2	3.77	0.498
e. At work	82.4	9.3	4.9	0.5	2.9	1.21	0.548
f. In transit	59.8	30.4	7.4	1	1.5	1.49	0.679

Note. Scale: N=Never (0 times per month); S=Seldom (1-4 times per month); O=Often (5-10 times per month); A=Always (More than 10 times per month); M=Missing values
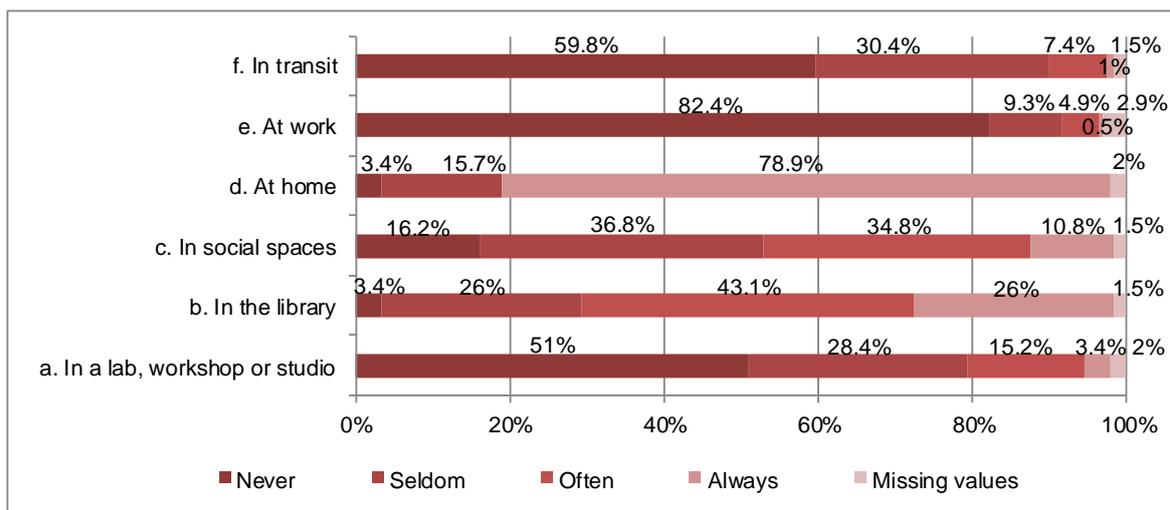
Figure 15. How often students study/work on assignments in different places outside of regular class time.

4.4. Section 4: Your study and communication habits with classmates and instructors

In this section, students were asked to rate the level of agreement with statements related to their study and communication habits with classmates and professors.

Regarding the students' study habits (Table 27, Figure 16), less than a quarter of students prefer to work on assignments on their own when doing schoolwork. Around half of students prefer to learn by themselves and welcome the opportunity to study with friends and are used to doing several different tasks at the same time. Almost three-quarters of students prefer clear instructions before trying something new.

Table 27. Student's Study Habits

Items	SD (%)	D (%)	A (%)	SD (%)	M (%)	Mean	Std. Dev.
a. Work on my own	3.4	25	39.2	28.4	3.9	2.96	0.837
b. With friends	13.7	35.3	31.4	14.7	4.9	2.49	0.923
c. Learn for myself	7.8	40.2	29.9	17.6	4.4	2.6	0.882
d. Get clear instructions	2	19.6	34.3	40.2	3.9	3.17	0.823
e. Used to doing several different tasks	7.8	29.9	41.7	15.7	4.9	2.69	0.845

Note. Scale: SD= Strongly disagree; D= Disagree; A= Agree; SA= Strongly agree; M=Missing values
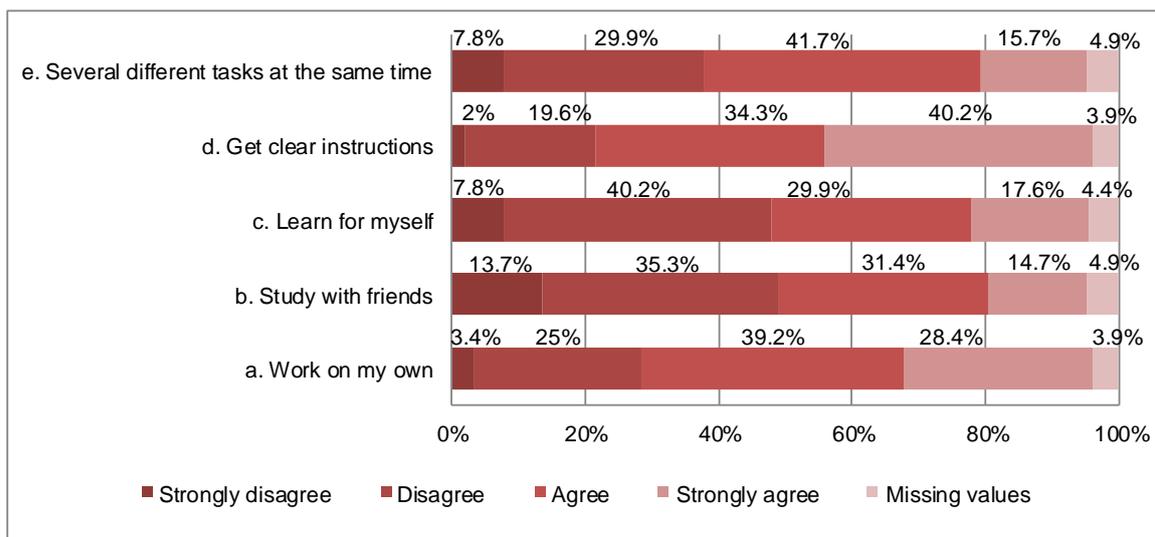
Figure 16. Study habits.

For the question "when do students usually study or work on course assignments", based on a multiple response question type, students were asked to select more than one correct answer. A total of 602 responses were mentioned by 196 respondents (196 valid cases). The most commonly cited was "On weekends" followed by "In the evenings" and "In the afternoon". There is no significant difference between the mean scores of students who study or work in the afternoon and in the evenings. The least preferred time for studying and working were between classes.

Table 28. Study Routine

Study routine	N	Percent	% of cases
a. During class	55	9,1%	28,1%
b. In the morning	103	17,1%	52,6%
c. Between classes	39	6,5%	19,9%
d. In the afternoon	123	20,4%	62,8%
e. In the evenings	126	20,9%	64,3%
f. On weekends	140	23,3%	71,4%
g. Other times	16	2,7%	8,2%
Total	**602**	**100,0%**	**307,1%**

Note. Dichotomy group tabulated at value 1. 8 missing cases (3.9%)

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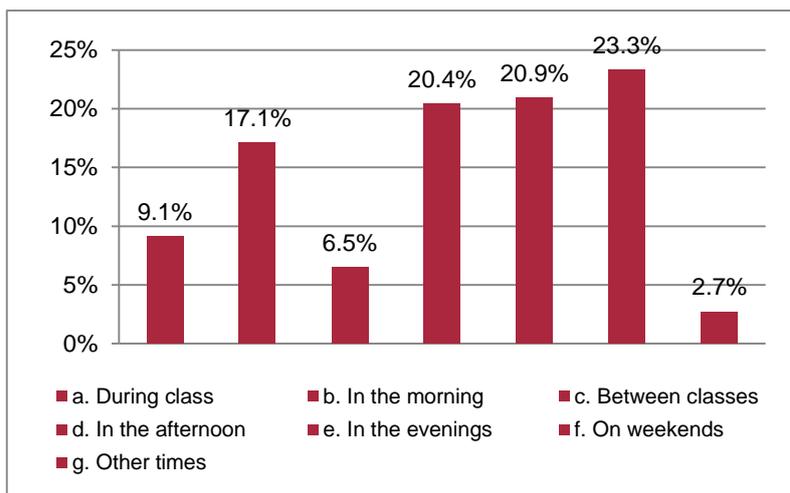
Figure 17. Study routine.

In regards to the relationship with peers (Table 29, Figure 18), 84.3% of respondents trust other students in this program; 92.6% can rely on classmates to help them, 75% can rely on classmates to respond course questions within a few hours, and 64.7% enjoy discussing their ideas about course content with other students. Data also reveal that most students (87.7%) feel like he/she is always connected to friends because of technologies such as cell phones and the Internet.

Table 29. Student's Relationship with Peers

Items	SD (%)	D (%)	A (%)	SD (%)	M (%)	Mean	Std. Dev.
a. trust other students	2.5	9.8	39.7	44.6	3.4	3.31	0.756
b. rely on classmates to help me	0.5	3.9	38.7	53.9	2.9	3.51	0.602
c. rely on classmates to respond questions	1.5	19.6	41.7	33.3	3.9	3.11	0.776
d. enjoy discussing ideas with other students	4.4	27.5	41.7	23	3.4	2.86	0.831
e. connected to friends because of technologies	0.5	8.3	23.5	64.2	3.4	3.57	0.671

Note. Scale: SD= Strongly disagree; D= Disagree; A= Agree; SA= Strongly agree; M=Missing values

120
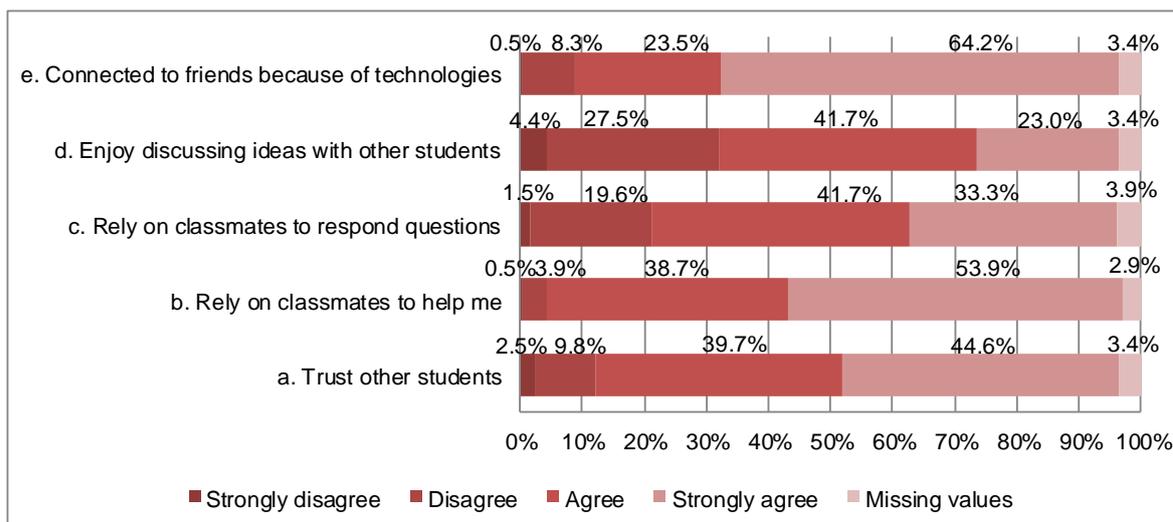
Figure 18. Student's relationship with peers.

Students were also asked to indicate why they work with classmates (Figure 19). Six items related to these issues were presented (Table 30). A large majority of students feel that relationship with peers help them understand course content better (83.4%) and do high-quality work (76%). Most of them enjoy it (75.5%), keep them motivated (69.7%) and feel that they save time (54.9%).

Table 30. Student's Reasons to Work with Classmates

Items	SD (%)	D (%)	A (%)	SD (%)	NA (%)	M (%)	Mean	Std. Dev.
a. helps me understand course content better	2	9.3	32.4	51	2	3.4	3.43	0.77
b. I enjoy it	2.5	13.7	37.3	38.2	4.9	3.4	3.3	0.868
c. helps me do high-quality work	4.9	12.3	33.8	42.2	2.5	4.4	3.26	0.901
d. saves time	14.7	25.5	28.9	26	1.5	3.4	2.73	1.066
e. keeps me motivated	2.9	19.6	32.4	37.3	3.9	3.9	3.2	0.917
f. provide useful feedback for my work	2	7.8	35.8	47.5	2.9	3.9	3.43	0.772

Note. Scale: SD= Strongly disagree; D= Disagree; A= Agree; SA= Strongly agree; NA=Not applicable**;** M=Missing values.
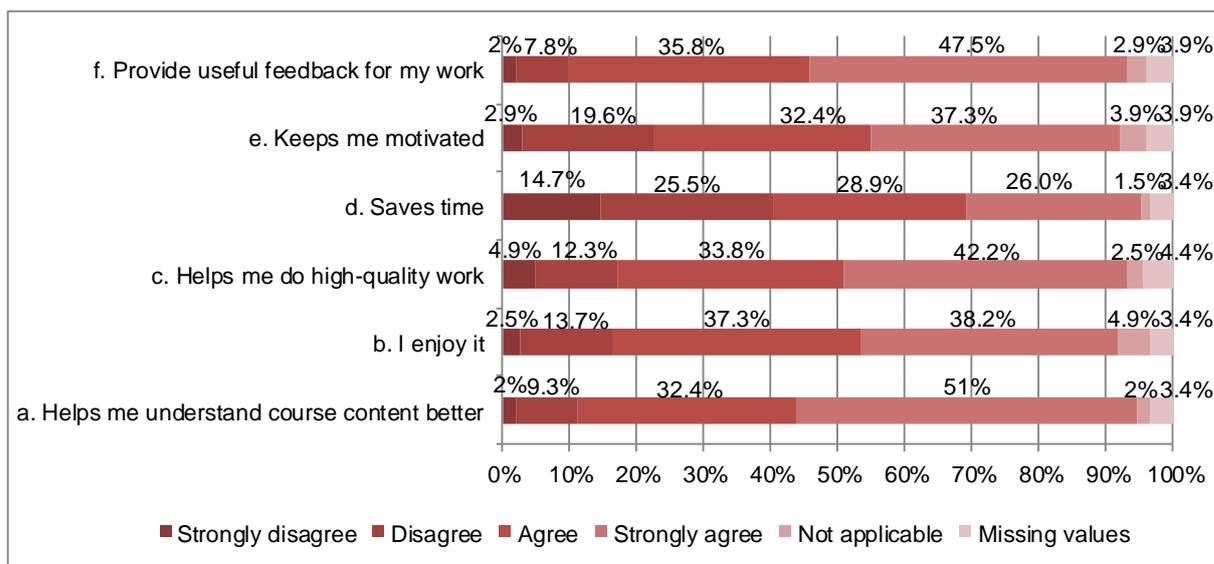
Figure 19. Student's reasons to work with classmates.

Table 31 (Figure 20) presents the students' experience with their academic program and peers. 71.6% do not feel isolated from other students. The majority of students (84.4%) were generally satisfied with their academic program and would recommend it to others. Most students feel (86.8%) that they do not need a lot of help, and 64.2% feel their workload is 'manageable'.

Table 31. Students' Experience with the Program and Peers

Items	SD (%)	D (%)	A (%)	SD (%)	M (%)	Mean	Std. Dev.
a. feel isolated from other students	71.6	14.7	8.3	1.5	3.9	1.37	0.708
b. need a lot of help	57.4	29.4	6.4	2	4.9	1.51	0.714
c. has a manageable workload	6.9	25.5	44.6	19.6	3.4	2.8	0.845
d. would recommend it to others	2	9.8	27	57.4	3.9	3.45	0.76

Note. Scale: SD= Strongly disagree; D= Disagree; A= Agree; SA= Strongly agree; M=Missing values

122
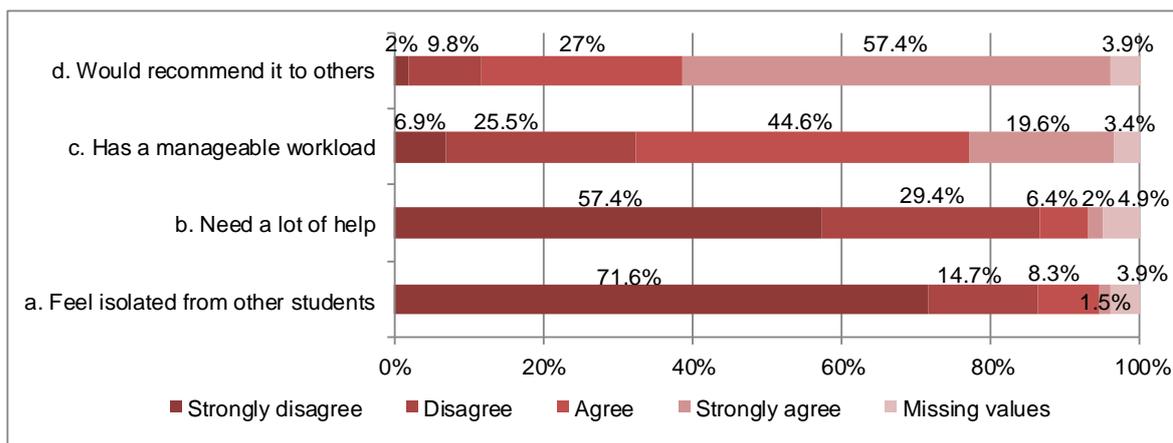
Figure 20. Students' experience with the program and peers.

In terms of students' experience with professors (also includes lecturer, assistant and associate professor) (see Table 32, Figure 21), the majority of respondents (78%) stated that professors are available when they have any questions in a course. Almost all the students disagree (89.73%) with the item "don't ask questions outside of class". They also feel that professors in their academic program are knowledgeable (85.8%). Most students feel they can rely on professors to respond questions within a few hours and the majority of them do not hesitate to ask a professor for help (81.4%).

Table 32. Student's Experience with Professors

Items	SD (%)	D (%)	A (%)	SD (%)	M (%)	Mean	Std. Dev.
a. are available when I have any questions	2.5	18.1	46.6	31.4	1.5	3.08	0.773
b. don't ask questions outside of class	59.3	30.4	7.4	2	1	1.51	0.721
c. are knowledgeable	2	10.8	53.9	31.9	1.5	3.17	0.696
d. can rely on them to respond my questions	6.9	32.8	38.2	21.6	0.5	2.75	0.874
e. not hesitate to ask for help	2.5	14.2	35.3	46.1	2	3.27	0.802

Note. Scale: SD= Strongly disagree; D= Disagree; A= Agree; SA= Strongly agree; M=Missing values
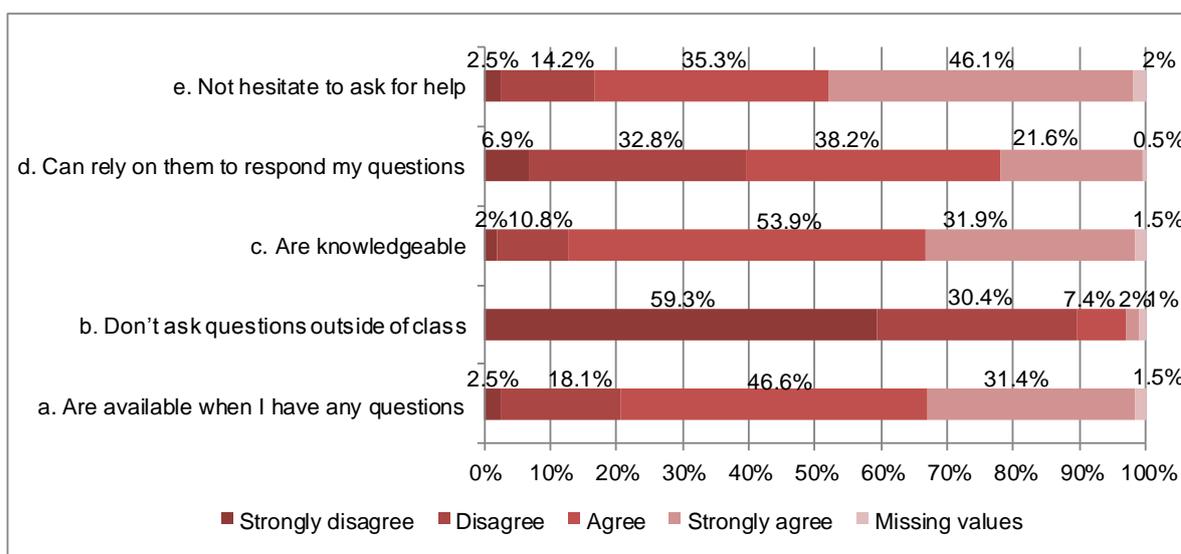
Figure 21. Student's experience with professors.

When asked about their personal interests, 94.2% of students are comfortable with digital technologies and 89.7% have very clear goals in life. Most students also enjoy talking about themselves to people (97.1%), reading (69.6%), and meeting new people (94.6%). Some students (58.3%) get involved in projects and activities that have an impact in society.

Table 33. Students' Personal Interests

Items	SD (%)	D (%)	A (%)	SD (%)	M (%)	Mean	Std. Dev.
a. I am comfortable using computers, Internet and other ICT	0.5	4.9	17.2	77	0.5	3.71	0.578
b. I enjoy meeting new people	0.5	3.4	29.4	65.2	1.5	3.62	0.581
c. I enjoy talking about myself to people I meet	1	0	21.1	76	2	3.77	0.448
d. I have very clear goals in life	2	7.4	34.8	54.9	1	3.44	0.719
e. I enjoy reading	6.4	22.5	33.3	36.3	1.5	3.01	0.927
f. I get involved in projects that have an impact in society	7.4	32.4	34.3	24	2	2.77	0.908

Note. Scale: SD= Strongly disagree; D= Disagree; A= Agree; SA= Strongly agree; M=Missing values
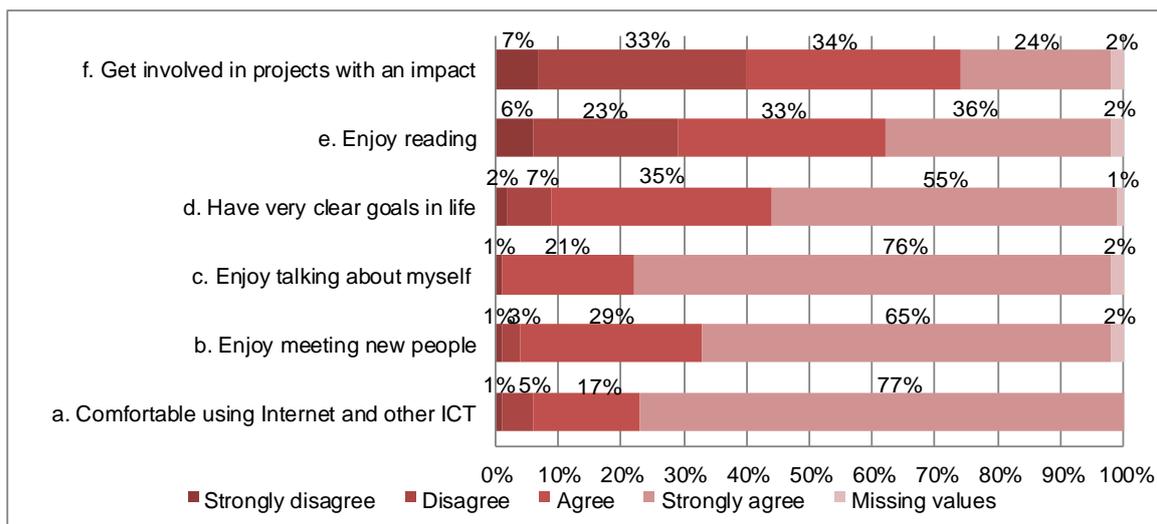
Figure 22. Students' personal interests.

4.5. Summary

This chapter has presented the results of the data collected from the online questionnaire administered to first year university students of the Faculty of Educational Sciences and Psychology - of the degrees of Pedagogy, Social Education, Early Education and Primary Education located in the Campus of Tarragona, Tortosa and El Vendrell.

In summary, most students feel comfortable with digital technologies and they see social networks as more about connecting and interacting with friends more than about academic communication. Students generally prefer personal e-mail, face to face interaction, social networks and mobile cellphone to communicate and connect with others. Regarding study habits, students prefer to learn by themselves, and are used to performing various tasks simultaneously.

In the next chapter, an analysis of the data collected from semi-structured, face-to-face interviews with second year university students of the Faculty of Educational Sciences and Psychology - of the degrees of Pedagogy, Social Education, Early Education and Primary Education is presented.

CHAPTER 5

Findings II: Semi-structured Interviews

Chapter 5: Findings II: Semi-structured Interviews

5.1. Introduction

This chapter summarises and presents the results of interviews, obtained from the questions formulated in the semi-structured interview guide, used to interview 40 second year university students of the Faculty of Educational Sciences and Psychology - of the degrees of Pedagogy, Social Education, Early Education and Primary Education from November 2012 to March 2013.

The chapter is structured around three sections. The first one will provide us general information of the students. The others two will be around the two major themes emerging from the study: "digital technology" and "new generation of students" as examined in chapter 3. Summaries of results are generally presented in figures and tables that summarise the results of the statistical analysis; while all raw data and complete transcription of interviews are shown in Appendix E.

Table 34 shows the major two themes related with each questions of the interview guide according to the students' responses.

Table 34. Interview Questions

Theme	Interview Questions
Digital technology	What does digital technology mean to you? What do you think of when you hear the term?
	What digital technologies do you use most frequently?
	Please, give me some examples of how you use digital technology for social and academic purposes?
	What are benefits of using the technologies you use for social and academic purposes?
	There are often several technologies that can be used for the same purpose. So, how do you decide which technologies to use? For example e-mail or Facebook
	Do you have different technologies for different parts of your life, e.g, technologies for school, for work, for your social life, for entertainment?
	Are you constantly connected at Internet? Are there any specific purposes to be connected? Why are you getting off?
	When you go home, how you use digital technology? What will you use and how?
	On a typical day at URV, how do you use technology? What kind and how?

	In your program, is the technology being used in innovative ways or just at a fairly basic level or not at all?
	Tell us more about how digital technologies are used in your program?
New generations of students	In most developed countries, students who were born roughly between 1980 and 1994 represent the first generations to grow up with this technology. This generation was given several names that emphasize its affinity and tendency to use digital technology, have you heard any?
	If yes, how do you feel about it? Does it represent you?
	Is there anything else you would like to add?

Table 35 shows the codes related with each questions of the interview guide according to the students' responses. Note that some codes are used for more than one question. For detailed information about the categories and codes see Appendix D.

Table 35. Codes According Interview Guide Questions

Question	Category (sub category)	Code
What does digital technology mean to you? What do you think of when you hear the term?	meaning_DT ▪ hardware_device ▪ software_app	
What digital technologies do you use most frequently?	use_DT ▪ frequency_use_DT	low_frequency moderate_frequency high_frequency

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Please, give me some examples of how you use digital technology for social and academic purposes?	use_DT	hardware_device
	▪ academic_purposes	▪ computer
	▪ social_purposes	- laptop
		- PC
		- Tablet
		▪ e-book
		▪ mobile
		- smartphone
		▪ video_games
		▪ GPS
		- TomTom

software_app
- ▪ cloud_storage
  - Dropbox
  - Prezi
- ▪ e-mail
  - URV_e-mail
  - personal_e-mail
- ▪ Google
  - Google_Blogger
  - Google_Chrome
  - Google_Docs
  - Google Hangout
  - Google_Mail
  - Google_Maps
  - Google_Search
  - Google_Talk
  - Google_Translate
- ▪ Office_programs
  - Excel
  - Power_Point
  - Word
- ▪ OpenOffice
- ▪ social_networks
  - Facebook
  - Facebook_groups
  - Twitter
  - Twitter_group
  - Tuenti
  - LinkedIn
  - Instagram
  - Vimeo
  - YouTube
- ▪ Internet
- ▪ Evernote
- ▪ web_browser

What are benefits of using the technologies you use for social and academic purposes?	benefits_DT
	▪ academic_purposes
	  - hardware_device
	  - software_app
	▪ social_purposes
	  - hardware_device
	  - software_app
	▪ disadvantages
		access
		communication
		▪ chat
		▪ mobile
		▪ computer
		▪ Tablet
		▪ interactive_whiteboards
		▪ blog
		▪ audio_calls
		  - Viber
		▪ video_calls
		  - Messenger
		  - Skype
		  - Google Hangout
		▪ e-mail
		▪ text_messaging
		  - LINE
		  - WhatsApp
		  - Viber
		▪ Dropbox
		connected_to
		convenience
		economic
		entertainment
		fast
		free
		group_work
		▪ collaborative_learning
		▪ collaborative_work
		information
		▪ information_search
		▪ interchange_information
		interaction
		price
		time
		useful

There are often several technologies that can be used for the same purpose. So, how do you decide which technologies to use? For example e-mail or Facebook	hardware_device
	software_app
		e-mail
		▪ URV_e-mail
		▪ personal_e-mail
		  - Google_Mail
		  - Hotmail
		  - Yahoo
		social_networks
		▪ Facebook
		▪ Twitter
		Google_Search
		YouTube
		WhatsApp
		▪ WhatsApp_groups

Do you have different technologies for different parts of your life, e.g, technologies for school, for work, for your social life, for entertainment?	DT_entertainment
	DT_work
	used_at_URV
		music
		▪ mp3
		▪ mp4
		▪ iPod
		▪ Shazam
		▪ Spotify
		video
		▪ Vimeo
		▪ YouTube
		social_networks
		▪ Facebook
		▪ MEETin
		▪ Twitter
		computer
		▪ laptop
		▪ Tablet
		Dropbox
		e-mail
		external_memory
		▪ USB_drive
		mobile
		▪ smartphone
		  - LINE
		  - WhatsApp
		Internet
		Office_programs
		OpenOffice

Are you constantly connected at Internet? Are there any specific purposes to be connected? Why are you getting off?	Internet	Yes_Internet No_Internet Internet_frequency ▪ low_frequency ▪ moderate_frequency ▪ high_frequency reasons_getting_off reasons_to_be_connected
When you go home, how you use digital technology? What will you use and how?	DT_home ▪ hardware_device	computer laptop PC Tablet digital_cameras DVD_Player_Recorder Internet WiFi mobile WhatsApp TV

On a typical day at URV, how do you use technology? What kind and how?	DT_URV ▪ URV_resources ▪ used_at_URV ▪ used_by_professors ▪ used_program	URV_CRAI ▪ computer_room URV_e-mail URV_Moodle URV_Intranet e-portfolio Internet ▪ WiFi interactive_whiteboards SPSS appropriate_used ▪ instructor_training inappropriate_used ▪ innovative_ways basic_level proficient_level
In your program, is the technology being used in innovative ways or just at a fairly basic level or not at all?	DT_URV ▪ used_program	basic_level proficient_level inappropriate_used ▪ innovative_ways
Tell us more about how digital technologies are used in your program?	DT_URV ▪ URV_resources ▪ used_at_URV ▪ used_by_professors ▪ used_program	URV_CRAI ▪ computer_room URV_e-mail URV_Moodle URV_Intranet e-portfolio Internet ▪ WiFi interactive_whiteboards SPSS appropriate_used ▪ instructor_training inappropriate_used ▪ innovative_ways basic_level proficient_level
In most developed countries, students who were born roughly between 1980 and 1994 represent the first generations to grow up with this technology. This generation was given several names that emphasize its affinity and tendency to use digital technology, have you heard any? If yes, how do you feel about it? Does it represent you?	gen_students ▪ terms identification ▪ Yes_identification ▪ No_identification	digital_natives Millennials Net_Gen other_term Yes_term No_term gender generational ICT_skills other_factor

5.2. General Context

Participants were all second-year students of the Pedagogy (27%), Social education (19%), Early education (27%) and Primary education (27%) (Table 37, Figure 23). The majority of participants were female (73%). The ages from participants ranged from 19 to 58. In order to analyse the data gathered, we divided the samples into "digital natives" (born in

1980 or later) and "digital immigrants" (born before 1980). Analysing their age, 35 students (87%) born in 1980 or later and 13% were born before 1980.

Table 36. Demographic Information

Category	Variable	Number	Percentage
Gender	Female	29	72.5%
	Male	11	27.5%
Generation of students	Digital natives	35	87.5%
	Digital immigrants	5	12.5%
Campus	Tarragona	20	50%
	El Vendrell	10	25%
	Tortosa	10	25%
Program	Early education	11	27.5%
	Primary education	11	27.5%
	Pedagogy	11	27.5%
	Social education	7	17.5%
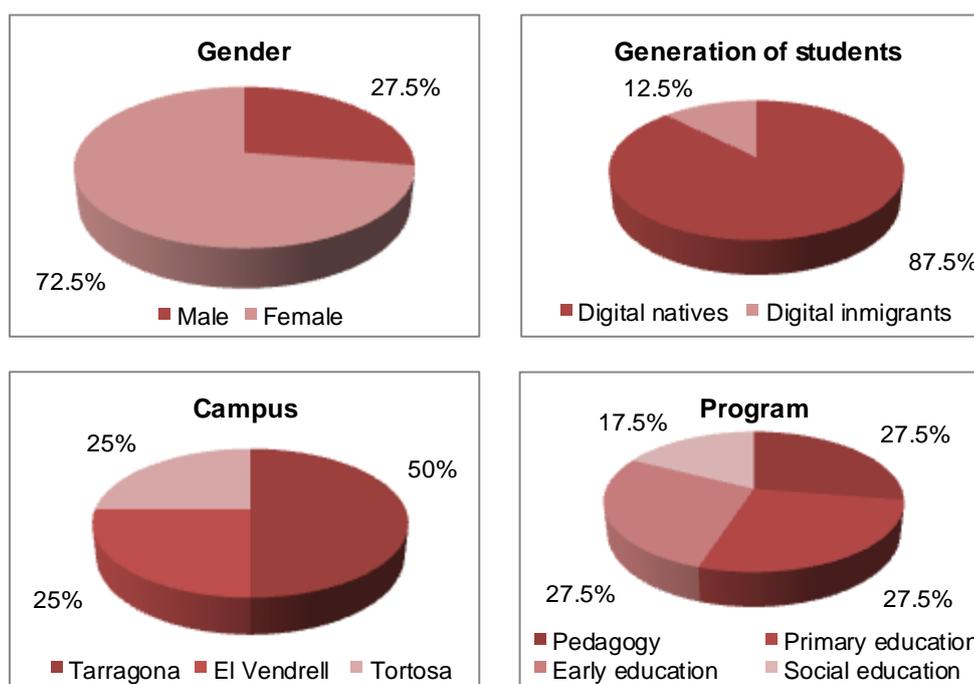
Figure 23. Demographic Information.

5.3. Two Main Themes "Digital Technologies" and "Generation of Students"

Analysis of the data revealed two themes, "digital technologies" and "generation of students"; twelve categories, several of which included smaller subcategories and 147

codes. In regard to "digital technology", these categories consisted of (1) meaning (software and device), (2) benefits (social and academic purposes; disadvantages), (3) use (frequency: low, moderate and high; social and academic purposes), (4) for university (URV resources, used at URV, used by professors), (5) for home, (6) for work, (7) for entertainment, (8) digital communication technologies (software and device), and (9) Internet (daily use, frequency and connection). In "generation of students", these categories consisted of (10) terms, (11) identification and (12) factor.
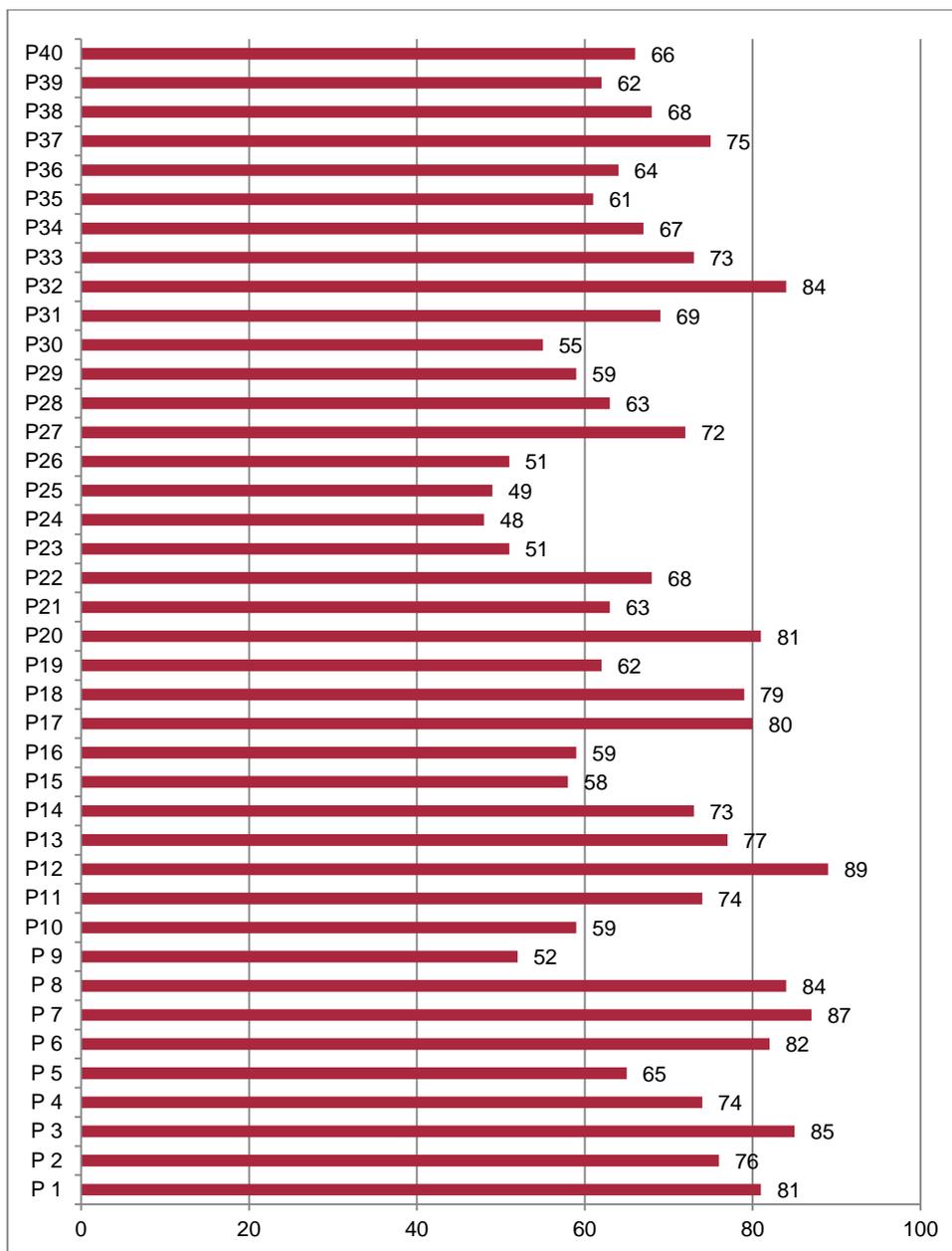
Figure 24. Frequency of categories and codes of each interview. P1… P40 (Interview 1 … Interview 40).
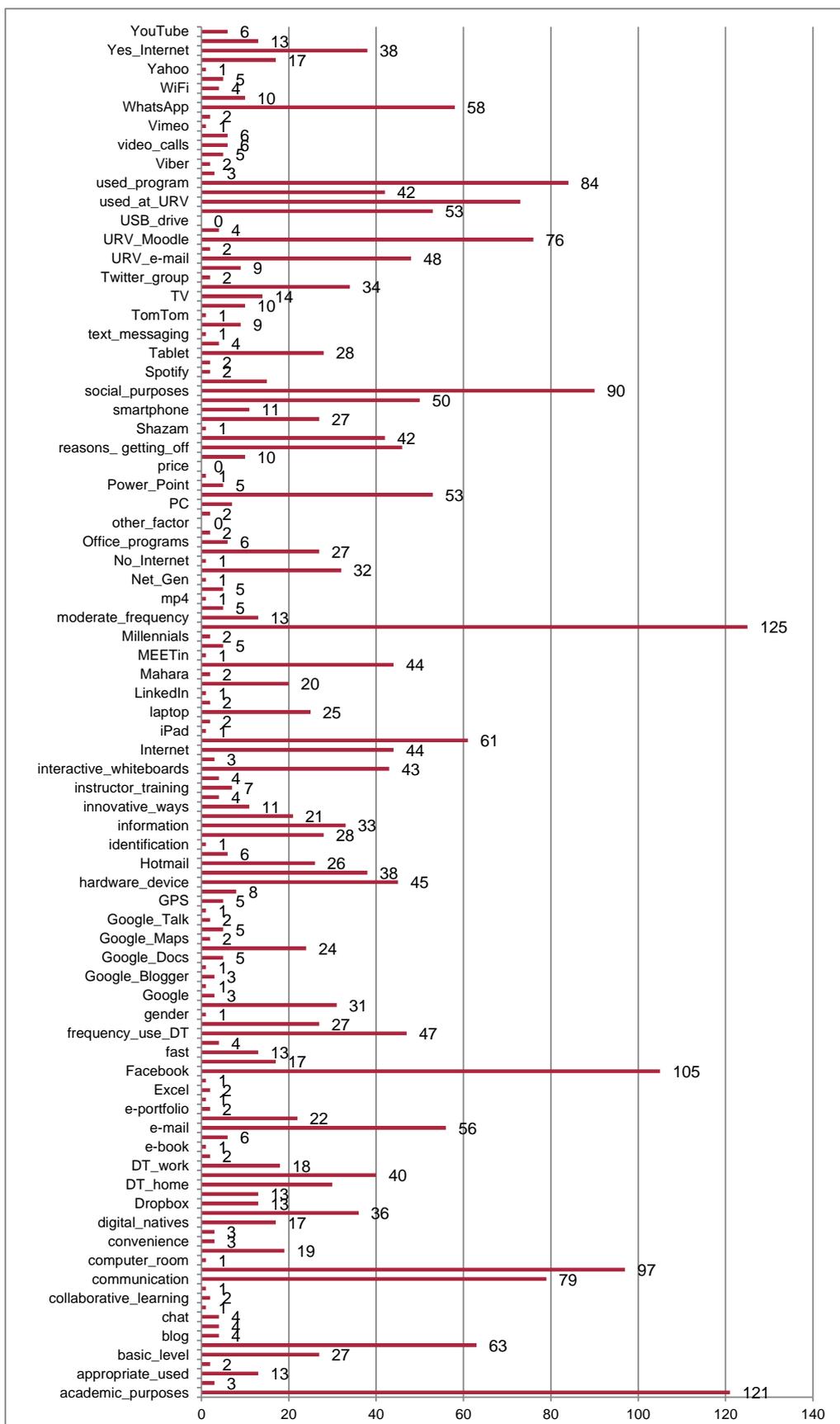
Figure 25. Frequency of categories and codes.

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Figure 24 shows the frequency of each category and code in every interview. Figure 25 shows the frequency, in other words, the total number of times each category/code was coded within the 40 interviews. Appendix F shows the complete matrix with the total number of times of all the categories and codes. In total, we got 2745 quotations related with the 145 categories/codes (see Appendix G to see the complete list of codes and its quotations).

5.4. Digital Technology

We use the term "digital technology" to refer to a wide range of technologies which store and transmit information in digital form and could be hardware-based/device (such as computers, mobile phones and other mobile devices, video and audio players, games consoles, etc.); or software-based (e.g. web applications, blogs, wikis, Social-Networking Sites, computer games, chat sites, etc.) (Abbott, 2007; Hague & Williamson, 2009).

According to the above definition, most of students defined "digital technology" only in terms of hardware/device and only one student in terms of software. Few students define it in both terms (hardware and software). Table 37 shows the most significance students' answers.

Table 37. Student's Definition of Digital Technology

Hardware/device
Tecnología digital (…) supongo que se refiere a todas aquellas tecnologías, aquellos inventos que están, que son, todo lo contrario a analógicos, todos los ordenadores, desde móviles, desde hoy en día GPS, todo este tipo de aparatitos, ¿no?, que usamos hoy en día. [Female, TGN, Early Education, 29 years old]
…ordenadores, Tablets, todo lo que es informática ¿no?... [Female, TGN, Pedagogy, 26 years old]
Me hace pensar en los aparatos que utilizamos en nuestro día a día, en los ordenadores, portátiles, netbook, móviles, mp3, hasta el televisor. [Female, TGN, Social Education, 19 years old]
…todo aquello relacionado con el mundo digital, con el mundo electrónico, con las nuevas tecnologías que pueden ser desde ordenadores, bandas táctiles, iPads, Tablets, PCs, portátiles, cualquier tipo de esta tecnología. [Male, TGN, Pedagogy, 22 years old]
Tecnología digital, pienso (…) bueno en ordenadores, en dispositivos móviles como los teléfonos y por digital, bueno se me viene eso a la cabeza ordenadores y teléfonos móviles. [Male, TGN, Pedagogy, 25 years old]
Tecnología digital eh… pues, tecnologías que van surgiendo hoy en día ¿no?, tales como teléfonos, smartphones y ordenadores, todo lo que tiene que ver con esto para mí. [Male, TGN, Social Education, 27 years old]
Tecnología digital, todas las herramientas que podemos utilizar para hacer nuestro trabajo, para formarnos y ese tipo de cosas. [Female, VDLL, Early education, 24 years old]

Tecnología digital, me viene las nuevas tecnologías de la información, los ordenadores, los iPad, lo que es la televisión… [Female, VDLL, Early Education, 19 years old]

Tecnología digital, pues usar ordenadores, móviles, todo lo relacionado con la tecnología para nuestro provecho personal o para ayudar a los demás. [Male, TSA, Primary Education, 26 years old]

Tecnología digital pienso en todos los aparatos que de una manera u otra sirven para realizar una actividad tecnológica, ya sean ordenadores, móviles, Tablets… [Male, TSA, Primary Education, 19 years old]

Software

No sé cómo definírtelo porque es el mundo en que vivo. Yo trabajo en informática, entonces, cualquier tipo de tecnología digital relacionada con la informática, con procesamiento de datos, procesamiento de imágenes, todo esto para mí es tecnología digital. [Female, VDLL, Early Education, 45 years old]

Hardware/device + software

Tecnología digital, todo lo que tiene que ver con ordenadores incluyendo Internet a parte de la televisión y todo eso, pero más que nada las técnicas que se pueden utilizar a través del ordenador más que televisión o radio. [Female, TGN, Social Education, 21 years old]

Pues cuando oigo ese término pues yo lo relaciono más que nada con… ordenadores, los móviles... todo lo que son aparatos que nos facilitan en cierto modo la vida... a través de Internet pues con Facebook, lo que son redes sociales… o sea lo que vienen hacer las TIC. [Female, TGN, Pedagogy, 29 years old]

…las redes sociales, el ordenador, el móvil, los diferentes tipos de móviles que hay, los diferentes ebooks, las Tablets, todo eso. [Female, VDLL, Early Education, 24 years old]

…en las nuevas tecnologías de la información y comunicación ¿no? Estos aparatos electrónicos nuevos. Bueno pienso en ordenadores, en Tablets, en Facebook… [Male, VDLL, Early Education, 20 years old]

Note. TGN: Tarragona; VDLL: El Vendrell; TSA: Tortosa

Also, some students were not capable to define this term.

Tecnología digital, pues en este instante yo no te sabría responderte con un término exacto… pues no lo sé. Ahora mismo me he quedado clavada. [Female, TGN, Pedagogy, 26 years old]

Tecnología digital, mm (...) pues la verdad que no sé muy bien cómo definirlo. (...) [Male, TGN, Pedagogy, 22 years old]

Pues, pienso en tecnología que está más avanzada que antes, que ya no es manual. [Female, TSA, Primary Education, 25 years old]

Tecnología digital, pues bueno, todo lo que hoy en día se hace con, a ver, con los ordenadores. Es que yo tampoco no lo tengo muy claro porque no la utilizo mucho, la tecnología, la utilizo ahora desde que estoy aquí es cuando la utilizo más. [Female, TSA, Primary Education, 45 years old]

Few students defined it in terms of search information. "*Para mí tecnología digital es un sitio donde puedes buscar información*". *[Female, TSA, Primary education, 23 years old]*

Few interviewers defined it in terms of technological advances and others in terms of communication.

Pues aparatos tecnológicos… de la actualidad digamos… tecnología para mí es avances también tecnológicos y electrónicos básicamente. [Female, VDLL, Early Education, 20 years old]

Es un medio que hemos pasado el conocimiento en el papel a conocimiento digamos como invisible, no lo vemos pero sabemos que existe la posibilidad de comunicarse a través de las ondas, a través del aire, a través del tiempo que esto para mí es un tipo magia si no existiera estuvieran en años atrás es indispensable y lo que se hace ahora con los iPads y los teléfonos móviles. [Female, TGN, Pedagogy, 58 years old]

Frequency of Digital Technologies
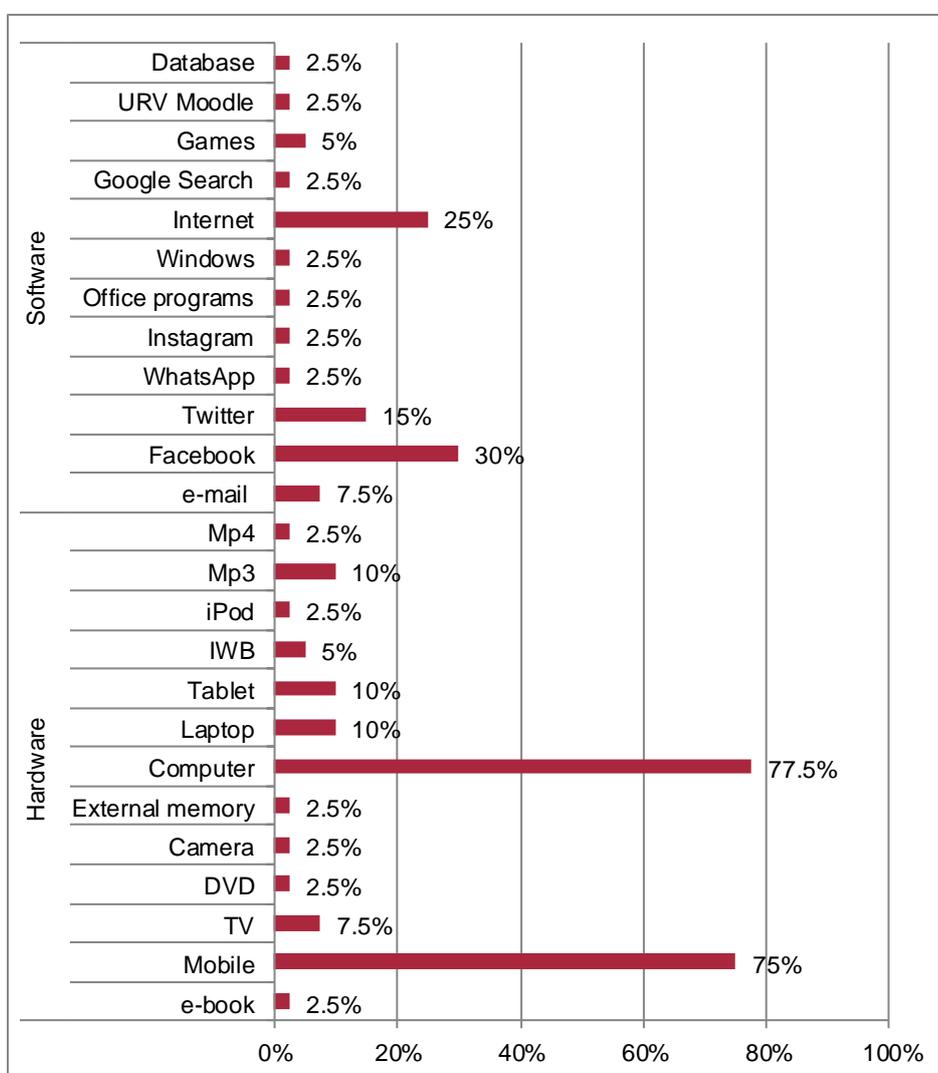
Figure 26. Frequency of digital technologies.

According to their answers (Figure 26), learners use the computer (77.5%) and mobile phone (75%) most frequently, followed by Facebook (30%) and Internet (25%). Figure 26 show the frequency of two categories "hardware/device" (hardware_device) and "software/application" (software_app) arose in the data, that is, the total number of times each digital technology was mention within students' responses to the question "What digital technologies do you use most frequently?"

All students had computers (desktop or laptop) and mobile phones (not all are smartphones), and access to mobile phones and were making intensive use of computers and mobiles during their daily activities around campus and between home and work. All students had Internet access at university, home or at their parents' house. All students used their personal equipment (computers, mobile phones and/or tablets) to access free Wi-Fi in the university. All of them answered accessing SNS using a computer (laptops) and mobile devices (smartphones and tablets). In terms of software, Facebook is used more frequently than e-mail as a form of communication and students spend the majority of their time with mobile phones on Facebook, Facebook Chat, Twitter and WhatsApp by chatting.

The main digital technologies students spoke of using in the context of their university studies were computer (laptop), mobile phone, the Internet (WiFi), institutional learning management systems (URV Moodle), e-mail (personal and institutional), PowerPoint and Word, and interactive whiteboard (IWB). At home, the most digital technologies are computer/laptop (in particular, PowerPoint, Word and Moodle), mobile phone (phone calls, WhatsApp), Internet (in particular, e-mail, Facebook and Twitter), tablet and television. Few students were working during the interview and in general they used few technology such computer and mobile phone (if it has been permitted).

> *En casa, bueno veo la televisión, el ordenador también para, no solo para trabajar, también escucho música. Internet también, el móvil y no sé.* [Female, VDLL, Early education, 24 years old]

> *En casa, pues ordenador, como he dicho, para usar Facebook y Twitter, luego para hacer trabajos en Moodle...* [Male, TSA, Primary education, 19 years old]

> *Cuando estoy en casa, pues, utilizo el portátil, y el Word para hacer faena de clase, y la Tablet, pues para nada, o sea (risas), para informarme de cuando necesito algo y tengo el ordenador apagado...* [Female, TSA, Primary education, 23 years old]

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En mi trabajo, ninguna. Bueno el otro día no tenía tinta en la impresora y utilicé el móvil para llevar la planificación al entrenamiento. [Male, TGN, Pedagogy, 24 years old]

...soy monitora de deportes y lo que son clases de repaso y, si me tengo que comunicar con alguien lo hago por el móvil, por el WhatsApp. [Female, VDLL, Early education, 19 years old]

Academic and Social Purposes of Digital Technologies

In regard to the academic and social purposes of the digital technologies, Table 38 shows some students' responses of the most used digital technologies. The students' responses are not exclusively for one category (see Appendix G to see all the quotations according category/code).

Table 38. Social and Academic Purposes of the Most Cited Digital Technologies

Hardware	Social Purposes	Academic Purposes
Computer	El ordenador de mesa lo uso un poco para ver series de televisión, me meto a diferentes páginas y las veo, a veces las voy siguiendo en inglés, en castellano, en cualquier tipo de idioma... [Male, TGN, Pedagogy, 22 years old] El ordenador por ejemplo, bueno las redes sociales, sobre todo Facebook utilizo y, bien para jugar por Internet un rato para entretenerme. [Female, VDLL, Early education, 24 years old]	Y a nivel académico para todo, el ordenador, para todo, o sea tanto Word tanto Office, Open Office, ehhh (…) buscadores. [Male, TGN, Social education, 22 years old] En la URV, sobre todo el ordenador que lo traigo a clase y lo utilizo pues para trabajar y hacer toda la faena que nos mandan en clase. [Female, VDLL, Early education, 24 years old]
Mobile	El móvil para las redes sociales, redes sociales bueno para informarme también porque leo el diario a veces a través del móvil. [Male, TGN, Social education, 25 years old] …a nivel social, pues, facilidad para hablarte con la gente, para poder quedar.… [Male, TSA, Primary education, 26 years old]	El s*martphone* es más social pero también lo utilizo para ponerme en contacto con mis compañeros académicamente porque… te puedes mirar los trabajos, revisarlos y al momento pues hacer una pequeña corrección y volverlo a enviar. [Male, TGN, Social education, 24 years old]
Tablet	La Tablet para buscar información por Internet, pues noticias, o hacer una pequeña busca, yo qué sé, de coche, de motos, de deportes, de video, páginas o blogs. [Male, TGN, Social Education, 24 years old]	…me llevo la Tablet para tomar apuntes, buscar información que te piden los profesores y descargar apuntes que ellos te dicen y tal. Hacer trabajos también y… me hace las mismas funciones que el ordenador portátil.… [Male, TGN, Pedagogy, 22 years old]
Software	Social Purposes	Academic Purposes

WhatsApp	El WhatsApp es una cosa que está, ¡vamos, la revolución, no!… O sea de forma personal pues para hablar con mi familia, amigos… hemos quedado en tal sitio pero no hay nadie, "hey donde estás", pues todo por el WhatsApp. [Female, TGN, Pedagogy, 26 years old] …el WhatsApp encendido todo el día porque no sé, mis padres tienen, mi hermana tiene, mis amigos tienen, pues, ya puedes hablar con ellos como estamos hablando tú y yo ahora.... [Female, TSA, Primary Education, 21 years old]	El WhatsApp para cuando estás quedando con un grupo y llegas tarde oye "pues, oye que llegas tarde, preséntate". [Male, TGN, Social Education, 20 years old] …a nivel de la universidad pues para trabajos y cosas así, bueno, podemos hacer un grupo de WhatsApp y bueno nos comunicamos por ahí… por ejemplo, si alguien dice algo de trabajo pues te lo envía al grupo y luego lo ves. [Male, VDLL, Early Education, 20 years old]
Internet	Pues compramos entradas para ir a conciertos. Todo lo que es bancario… papeleo me hago todo desde casa desde Internet, voy poco para la oficina. [Female, TGN, Primary Education, 31 years old]	A la hora de intentar saber una cosa, enseguida con Internet lo buscas y enseguida obtienes respuesta. [Female, VDLL, Early Education, 24 years old]
Facebook	Y Facebook lo utilizo más… para comunicarme con mis amigos, pa[ra] decirles cualquier cosa, hablar en el grupo de clase, por ejemplo. [Male, TGN, Pedagogy, 22 years old] …cuando hay que quedar con las amigas… para algún cumpleaños… organizamos un evento en Facebook o creamos algún grupo específico para… pasarnos información..... [Female, VDLL, Early education, 22 years old] …tengo un grupo compartido con los compañeros de estudio y, pues bueno, ahí hablamos las dudas, eh, pues comentarios graciosos, nada estrictamente serio… [Male, TSA, Primary education, 20 years old]	…también utilizo el Facebook para hacer trabajos en grupo, bastante… Todos los miembros que tenemos alguna novedad o alguna cosa pues lo ponemos allí y lo colgamos, lo rectificamos, lo hablamos, hasta las citas que a veces tenemos, "¡ah, miércoles a tal hora!". Todo por allí.... [Female, TGN, Pedagogy, 26 years old] También tengo grupo de Facebook de la clase para comunicarnos de trabajos, de cosas que pasan diariamente y cosas así. [Female, VDLL, Early education, 24 years old]
Twitter	Twitter es únicamente información de la sociedad, de los famosos o de los futbolistas y pilotos de motos, es lo único para lo que utilizo el Twitter. [Male, TGN, Social education, 24 years old]	Hicimos Twitter el año pasado para una asignatura… sobre las nuevas tecnologías de la comunicación, y la profesora... nos hacía hacer un Twitter, aprender a utilizarlo y ella nos revisaba… que supiésemos el funcionamiento. [Male, VDLL, Early education, 20 years old]
E-mail	Y el tema de correo ordinario pues para comunicarme con la gente… sobre todo que me llegue información de ofertas… Y si tengo algún problema con alguna empresa… pues comunicarnos con la empresa con este email. [Male, TGN, Pedagogy, 22 years old]	…el correo de la URV sólo lo tengo para… los profesores, sólo me comunico por allí con los profesores y con… Secretaría tienen que decir algo pues nos lo envían allí. [Female, TSA, Primary education, 23 years old]

Note. TGN: Tarragona; VDLL: El Vendrell; TSA: Tortosa

Students reported using their computer/laptop to use Office software such as word processing, spreadsheet, presentations and statistical programs; to browse for general information (e.g. news, holidaying, event timetables), to search for information for academic, social and entertainment purposes via Internet (Google search, web browsers); to do homework assignments; to take notes (on laptops at the university); to access communication media (Computer-mediated communication, e.g. instant messaging, e-mail, chat rooms); to communicate with faculty via institutional e-mail and friend via personal e-mails (Gmail, Hotmail); to watch digital videos/movies (YouTube); to uploading/download files; to play game(s), and others (also see Table 37, 38 and 40).

> *El ordenador, sobre todo (...) porque las clases son más mmm para tomar apuntes y eso prefiero hacerlo directamente con el ordenador...* [Female, TGN, Pedagogy, 26 years old]

> *En la URV, pues también los ordenadores para hacer trabajos o para coger apuntes a veces...* [Female, VDLL, Early Education, 19 years old]

> *...y para hacer trabajos, pues, uso mucho el ordenador para Power Point, videos, el JClic para hacer trabajos en clase.* [Female, TSA, Primary Education, 21 years old]

> *...es que para lo que es universidad, básicamente ordenador... por sobre todo los trabajos porque tienes Word, Power Point y todo lo que necesitas y por el Moodle.* [Male, TSA, Primary Education, 19 years old]

The term "mobile technology", as used in this study, includes mobile computers (e.g. laptops), mobile devices (e.g. mobile phones, tablets, e-books) and wireless communication tools (e.g. GPS). The students used their laptops, tablets and mobile phones to communicate with their friends, classmates, relatives and professors by e-mail, social networks, and smartphone Apps (WhatsApp, Viber, LINE). Students reported very high use of mobile phones for texting via WhatsApp and for communication via Social-Networking Sites (SNS), in particular Facebook. All students have mobile but the vast majority of students make extensive use of mobile applications for communication, and some of them used it for access to course materials and resources. According to learners' responses, mobile devices with smartphone technology, particularly Web 2.0-type applications (or "apps") such as WhatsApp, Facebook, and Twitter were the most used. Mobile phones were used to send text messages (WhatsApp), send e-mails (Google, Hotmail), and update social networking sites (Facebook, Twitter, Tuenti), as well as make

voice calls. All the students who have smartphones have installed WhatsApp. According to their answers, students showed a high reliance on mobile phones in particular for texting via WhatsApp, with the vast majority of them doing this daily (many times per day).

> *Bueno está todo el tema este de la mensajería instantánea de WhatsApp, de LINE, que es muy interesante sobre todo a la hora de creación de grupos… El hecho de poder comunicarte con unos cuantos a la vez, no individualmente. Generalmente uso esto, no voy mucho más allá (risas).* [Male, TGN, Pedagogy, 27 years old]

> *Y luego, también me renové el móvil y por lo WhatsApp, que yo no sabía ni qué era eso, pues también, ahora ya le he aprendido.* [Female, TGN, Social Education, 50 years old]

> *En mi móvil tengo el Instagram… Facebook… Twitter… Dropbox… WhatsApp, el Instagram. Ehhh uno que se llama Evernote o algo así. Eh tengo bueno las diferentes páginas web de Google Chrome… Skype…* [Female, TGN, Pedagogy, 20 years old]

> *…el móvil para quedar con los que nos vamos con el coche pues "yo ya estoy llegando, sal fuera de casa". Eh… luego, pues "¿a qué hora es esto?", la entrevista esta por ejemplo, "a las 12", "¿en qué aula?"…"yo estoy arriba, sube", y hemos subido.* [Male, TSA, Primary Education, 26 years old]

Eight students mentioned had tablets and only two of them used for academic purposes (see also Table 38). The main two purposes for the tablet were to access to the Internet (e.g. Facebook, e-mail, news) and for entertainment (e.g. games). Also, they considered the relevant benefit of the Tablet is their portability (or mobility) and flexibility (see also Table 37). Three students reported used location-aware handheld computers with global positioning systems (GPS) technology (two in their cars and one in her smartphone). Only one student reported used e-book as one of her most frequent technology.

> *…todos los programas que me bajo en la Tablet, tocar el piano o el Trivia para dos, me entretengo para cualquier ratito que tengo así muerto, pues.* [Female, TGN, Primary Education, 31 years old]

> *…yo antes de no tener la Tablet utilizaba muchísimo el portátil... pero con la Tablet, lo puedes llevar a cualquier sitio, no pesa nada, y además es muy cómodo de utilizar y, muy sencillo. Pues es que vamos, estoy en el sofá, estoy viendo la tele y con el Tablet encima mirando cosas por Internet.* [Male, TGN, Pedagogy, 22 years old]

> *...la Tablet porque es práctica y cómoda, y siempre que la llevo encima y voy a un sitio y tengo Internet pues miro el Facebook...* [Male, TSA, Primary Education, 19 years old]

All the students received an interactive whiteboard (IWB) basic training course but not all of them have attended it for personal reasons. Students reported used IWB at its most basic level, to display materials (text and images). One student reported not know-how-to-use the IWB despite she attended the course because she did not show much interest at all. Only one student considered IWB innovative technology for the university. According to students' responses, few professors were able to integrate IWB into their lessons and their teaching. Also few students have mentioned use IWB to perform activities. Many professors used only the traditional projectors connected to a PC (e.g. to show Power Points presentations and multimedia materials to the class).

> *No. (...) No. Lo vi una vez y con 01TGNprofesor y ya está. Tampoco yo me he puesto a hacer nada, ni tampoco he puesto interés en absoluto.* [Female, TGN, Pedagogy, 24 years old]

> *...por ejemplo, tenemos pizarras digitales. (...) A ver, estoy en segundo, pero desde que estoy en segundo nadie, ningún profesor la ha utilizado, lo único que utilizan es la pantalla como proyector.* [Male, TGN, Social Education, 24 years old]

> *...el año pasado hice un curso de pizarras interactivas... En la universidad, no he visto que nadie haga uso de ellas para innovar, todos ponen el Power ahí con el proyector y ya está.* [Female, TGN, Pedagogy, 24 years old]

> *...el proyector para pasar los Power Point... La PDI prácticamente no se toca y lo que utilizan los profesores es el proyector con el Power Point o lo que tengan que pasar y ya está.* [Male, TSA, Primary Education, 19 years old]
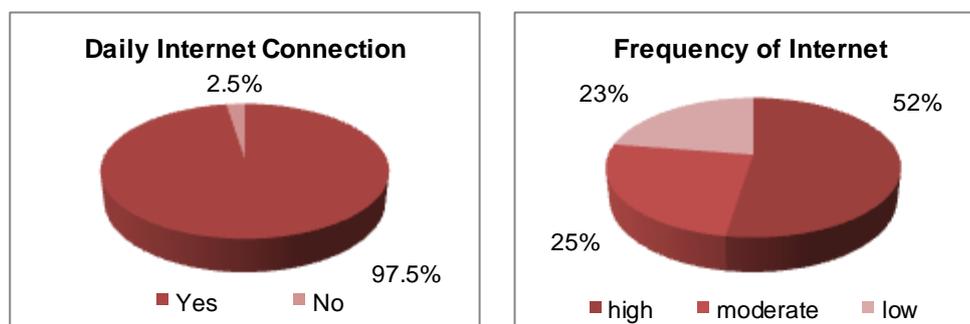
Figure 27. Internet Connection.

In general, the level of access to Internet is high (Figure 27) accessing multiple times per day. Almost all the students (97.5%) used the Internet daily. Only one student does not usually connect on Sundays. The frequency of Internet connection is always (or almost always), more than six times a day in 52.5 % of cases and 25 % is often, more than 3 times a day. Only 22.5 % connect to the Internet less frequently (few minutes, just one or two times a day/week). Both digital native and digital immigrants are frequent participants of Internet (see Table 39). Participants reported using Internet to keep in touch with friends/family; to participate in a SNS; to send and receive e-mail; to access the virtual campus; to search for information for academic, social and entertainment purposes; to download information; to browse for general information (e.g. news, holidaying, event timetables); to access communication media; to uploading/download resources (audio or video files, games, etc.) onto a computer or mobile device (Tablet, MP3, mobile phone); to access and to read news web sites; and to translate texts (Google Translator). The use of the Internet to access services (e.g. banking, booking) was less common. In addition to using the Internet for issues directly relating to their college work, students were using it for entertainment (e.g., watch videos online). Only three students reported playing video, computer, or online games as a recreational activity.

Table 39. Frequency of Internet Usage by the New Generation of Students

Generation of students	Frequency of Internet			Total
	High	Low	Moderate	
Digital native	19	9	7	35
Digital immigrant	2	0	3	5
Total	**21**	**9**	**10**	**40**

In regards to SNS, students appear to choose Facebook and Twitter to keep in contact with others or keeping them updated (Figure 28). Facebook is the most popular SNS between the students, with Twitter as a second choice but there was a large variation in terms of frequency of use. Some students only have one SNS that is Facebook. Five students mention they have created a Tuenti (a Spanish SNS) account, but they do not use it frequently because they prefer to use Facebook. One student also mentions that she does not use it at all anymore. LinkedIn also becomes important for one student when considering their further career.

> *...en mi caso, sólo tengo una red social, Facebook, y la utilizo en mi tiempo libre pues para hacer un poco de cotilla ¿no?, y para comunicarme, pues, con mis*

amigos en plan ocio y broma, por decirlo así. [Male, TSA, Primary Education, 20 years old

También tengo Tuenti pero no lo uso para nada. Me lo puse por familiares que tienen pero no lo acabo usando, acabo usando otras. [Female, TGN, Pedagogy, 29 years old]

Y el Tuenti me lo abrí sobre todo para toda la zona de Andalucía utilizan más Tuenti, no sé por qué, y me lo abrí para buscar a gente que yo conocía que sabía que no tenían Facebook. Pero realmente luego les terminé convenciendo para que se hagan Facebook. Y ahora ya no lo uso tanto, a lo mejor entro una vez a la semana. [Female, VDLL, Primary Education, 24 years old]

Pero yo tengo el LinkedIn, vale que esto es más profesional ¿no?... y allí es un sitio que sé perfectamente que si a alguien le intereso o si a mí me interesa alguna oferta allí puedo acceder a diferencia del Facebook que lo veo como más personal…. [Female, TGN, Pedagogy, 26 years old]
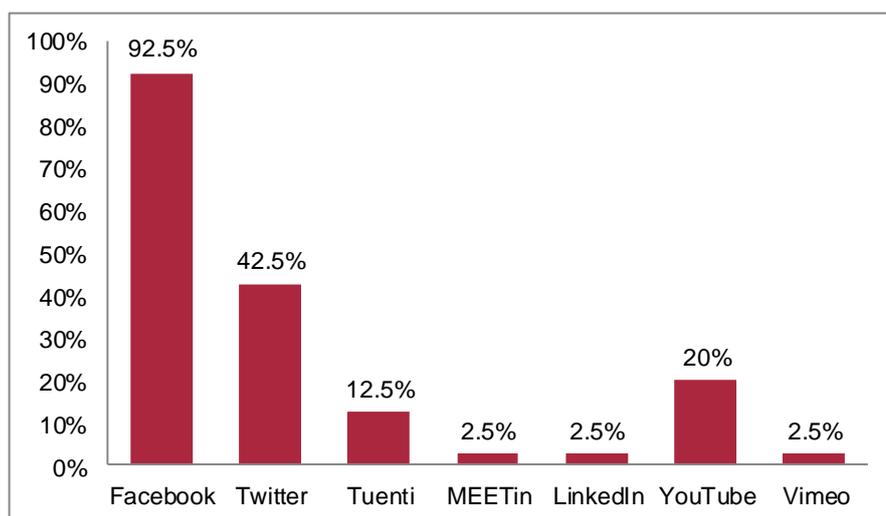
Figure 28. Social networks used by students.

Some students mentioned use Facebook for short periods of time a day or is rarely used, For them, their time spent on Facebook was only related to studying or specific academic purpose. Three students answered had not Facebook account but one of them belong to the Facebook's study group. One student answered that she deactivated her Facebook account because she entertained herself too much. Some students had never used a social networking site before attend university until request of professors or classmates.

Y el Facebook pues durante el día no le hago mucho caso también o mucho por la noche si veo que está interesante o no pues escribo una frase la verdad… Yo es que

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personalmente me considero un poco Face[book], muy dejado. [Male, TGN, Social Education, 24 years old]

Nada, no utilizo nada yo. Y el Facebook, ya te digo, lo utilizo sólo para cosas relacionadas con la universidad sino tampoco es que lo utilizo. [Female, TSA, Primary Education, 45 years old]

Pues antes tenía el Facebook pero me lo quité porque yo misma vi que me entretenía demasiado entonces ya me lo quité, no tengo ese problema. [Female, TGN, Pedagogy, 26 years old]

Facebook no uso, ehhh (...) ni ninguna cosa, ninguna red social de este tipo (...) [Female, TGN, Early Education, 29 years old]

Bueno yo soy un caso igual un poco extraño porque no tengo Facebook, no tengo Tuenti, ni ninguna cosa de estas porque, bueno, he decidido que no, no estoy en contra, pero he decidido que no. [Female, VDLL, Early Education, 24 years old]

...por cosas académicas del año pasado tuve que hacerme un Face[book] pero que no lo miro nunca, o sea, como que no existiera. [Female, TGN, Social Education, 50 years old]

...el año pasado, eh digamos la 01TGNprofesora nos sugirió darnos alta en el Facebook y el Twitter. [Female, TGN, Pedagogy, 58 years old]

Me tuve que hacer uno, claro porque todos los compañeros me decían "por favor hazte uno" y bueno me lo hago. [Female, TGN, Pedagogy, 26 years old]

Facebook (all the students) and Twitter (few students in TGN campus) were being used by the learners to support their tasks, for group work and study group activities (also see Table 37 and 38). According to their answers, few professors are ready to engage with Facebook and/or Twitter in such uses. In general, male/female, younger/elder students were using Facebook to almost the same extent: to contact their classmates concerning course assignments, group projects, or team work; but they are not contacting their teachers by SNS (Facebook, Twitter and Tuenti). According to their answers, students establish communication with their friends or families using the different tools of Facebook (i.e., the Wall, personal messages, chat, Skype). No students used Twitter to communicate directly with peers, friends, family and/or professors; in general, they were interested in following their users' updates.

El Twitter… algunas veces a mí se me ocurre poner algo… pero lo único que hago es seguir a la gente famosa si es que quieres saber lo que hace. [Female, TGN, Pedagogy, 24 years old]

Eh, Twitter muchas veces simplemente lo utilizo para seguir personas que me interesan en algún momento o para algunos programas de la tele para estar un poco más enterada. [Female, VDLL, Early Education, 24 years old]

…el Twitter, lo uso más para leer las noticias a modo rápido. Eh… pues, soy seguidor de muchas WebQuest, de periódicos, de curiosidades por Internet, de Cataluña información, por ejemplo, y en un rápido vistazo, pues, me entero de las noticias más importantes del día, sin tener que esperar a las 6 de la tarde para ver las noticias por la tele. [Female, TSA, Primary Education, 26 years old]

The University provides all students with a University e-mail account and e-mail is used regularly in the University as an "official" form of communication between staff and students. This account allowed the student access to all online services (Moodle, URV e-mail, library, etc.). Most of the students normally checked their e-mail accounts (personal and institutional), but they are using their personal e-mail account for personal and academic purposes. In contrast, students perceive URV e-mail as an "official media" for contacting professors. Participants also reported using their personal e-mail (Gmail, Hotmail) to keep in touch with friends. Also, students were able to identify which technology they could use for the same purpose (also see Table 37, 38 and 40).

El e-mail personal lo utilizo entre compañeros de clase y para mis cosas personales. Y el de la URV lo utilizo sólo para hablar con los profesores. No me comunico con mis compañeros a través del correo de la URV. [Female, TGN, Social Education, 19 years old]

…mi correo de la universidad sólo es para relacionarme con los profesores si tengo alguna duda o ellos conmigo y para recibir información sobre la universidad… Y, el personal, allí es donde con los compañeros nos mandamos los trabajos, si tenemos apuntes para intercambiar recursos, y con mis amigos pues también uso el personal. Es que tengo dos de personal, uno que es Gmail que es más serio, digamos, que es para trabajos, cosas más de estudio, de trabajos míos; y, tengo otro que es el Hotmail que hace muchos años que lo tengo que es más para cuando te mandan esos mensajes pues en Power Point de cosas graciosas... [Female, TSA, Primary Education, 21 years old]

The Learning Management System (LMS) chosen by this university was Moodle, an open source system that has been adopted by a number of post-secondary institutions in

Catalonia. Students commented on the anytime, anywhere aspect of accessing information on the course LMS noting that the syllabus, course materials and lecture notes are posted and uploaded, and notices for the class are ways for someone who is not on campus to get information of the course. Not many learners considered URV Moodle a good e-learning platform and their general opinion is positive. Few students mentioned that they use it at a few occasions. One student considered Moodle as a not innovative tool. Also, interviewers expressed a preference for the social networking platform of Facebook over the institutional course management systems (URV Moodle).

> *El Moodle (...) es casi la herramienta básica del estudiante, muchas veces casi no vendría a clases, casi lo haría todo por el Moodle que es la base de todo, todo está allí colgado, apuntes, trabajos, todo. Pienso que se hace un buen uso en ese sentido...* [Female, TGN, Early Education, 29 years old]

> *El Moodle lo utilizo para coger información o sea lo que cuelgan los profesores y un poco más. Es que entre los compañeros ya como usamos el Facebook y el WhatsApp, pues ya tenemos el Moodle un poco apartado… el Moodle ya no es innovador y aparte es que no hacemos mucho uso, lo utilizamos, yo creo que la mayoría para coger los Power que cuelgan los profesores, la información, y es que para comunicarnos no lo utilizan.* [Female, TGN, Pedagogy, 26 years old]

Not very many students made a phone call or videophone call using Skype. According to their responses, participation in Skype interactions was with loved ones and often used to help maintain distant links.

> *Pues yo tengo mucha relación con América Latina y me puedo vincular con México, con gente que está en Perú o en Chile… Con Estados Unidos tengo familia y estamos muy conectados con el Skype a nivel de hacer digamos con la webcam.* [Female, TGN, Pedagogy, 58 years old]

> *Por ejemplo, ahora mismo mi hermana está en Punta Cana, viaje de final de carrera y ayer hice un Skype con ella. Si no fuera por el Skype yo no la hubiera visto ¿no?, físicamente, porque también hubiera podido hablar pero no verla.* [Female, TGN, Pedagogy, 26 years old]

According to students' responses, few professors promote the use of blogs and wikis in Moodle. Moodle was not used to communicate with peers and professors via blogs or wikis. *"Muy poco, es que los profesores tampoco los impulsan… no, no se usan, no"* [Male, TSA, Primary Education, 19 years old]. Moodle was reported by students for

content presentation (upload/download assignments), and interaction with professors via discussion forums. Mahara is the chosen electronic portfolio (e-portfolio) in this university which was integrated into the virtual learning platform (URV MOODLE). Only one student mentioned this tool and according to him is used to communicate with professors.

> *Básicamente, yo creo que como mucha gente de esta facultad lo usamos únicamente como descarga… para ir a ver… lo del programa, la asignatura, las prácticas todo lo que va y con los foros rara vez (…) y bueno wiki y todo eso poca cosa verdad (…)* [Male, TGN, Pedagogy, 27 years old]

> *Bueno el blog del Moodle no sé qué es, pero el portafolio sí y las wikis. Ah (…) después hay los fórum que también lo utilizamos y el correo, y ya está.* [Female, TGN, Pedagogy, 24 years old]

> *…el Mahara lo utilizaría también como algo para con fines educativos, como si dijéramos, para ponerte en contacto con el profesor* [Male, TGN, Pedagogy, 22 years old]

Students' responses demonstrate how diverse learners of all ages are in their digital technology experiences, in particular those relating to Web 2.0 and mobile technologies. Some younger students tended to have more experience of using social networking sites than older students. However, one student commented the need for Facebook assistance for the first time she used it. Learners' had no experience with wikis and blogging was not a particularly popular activity either. Also, all the students were capable to decide which technologies to use for the same purpose (see Table 40).

> *Yo creo que el primer día que entre a Facebook, me perdí, no sabía… me lo explicaban mi amigas "tienes que hacer esto, esto"…* [Female, VDLL, Early Education, 23 years old]

Table 40. Student's Responses: Several Digital Technologies for the Same Purpose.

Social Network (Facebook vs. Twitter)	
Male, TGN, Pedagogy, 24 years old	Facebook sería como mi lado más social y Twitter sería como mi lado más académico, más profesional. Twitter lo utilizo más que nada para sacar noticias, para estar un poco más informado al día.
Female, TGN, Pedagogy, 24 years old	…el Facebook… tenemos un grupo de los grupoClaseTGN y allí colgamos las cosas de clase… El Twitter pues mira algunas veces a mí se me ocurre poner algo… pero lo único que hago es seguir a la gente famosa si es que quieres saber lo que hace.
Male, TSA, Primary Education, 19 years old	La principal red social que utilizo es Facebook que bueno ésta es pues tanto para hablar con amigos e incluso para enviar trabajos… enviar documentos o lo que sea creamos allí un vínculo y bueno el Facebook… sirve de popurrí de todo. Y la otra que utilizo pero no tanto es Twitter pero más que nada es para comentar algún estado o explicar alguna cosa pero encuentro mucho más útil Facebook que Twitter, que no lo valoro tanto.
Social Network (Facebook vs. Tuenti)	
Female, TSA, Primary Education, 23 years old	Y de entretenimiento, pues tengo varias redes sociales como Facebook para la gente de aquí, el Tuenti para amigos que tengo en otra zona de España…
E-mail (Personal vs. Institutional)	
Female, TGN, Social Education, 50 years old	…si tengo que mandar un correo a algún profesor de la URV… por ejemplo, ese estudio de investigación que necesitaba documentación y he tenido que mandarlo a estamentos oficiales, lo he mandado a través de la URV. Por eso, si son para compañeros… yo mando el mío que es el que más abro. A veces me llega directo al móvil, el de la URV no me llega directo al móvil, y así tengo más facilidad de ver el mensaje. Apretó una tecla y no tengo que encender el ordenador.
Female, VDLL, Social Education, 19 years old	…por ejemplo, en temas correos siempre utilizo el mío, el de la URV lo tengo sólo para recibir correos internos que nos mandan de información, sino normalmente siempre suelo utilizar mis cuentas personales.
Female, TSA, Primary Education, 25 years old	…si es para hablar con los amigos o transmitir información… pues ya sé que voy al correo personal. Si sé que es de trabajo o para hablar con los compañeros de clase o con algún profesor ya sé que no puedo usar mi cuenta personal… Diferencio según lo que voy hacer, ¿no?, si voy hacer un trabajo de clase, ya sé que es de la URV.
Female, TSA, Primary Education, 23 years old	…el correo de la URV sólo lo tengo para, pues, los profesores, sólo me comunico por allí con los profesores y con… pues, en Secretaría tienen que decir algo pues nos lo envían allí… el Gmail, lo utilizo, pues, por si tengo que enviar un trabajo a una compañera o si tengo que uf, no sé, que hacer alguna cuestión… a alguna empresa o lo que sea pues ya voy directamente a mi Gmail, no voy desde mi universidad.

Personal e-mail (Gmail vs. Hotmail)	
Female, TGN, Social Education, 21 years old	…correo electrónico lo utilizo siempre. Luego sé que tengo 2, tengo el Hotmail que es algo más personal y el Gmail que es algo más académico, así distingo un poco lo que es el ocio de lo que son las actividades más educativas.
Female, TSA, Primary Education, 23 years old	El Gmail… me lo hice porque eso de regístrate aquí, tienes que tener una cuenta Gmail, pero no lo uso casi la verdad… El Hotmail lo tengo más coloquial, más amigos, publicidad o lo que sea, pero el Gmail lo tengo más en ámbito más formales o de trabajo, o de currículum.
Mobile devices (Mobile phone vs. Tablets, Laptop vs. Tablet)	
Male, TGN, Pedagogy, 22 years old	Pues sobre todo móvil y Tablet lo utilizo para fines sociales pues para conectarme al Facebook, al Twitter, mirar noticias de Internet, mirar páginas deportivas, todo lo relacionado con el mundo de Internet. La Tablet exactamente lo mismo.
Male, TSA, Primary Education, 19 years old	…una de las desventajas que tengo en el móvil es que no tengo Internet, solamente me funciona con WiFi y entonces cuando llevo el móvil encima no sólo lo utilizo para enviar mensajes o llamar. Y la Tablet pues es muy distinto porque la tengo tanto para juegos como para hacer imágenes, no sé para enviar información mediante el correo, para ver Facebook… el portátil pues tanto para diversión como para trabajar con él por asuntos de la universidad o aspectos así.
Mobile devices (Laptop vs. Mobile phone/Tablet)	
Female, TGN, Pedagogy, 23 years old	El portátil y el móvil que ahora sirven como ordenadores.
Female, TSA, Primary Education, 23 years old	…cuando estoy en la calle utilizo el móvil y puedo ver el Facebook cuando quiera. Cuando estoy en casa, pues, si estoy haciendo trabajos y tal siempre lo hago con el portátil. Y si es, no sé, si por cualquier circunstancia tengo el portátil apagado que normalmente siempre está encendido pero bueno (risas), pero estoy haciendo trabajos y tal, pero pues utilizo la Tablet, pero que la Tablet la utilizo muy pocas veces ¿eh?, tampoco la veo yo muy funcional.

Note. TGN: Tarragona; VDLL: El Vendrell; TSA: Tortosa

Benefits and Disadvantages of Using Digital Technologies

All of the students described the benefits of using digital technologies for academic and social purposes; they cited communication (most cited), information, convenience, learning, saving time, collaboration, problem-solving, entertainment, saving money, among other benefits (see also the frequency of categories and codes in Figure 25). Table 41 shows some student's responses; some responses are not exclusively for one benefit (see Appendix G to see all the quotations).

Table 41. Benefits of Digital Technologies for Academic and Social Purposes

Benefit	Academic Purpose
For communication	…y a nivel académico ya te digo también, eso de quedar con los compañeros a una hora… [Male, TGN, Pedagogy, 27 years old]
To get information	Y a nivel académico creo que si sabes gestionar bien la información y sabes dónde buscarla… pues también puede ser un punto muy a favor… porque puedes entrar a todos los mundos haciendo un clic desde casa y puedes estar muy informado de todo. [Female, TGN, Pedaggoy, 20 years old] …a la hora de hacer un trabajo, por ejemplo, antes era ir a la biblioteca, coger libros y además así en cambio ahora hay un montón de información, mmm… cosas que en las noticias ni te dicen lo puedes encontrar en Internet, o sea cosas que no quieren que la gente se entere, tú luego lo puedes ir mirando ahí… [Female, VDLL, Early Education, 22 years old]
To share information	Académicos pues…te puedes pasar trabajos, te puedes pasar correos, te puede pasar mucha información que antes no podías. [Female, VDLL, Early Education, 24 years old]
To stay in touch with classmates	… por ejemplo, ahora en la universidad se nota mucho porque cada uno es de una zona diferente, entonces eso te permite estar más cerca de los compañeros, tenerlos disponibles la mayor parte del día en cualquier medio, ya sea móvil, Facebook, WhatsApp lo que sea, entonces te facilita la faena de la universidad. [Female, TSA, Primary Education, 23 years old]
To find help with school work	…lo tienes todo un poco más por mano, no hace falta que te vayas a la biblioteca de Zaragoza para encontrar un libro, te lo traen directamente después haces lo trámites por Internet. [Female, TGN, Social Education, 21 years old]
To be accessible	…por ejemplo, a nivel académico, es todo mucho más accesible, el hecho de que el profesor te pueda colgar los apuntes y ponerte en contacto desde casa y sin tener que ir a lo mejor al Instituto o la universidad, eso es una ventaja. [Female, TGN, Pedagogy, 24 years old]
To save time	Tenemos muchos grupos diferentes y muchos trabajos, entonces esto facilita muchísimo… con el Google Docs haces la faena y luego lo mandas por correo y ya está. Te ahorras mucho tiempo de estar fuera o de tener que estar en la biblioteca… [Female, TGN, Social Education, 19 years old] Los beneficios es que te ahorras mucho tiempo. En vez de ir a la biblioteca a buscar libros y eso, pues tú ya buscas los títulos que necesitas a ver si están libres o no en la biblioteca por el ordenador por Internet... [Female, TGN, Social Education, 50 years old]

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Benefit	
To save money	Estar en contacto también gratuitamente, no tienes por qué gastar en euros sobretodo… [Male, TGN, Social Education, 24 years old]
To be quick/fast	…pues la rapidez, porque como tenemos que hacer muchos trabajos en grupo, yo desde mi casa, nos conectamos… por el vídeo, el chat de Gmail… cada uno desde su casa, ni nos movemos ni nada. [Female, TGN, Primary Education, 31 years old]
For learning	…es que te facilita mucho el trabajo. El poder coger y descargar desde el teléfono móvil un archivo del profesor o unas notas y poderlas mirar en cualquier sitio sin tener que depender de un ordenador para mí es muy facilitador en cuanto a los estudios. [Male, TGN, Social Education, 25 years old]
To greater mobility/ portability	…la facilidad en que puedes encontrar todo tipo de recursos y de una forma, no sé, más fácil, como ya he dicho también, más transportables, lo puedes tener en todos los sitios… [Male, TSA, Primary Education, 19 years old]
To be easy to use	…es el hecho en sí de que toda la información está ahí y está al alcance de cualquiera. Entonces, es muy fácil sentarte y encender el ordenador y buscar cualquier cosa, cualquier duda que se te pase por la cabeza en un clic la tienes solucionada, ¿no? Entonces se facilita mucho el trabajo… la facilidad y rapidez. [Female, TGN, Early Education, 29 years old]

Benefit	Social Purpose
For communication	Te puedes comunicar con gente de otros países sin moverte de casa que no tendrías la oportunidad sino tuvieras la tecnología. [Female, TGN, Primary Education, 31 years old] Pues, social, es la globalización, ¿no?, que nos podemos comunicar con los que están en la otra punta del planeta, y, bueno, eso es un avance… [Female, TSA, Primary Education, 25 years old]
To get information	Y también te enteras, con datos mismo, te enteras de lo que está pasando en cualquier momento y en cualquier lugar del mundo. Que es bueno porque si miras el tiempo, si vas para Barcelona, sabes qué tiempo hay… te puedes modificar la ropa o puedes modificar tus días de ir por depender del tiempo. [Female, VDLL, Early Education, 24 years old]
To stay in touch with acquaintances, friends and/or relatives	…a nivel social, está claro que antes para comunicarte y relacionarte con tus amistades tenías que congeniar en el mismo punto, y ahora…eso te permite contactarte con alguien que no está en el mismo punto físicamente sino que te puedes comunicar pues a nivel de otros países, de otros pueblos sin la necesidad de quedar físicamente. [Male, TSA, Primary Education, 20 years old] Yo creo que a nivel social ha mejorado mucho el hecho de poder hablar con la gente que está lejos y que sea instantáneo, que no tengas que enviar una carta y esperarte que llegue 15 días. [Female, TSA, Primary Education, 21 years old]
To meet new people	…porque puedes conocer gente de otros países, de otros sitios… sin la necesidad de encontrarlos físicamente… [Female, VDLL, Early Education, 20 years old]
To be quick/fast	…es una forma rápida de comunicarte tanto por WhatsApp como por Facebook ya que tú con los móviles que hay actualmente tienen de todo, Facebook, Twitter, o sea, cualquier cosa que alguien te publique enseguida lo recibes en el móvil… [Female, TGN, Pedagogy, 26 years old]
To be easy to use	…que es muy fácil utilizarlas, o sea… que solamente apretando un botón… [Female, TSA, Primary Education, 45 years old]

To save money	Bueno a nivel social, mmm… en comunicación han ayudado muchísimo porque ahora hay forma de hablar con la gente sin tener que pagar nada que antes era imposible pues hablar con gente de la otra punta del mundo que con la aplicación esta del WhatsApp, por ejemplo, va muy bien. [Female, VDLL, Early Education, 22 years old]
For entertainment	…a nivel de preparar agendas, preparar viajes, es muchísimo más fácil hacer una reserva… a través de Internet tanto posibles actividades culturales, como de ocio y me parece fantástico que uno no tenga que ir a una taquilla a comprar a última hora una entrada. [Female, TGN, Pedagogy, 58 years old]
For convenience	…en lo que se refiere a los bancos ¿no?, eso de la línea abierta… porque yo me he ahorrado muchos viajes de tener que ir al banco y hacer colas y todo esto. [Female, TGN, Social Education, 50 years old]

Note. TGN: Tarragona; VDLL: El Vendrell; TSA: Tortosa

Students also mention some disadvantages about the digital technologies relate to anxiety, stress and addiction (uncontrolled usage) to Internet. Students expressed explicit concern over the length of time they spend online. One student mentioned that close contact with people and professors is missing.

Quieras o no estar mucho al contacto con las tecnologías te estresa. Tanto rato en el ordenador me duelen lo ojos, necesitas salir de ese círculo porque es un círculo vicioso. [Female, TGN, Social Education, 21 years old]

Yo creo que Internet llega a ser como una droga, para mucha gente llega a ser como una droga y hay que saber separar, saber dividir el tiempo. [Male, TGN, Social Education, 22 years old]

...hace nada que tengo Internet en el móvil y esto es un vicio, empiezas y no terminas. [Female, TGN, Pedagogy, 26 years old]

...para mí no aporta nada, al revés, es un vicio más, es una adicción más. [Female, VDLL, Early Education, 45 years old]

...si estoy haciendo faena, un trabajo de la universidad y no tengo el Facebook es como si me faltara algo, es como si estuviera desconectado del mundo. [Male, TGN, Social Education, 25 years old]

Por la serie de horas que puedas estar en entretenimiento vía Twitter, ahora miro videos, ahora comento esto, ahora miro lo otro, entonces esto es tiempo que estás cogiendo de lo que deberías estar invirtiendo en otra función... [Female, TSA, Primary Education, 23 years old]

A veces el contacto con las personas se pierde, porque yo vengo de otra carrera… y antes no había tanta interacción por Internet y tanto de esto y creo que se ha perdido un poquito en compañeros y todo esto sí en relación con profesor también… Los profesores ahora, a mi forma de ver, se escudan mucho en esa

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herramienta y el contacto con el alumno se deja de lado. [Female, VDLL, Early Education, 24 years old]

Digital Technologies in the Academic Program

In regard to the question how digital technologies are used in the academic program, most students cited that digital technologies are used only at a fairly basic level despite the university's investment in new digital technologies (e.g. interactive whiteboards). Students perceive their professors expertise with digital technology to be at fairly basic level for office applications (word processing, spreadsheet and presentation). Students would like to see their professors integrating digital technologies into their teaching and learning processes. According to learners' responses, few professors demonstrated a proficient level of confidence and ability with digital technologies skills and demonstrated innovative use of digital technologies in their teaching practice.

> *Hay de todo, hay quien los usa con más facilidad y hay que los usa con menos pero la mayoría de los profesores tienen conocimientos básicos de las nuevas tecnologías.* [Female, TGN, Pedagogy, 29 years old]

> *Yo creo que ya desde el hecho que tenemos un entorno virtual, en este caso el Moodle, eso implica que los profesores se renueven, que nos pasen la información toda por allí que no tenga ningún fallo, que nos pasen los Powers, que nos pasen los ejercicios a realizar, todo esto ya es renovación.* [Female, VDLL, Early Education, 23 years old]

> *El año pasado sí que tenía una maestra que nos hacía hacer storytelling, que nos hacía hacer un wiki, teníamos un blog cada grupo o sea que ésta fue muy buena porque nos hizo hacer Twitter y gracias a ella tengo Twitter, nos hizo hacer el blog o sea que aprendimos muchísimo gracias a ella, SPSS, creo que se llaman y cosas de esas.* [Female, VDLL, Early Education, 24 years old]

5.5. Generation of Students

Only 37.5% of students have heard a term/name to define this new generation (digital natives, Millennials) and 65% did not consider this definition represented them (Figure 29). Digital native was the term most mentioned for the students. Table 42 shows the most significant students' answers.
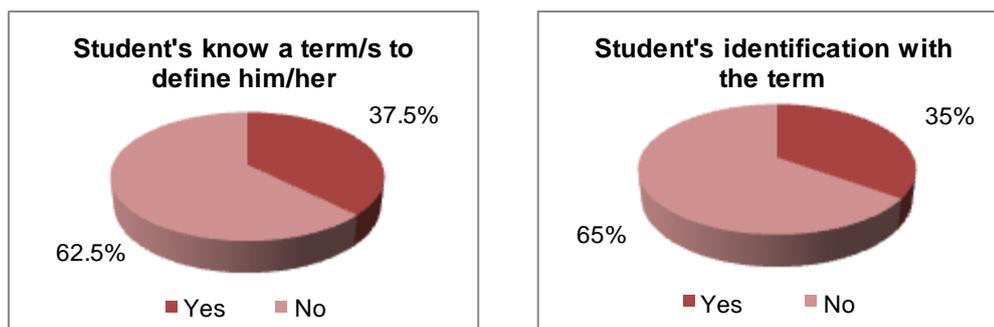
Figure 29. Generation of students.

Table 42. Students' Answers about How They Feel about "Digital Native" Discourse

The student does feel the term/concept represents him/her
Si, porque estamos acostumbrados desde bien pequeños a usar la tecnología, los ordenadores, cosa que nuestros padres o nuestras generaciones anteriores no usaban. Se nota mucho el cambio de la facilidad con la que nosotros cualquier tecnología nueva o cualquier aparato nuevo lo cogemos sin miedo, lo usamos, aprendemos a usarlo rápido. Nuestros padres se ven que están perdidos, no saben por dónde empezar y los que vienen por detrás nuestro van todavía mucho más avanzados increíblemente porque nacen ya con un aparatito en la mano. [Female, TGN, Early education, 29 years old]
Yo creo que sí. A ver, yo pienso, mi madre, bueno, ha nacido antes de los nativos digitales, es una inmigrante digital como digamos y a ella bueno pues le ha costado mucho más aprender de las tecnologías. [Male, TGN, Pedagogy, 24 years old]
Porque ya desde pequeña mmm… he estudiado, he ido a cursos de informática, he aprendido a utilizar un ordenador como quien aprende a leer… por ejemplo a mi sobrina que tiene 5 años ya coge el móvil y hace lo que le da la gana… [Female, VDLL, Early education, 21 years old]
Claro, yo me siento identificada porque en casa yo lo noto, por ejemplo, con mis padres, o sea, la diferencia que hay en este ámbito es bastante grande… o sea de tener que enseñar a mis tíos, a mis padres cómo funcionaba un ordenador… se nota mucho la diferencia... [Female, TSA, Primary education, 23 years old]
The student does not feel the term/concept represents him/her
Yo creo que están exagerando demasiado… se está abusando porque yo veo niños con 8 años con móvil, no es necesario porque no lo necesitas… Yo he tenido que aprender a utilizar un móvil, yo estoy aprendiendo a utilizar un ordenador, ni conocemos todos los programas, ni nacimos enseñados, digamos que sí que tenemos más facilidad porque estamos más abiertos de mente. No es lo mismo que yo con 22 años empiece a aprender una cosa nueva que mi madre con casi 50 empiece a usar el ordenador. Sí que tenemos más facilidad pero no se da por hecho de que sepamos. "No es que vosotros sin móvil no sabrías vivir". Sí que sabríamos vivir porque yo nací en el 90 y viví sin móvil, viví sin ordenador, yo salía a la calle a jugar. [Female, TGN, Social education, 21 years old]
Yo particularmente no mucho… No puedo evitar tener móvil con WhatsApp o tener Facebook, eso no lo puedo evitar… ni me llama mucho la atención, por ejemplo si sale algo nuevo, antes lo tiene que tener todo el mundo para que luego me entere yo de que eso puedo usarlo… [Female, TGN, Pedagogy, 24 years old]

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Yo creo que no… yo creo que lo niños de hoy en día o hace 5 ó 6 años que han nacido que dominan más ya desde más pequeños…Yo creo que, a veces, mientras va pasando el tiempo los niños van aprendiendo cada vez más. Ayer mismo estaba hablando con una compañera de mi clase que tiene una ahijada que tiene 2 años y sus padres tienen un ordenador digital y la niña con 2 años ya sabe dónde tiene que ir a YouTube para ver a Pocoyó… Yo con 2 años eso no lo hacía. [Female, VDLL, Early education, 24 years old]

Yo creo que no tanto. No tanto como la gente que hoy en día, o sea, hay cosas que todavía me cuestan. No nací… ya con un ordenador sino más tarde, tercero, cuarto, empecé a utilizar ordenador pero no había tantas tecnologías como ahora, Facebook no existía. Yo creo que el primer día que entre a Facebook, me perdí, no sabía… me lo explicaban mi amigas "tienes que hacer esto, esto"… porque sino te pierdes y la gente más mayor tampoco sabe, se tiene que apuntar a cursos de informática, no tienen idea de utilizar el ordenador. [Female, VDLL, Early education, 23 years old]

Sí. Tecnológicamente sí, pero tampoco me considero un nativo digital. Estoy rodeado de tecnología… me limito al móvil, al portátil y Facebook, y ya está. [Male, VDLL, Early education, 20 years old]

Sinceramente, creo que en mi caso no es así, no dependo de la tecnología como mucho de mis compañeros o gente de mi edad. Ya te digo, yo soy gente de costumbres básicas, el teléfono no lo tengo inteligente, al ordenador entro dos veces por necesidad; la televisión, pues, para ver las noticias. Muchos de mis compañeros están todo el día cotilleando, cotilleando en el ordenador, y no sé, sinceramente lo veo desde mi punto de vista, hay cosas buenas y cosas malas. [Male, TSA, Primary education, 20 years old]

Bueno no. Yo he empezado tarde ¿no?… entonces yo no soy como ahora los niños están con sus papás y ya tocan los móviles y ahora ya lo saben funcionar. Yo a lo mejor, a los 15 ó 16 no empezaron los móviles aquí, entonces llegó un poco tarde pero lo uso todo y sé cómo hacerlo además. [Female, TSA, Primary education, 25 years old]

Note. TGN: Tarragona; VDLL: El Vendrell; TSA: Tortosa

5.6. Summary

This chapter included a presentation of findings that were drawn from the qualitative data analysis of this study, derived from the 40 semi-structured interviews as previously described. From the analysis, two main themes emerged from the data. These themes were: "digital technologies" and "generation of students" and each theme was discussed in detail.

The results suggest that the technological knowledge of the students is not what has been suggested by proponents of the "digital natives" discourse (references). The range of digital technologies (devices and softwares) used for academic and social purposes is rather limited. In particular, our findings show that the vast majority of students were using few digital technologies in their everyday lives, for their in-university and out-of-university contexts. The findings of this study do not support the claim that younger students are more technologically adept than older students (references). Indeed, both used many of the same technologies in their everyday lives, with computer, mobile phones (WhatsApp), the Internet, e-mail (personal and institutional account) and Facebook; but this should not lead

to the conclusion that the new generation of students has developed sophisticated technological abilities.

The results in this chapter have provided an insight into what students perceive as academic and social purposes of the digital technologies and if they perceive themselves as a member of the "new generation of students" in the digital era. The findings and implications drawn from the results of data analyses presented in the previous and in this chapter will be presented and discussed in the following chapter.

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CHAPTER 6

Introduction

Chapter 6: Discussion

6.1. Introduction

This chapter interprets the findings presented in the two previous chapters, and addresses the research questions. The three research questions will be addressed in light of the literature review of Chapter 2, and the main two themes (digital technology and new generation of students) that emerged from the data analysis of the interviews and the integrative literature review will be discussed. We also highlight that according to the findings the three research questions are closely related and mutually reinforcing. Finally, the implications of the findings will be discussed and further study directions proposed.

6.2. Research question 1: Do postsecondary students distinguish between their social and educational use of ICTs?

According to our findings all the students distinguish between their social and educational use of digital technologies (devices and softwares). This suggests that within an identified set of digital technologies, students were able to identify which was better suited to a given task. All students can distinguish social practices (e.g. Facebook) for academic purposes, choose technologies according to their need (social and/or academic purposes), and can see the affordances of technologies for various purposes (e.g. for entertainment, communication, interaction, etc.). For example, Facebook's integration into students' social practices, particularly in relation to different modes of access to Facebook (e.g. students use of Facebook's app on mobile on the go). In line with Barkhuus & Tashiro (2010), the students used the advantages that mobile access provides, especially in relation to relationships (peers, classmates, family, relatives); although it should be noted that we did not find any evidence of faculty and student communication through Facebook. The above finding is in line with other studies on exploring social and academic uses of technology in Higher Education (Brown & Czerniewicz, 2010; Bullen, Morgan, Belfer, & Qayyum, 2009; Morgan & Bullen, 2013; Czerniewicz, Williams & Brown, 2009).

For academic purposes, it was found that learners (regardless of age) use the Internet as their primary source of information (e.g. Google) to find resources to support their studies.

This finding is consistent with an earlier study at UK (Benfield, Ramanau & Sharpe, 2009). For social purposes, the findings showed that Internet helps students maintain close ties between family and friends, both close and nonclose, especially those too far away to visit in person on a regular basis (e.g. instant messaging, Skype, Facebook). The Internet, in its social role, acts as a means of communication (Neo & Skoric, 2009).

For academic purposes, students distinguish formal from informal help-seeking. Help-seeking is defined as an adaptive strategy that students can use when they encounter problems too difficult for themto solve by themselves (Kitsantas & Chow, 2007; Roussel, Elliot & Feltman, 2011). Consistent with research by previous studies (Kitsantas & Chow, 2007; Dawson, Meadows, & Haffie, 2010; Karabenick & Dembo, 2011; Qayyum 2010; Zhan & Le, 2004), our results suggest that learners were likely to seek help from informal resources (talk to a classmate, search online, and try to address it by themselves) than formal resources (professor, lecturer, assistant, associate professor and support services). Also, the findings showed that overall students were using digital technologies to support their help-seeking. (e.g. Google search, Facebook, WhatsApp). For example, communication-based activities showed the highest frequency of use, especially using a mobile phone to send a text message (WhatsApp) to their classmates. Students also pointed to WhatsApp as a way of communicating about course topics as a way of seeking help. Our students used search engines such as Google to access online learning materials. No student mentions Google Scholar for identifying research articles.

The factors that encourage or discourage university students in seeking help from classmates rather than other sources are unclear. It has been shown academic help-seeking depends on students' perceptions and beliefs, social norms, learning context, classroom performance goal structure, trust of peers, the quality of students' relationship with instructors, the course content/knowledge domain, course design, existing institutional supports, and professor's instructional strategies, approaches, openness, and flexibility (Kitsantas & Chow, 2007; Karabenick & Dembo, 2011; Payakachat et al., 2013; Qayyum, 2010). One possible reason that students were seeking help from with peers is that students felt comfortable with communicating with peers, trusted the accuracy of their knowledge and trusted they would be timely and reliable in their responses. In academic settings, positive, secure relationships should avoid concerns about shame and rejection. According

to Roussel et al. (2011, p. 395), help-seeking "combines aspects of academic and social engagement, as it is both a learning strategy and a form of social interaction".

According to Košir, Sočan and Pečjak (2008), two most frequent and important forms of social relations that students form and maintain are to peers and to teachers. Trusting each other is one of the most important constituents of a society because trust helps facilitate smooth interactions between individuals, groups, and organizations (Bilgic & Gumuseli, 2012; Lount & Pettit, 2012). The findings show that majority "trust other students", "can rely on classmates" and "enjoy discussing their ideas with other students". Research by Hon and Grunig (1999) has shown that trust is one of six independently measurable components to build effective relationships. In education, high level of trust among classmates contributes positively to promote social action and relationships (Bilgic & Gumuseli, 2012; Farini, 2012). According to Chang and Lee (2013, p.321) trust "may reduce interpersonal tension and conflict and promote intra-community collaboration, cohesiveness, and identification, as well as enhance interpersonal harmony and cooperation".

According to Qayyum, trust had three main dimensions "affective; perceived utility; and reliability" (Qayyum, 2010, p. 70). The "affective" dimension is evidenced in the level of emotional comfort students felt about communicating with classmates. According to Qayyum (2010) how students communicated with classmates also depended on whether they trusted their classmates. The "utility" dimension is shown when students had confidence working with peers because: (a) help them with their course content better, (b) do high-quality work, (c) keep them motivated and (d) feel that they save time. The "reliability" dimension is evidenced in terms of time, when students trusted their classmates could provide a quick response when they needed (via WhatsApp, Facebook group). These results are in line with Qayyum (2010) findings.

Previous studies (Karabenick, 2003; Kitsantas & Chow, 2007; Payakachat et al., 2013; Qayyum, 2010; Roussel, Elliot & Feltman, 2011) found that students' help-seeking behaviour was related to their self-esteem, viewing it as a threat to their competence or self-worth decreasing the likelihood that students seek help. Self-esteem, which is an intrinsic motivation, is one of the most basic of human needs and is considered an important psychological factor that affects learning (Paraskeva, Mysirlaki & Papagianni,

2010; Zhan & Le, 2004). Institutions and educators need to acknowledge that students are using informal help-seeking options more than formal/institutional channels (Qayyum 2010).

Learners are able to recognize what technology they can and cannot use given a specific context. The most illustrative example is student use of personal vs. institutional e-mail. All the students have a university's official communication e-mail address with professors and peers, but students are using URV e-mail more than any other digital technology option for communicating only with faculty in the advising experience when it comes to academic goals. To Bulut and Rabab'ah (2007, p. 50) "the nature, goal and frequency of it may depend on various factors such as the teaching traditions, technological facilities and specific-course requirements". According to Biesenbach-Lucas (2007), the academic purposes for which students use e-mail with their professors are: "getting information/advice about course materials and quizzes, addressing late work and missed classes, challenging grades, showing interest in and understanding of course material…" (p. 61). According to Bullen, Morgan and Qayyum (2011b), students used e-mail with professors in situations that demanded more formality, or where it was desirable to maintain a certain distance. In principle, faculty expected students to have the ability to write e-mail messages characterized by features that reflect greater formality (e.g. politeness, carefully edited, good grammatical content without lack of punctuation) (Duthler, 2006; Biesenbach-Lucas, 2007). This is consistent with the findings of Li, Finley, Pitts and Guo (2010) who observed that actual communication between faculty and their students is "largely limited to formal and structured situations such as classroom lectures" (p. 4). The social distance dimension can refer to the degree of familiarity and frequency of interaction between the student and the professor (Duthler 2006; Biesenbach-Lucas 2007). Common contact between students, friends and family in the online venue is via personal e-mail. This result is in line with the findings in Canada (Bullen, Morgan, Belfer, & Qayyum, 2009; Bullen, Morgan, Romero, Sangrà & Guitert, 2012, Qayyum, 2010).

Also, all the respondents were capable to identify the benefits of digital technologies for academic and social purposes. Some of them are critically aware of the pros and cons of the use of different technologies which is in line with Conole, de Laat, Dillon and Darby's (2005) results. The majority of students valued speed and the convenience of portability

and function available in mobile devices (e.g. laptops, smartphones). New advances in technology is providing an opportunity for people to take their technology with them wherever they go (e.g. portable media players, smartphones, small laptops, tablets) could all be utilized to create, store, and access a wide range of digital information from a variety of locations.

Some students took a more cautionary stand and suggest that the technology policies in their academic program should be made responsive to their academic needs. It is important to point out that some students expressed caution with technology potential impacts such as Internet addiction and cyberbullying. Besides, few students showed some resistance to adopting some particular technology, such as Facebook, or resistance to changing one technology to another, for example mobile phone standard to smartphone. Also, one student mention she used to have Facebook account but she deactivated it because it is overwhelming and too time consuming. According to Morgan & Bullen (2009, p. 19), technology resistance "is described as a user's movement away from a technology because of privacy concerns or resentment of the technology and the practices associated with it". Much resistance to change is simply comfort with the status quo. According to Åkerlind & Trevitt (1995), trying something new typically produces feelings of discomfort, stress or anxiety. At the same time students' activities in and interpretations of new technology depends on his/her individual experiences. There is resistance to change and past experiences affect individuals' interpretations (Vuorela & Nummenmaa, 2004). Students' use of the technology is affected by their past experience and this can affect their judgment and make them have negative attitudes toward some technology (Åkerlind & Trevitt, 1995; Vuorela & Nummenmaa, 2004).

6.3. Research question 2: What impact does students' social use of ICTs have on postsecondary learning environments?

There is insufficient evidence to identify the actual impact of such technologies upon learning either in terms achievement or final academic results. Results from this study do demonstrate some impacts in their learning by improving the communication between them and peers. We could declare that some digital technologies impacted on the way they collaborate with their peers. The findings show that while learners are using some digital technologies for socializing, they are clearly being used in multiple spaces, including the

formal contexts of the school setting. For example, Facebook is a social tool and our findings indicate that the students used it as a pedagogic tool for communication and interaction according to their needs via Facebook's group and discussion forum that facilities participation and discussions. According to students' responses, Facebook is an important method of communication for the majority of students and they were sharing with their friends' class-related information. The participants were using in particular Facebook for many reasons. The most important reason given was to communicate with others (classmates, friends and family). For academic purposes, students were using Facebook to contact their classmates concerning course assignments, group projects, or team work. Learners also found their interactions with classmates via Facebook were important in helping them make sense of the subject matter, providing some homework help and support during classes and they also reported that these interactions extended their learning. This result is in line with Smith (2009) who found that Facebook can actively encourage online community building, extending learning beyond the boundaries of the classroom.

In particular, the findings show that the vast majority of students were using some particular digital technologies in their everyday lives, for their in–university and out-of-university contexts. We also found that increased familiarity with these technologies (e.g. Facebook, WhatsApp) positively impact into the developing of important social skills. Clearly both Facebook and WhatsApp are attractive, engaging interactive activities for most of the students. A possible reason could be that Facebook offers a variety of intrinsically interesting activities to perform (e.g. posting status updates, view pictures and chatting with friends) that can all be performed within a single site (Wood, Zivcakova, Gentile, Archer, De Pasquale & Nosko, 2012). WhatsApp relies primarily on exchange messages without having to pay for SMS where students can create groups, send each other unlimited images, video and audio media messages.

Our findings evidence that the students spend some of their time with mobile SNS on Facebook and Facebook Chat. This is primarily due to the fact that many respondents were using software applications that more easily allow for real-time communication and sharing (course information, college notes). With the Facebook and Twitter applications available for their smartphones, it was easy for learners to check updates (Barkhuus & Tashiro, 2010). These results show that mobile technologies have had a positive impact on

students' communication and data transfer reducing dependency on fixed locations for both social and academic activities, and thus have the potential to change the way students work and learn (Rapetti, Picco & Vannini, 2011). These findings indicate that somehow, mobile technologies are more flexible and enable students greater freedom of learning any place and any time. These results are also in line with other studies in UK (Benfield, Ramanau & Sharpe, 2009) and Saudi Arabia (Al-Fahad, 2009).

In accordance with the curriculum, learners are supposed to work independently and collaboratively using technology extensively. According to students' responses, few professors encouraged their students to web-based collaboration through blogs, wikis, e-portfolios, and online spaces for networking. That is the possible reason why not very many students used some of Web 2.0 services, such blogs, wikis, social networking sites, micro-blogging, or social bookmarking in their classes. Also, students were not actively contributing or generating content using ICT tools such as wikis/blogs or YouTube. We do not have evidence if all these technologies have any significant impact on learning like the development of higher level thinking abilities (such as synthesis, analysis, and evaluation), and the deep processing of information.

Described as multitaskers, today's higher education students are comfortable being engaged in several tasks simultaneously (multitasking) (Frand, 2000; Oblinger, 2003; Prensky, 2001b). To Kirschner & Karpinski (2010, p. 1238), multitasking is the "simultaneous execution of two or more processing activities at the same time". However we consider, it is improperly called "multitasking" because we agree with Schulmeister (2010, p. 35): "real multitasking is not possible because the brain processes actions sequentially". Schulmeister (2010) prefers to call it "task-switching" (similar to shifting of attention). When one tries doing several things at once the attention is dividing. "Because the total amount of attention available is limited, the amount of focused attention for any single task decreases as the number of demands increases" (Rekart, 2011, p. 61). For the above reason, we prefer define multitasking as "divided attention and non-sequential task switching for ill-defined tasks as they are performed in learning situations (Junco & Cotten, 2012).

The majority of students were used to doing several different tasks at the same time; for example, students used different technologies, when a student sending a WhatsApp

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message to a friend, while are doing homework and other activities. Perhaps the most salient features of WhatsApp is that the program is constantly running when the student is online, regardless of other activities in which the student maybe engaged, and this allows messages to be immediately accessible and in real-time (Wood et al., 2012). Some argue that true multitasking cannot be done effectively and that it will have a negative impact on learning (DiLullo, McGee & Kriebel, 2011, Junco, 2012b). Others suggest it could is useful for new professional profiles (Calvani, Fini, Ranieri & Picci, 2012; Rekart, 2011). In any case, students are paying attention to multiple stimuli rather than sustaining focus on just one stimulus, for that reason it is important that educators take into consideration facts concerning multitasking, the brain and the learning (Rekart, 2011).

All the students received an interactive whiteboard (IWB) basic training course, few students used it and almost all consider did not have enough skills to use it. A possible reason of this is that the majority of professors did not use it. According to Williams (2008), using digital technologies do not necessarily entail changing pedagogy and could be employed to support existing practices; IWB "provide an example of how the conservative profession of teaching has mediated the introduction of new technologies" (p. 220). Previous studies have shown that the proper use of interactive whiteboards (IWB) in classroom environments assists students' learning by supporting their knowledge construction through different means such as active participation, collaboration, interaction, discussion and engagement in learning and teaching situations (BECTA, 2003; Murcia & Sheffield, 2010; Northcote, Mildenhall, Marshall & Swan, 2010; Slay, Siebörger & Hodgkinson-Williams, 2008; Smith, Higgins, Torff & Tirotta, 2010; Türel, 2011; Wall & Miller, 2005).

Unfortunately, evidence to date on the impacts of e-portfolios on the learner and learning and achievement outcomes is sparse. In education, e-portfolios are recognised as being a technological tool that supports a variety of pedagogical processes and assessment purposes; allows the student to manage their learning experience and helps teachers to observe students' work and their processes of learning during a period of time (Abrami & Barrett, 2005; Lopez-Fernandez & Rodriguez-Illera, 2009). Few students mention the use of e-portfolios. A possible reason of this could be that few professors used them in their classes, for example, to measure and record development, document growth, plan activities, and share information with their students.

Finally, we consider that the impact of technology advancement in student's life could affect their perception about their professors and university. According to students' responses, the majority of professors used presentation software (e.g. Power Point) and videos during teacher exposition, few professors used interactive whiteboards or other technology. Students' responses showed that whilst professors have mastered certain digital technologies (e.g. Word Processor, PowerPoint) they are not familiar with a range of others (e.g. blogs, wikis, e-portfolio, IWB, media sharing services, collaborative editing tools). In general, the main use of digital technology by teachers is to prepare materials to deliver in lessons via URV Moodle or lectures based on PowerPoint via projector; the majority of professors do not used an interactive whiteboard for class teaching. This result could indicate a need for more teacher training with a focus on the pedagogical use of digital technologies to support teaching and learning.

The university uses Adobe Connect as its institutional videoconferencing system and it is used for teaching activities for undergraduate and postgraduate courses and to provide richer visual support for students. However, use of audio/video conferencing systems is not common between the students because it is an institutional service available only to professors. According to MacIntosh (2001), as cited by Tipton, Pulliam, Allen and Sherwood (2011, p. 28), "students' learning is influenced positively when faculty are comfortable with presenting via videoconferencing, with their course material, and with using appropriate technology in class". The use of this does take some practice because it requires the faculty to divide attention among teaching the class, responding to students' questions or needs, and operating the videoconferencing equipment (Tipton et al., 2011). To Hedestig and Kaptelinin (2002, p. 179), "successful teaching and learning in a videoconference setting was found to be associated with special types of arrangements and expertise". For example, the breakdowns that could occur during the videoconferencing will demand an expertise of the videoconference facilitator/coordinator/professor.

6.4. Research question 3: What is the relationship between social and educational uses of ICTs in postsecondary education?

At a general level there is a close relationship between social and educational use of some ICT. In theory, the social and academic lives remain as separate activity systems (Morgan

& Bullen, 2009), however, our findings suggest that there is also a significant overlap in their use of some digital technologies (e.g. mobile phone, WhatsApp, Facebook) for academic and social purposes. For example, Facebook is a SNS that is mainly used for social interaction, especially to maintain existing relationship; however students were using Facebook for both academic (e.g. completing school assignments) and social purposes. This finding could suggest that the boundaries between formal and informal spaces are becoming blurred (Benfield et al., 2009; Clark, Logan, Luckin, Mee & Oliver, 2009). It is important to understanding the significance of these boundaries for the design of learning events/activities, tools and techniques specifically to manage this.

Besides, students expressed a preference for the social networking platform over other the institutional course management systems (URV Moodle). The university had official channels for providing course materials. However, students were using other informal channels for this (e.g. Facebook). Use of Facebook, Twitter and other SNS are not blocked in the university. One possible explanation of students' inclination to use Facebook is that "Moodle tends to be very focused and lacks the personal touch and networking capacity that SNSs offer" (Brady, Holcomb & Smith, 2010, p. 152). With regard to communication, it is noticeable that students are not using the communication capabilities in Moodle, particularly advanced communication elements like forums, chats, blogs, and wikis. Most of students' communication is done in groups (Facebook and WhatsApp groups). According students' responses, Facebook groups are not just a substitute or supplement to LMS (Wang, Woo, Quek, Yang & Liu, 2012), in contrast, we believe they have some advantages over the LMS in promoting collaborative and active learning as a stimulator of participation and as an easy mode of communication and interaction between peers (Valtonen, Dillon, Hacklin & Väisänen, 2010; Meishar-Tal, Kurtz & Pieterse, 2012). Also, the findings suggest that while some students may feel comfortable with educational applications of Facebook and Twitter, few professors are ready to engage with them in such uses. To Hilton III & Plummer (2012), professors are reluctant to use it because some consider that an entry into Facebook world of their students may undermine their credibility as qualified professors.

The findings also indicate that students used publically available ICT applications far more than they used the university-supported applications for communicating with classmates. Students are using applications that they use in their everyday life, beyond their role as a

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student. Students feel comfortable with digital technologies and using technology for communication is part of students' lifestyles. Internet use has led to more communication with distant ties as well as to overall more ties maintained (Hwang, 2011). This result is similar to the findings in Finland (Valtonen et al., 2010; 2011) and USA (Kirschner & Karpinski, 2010). The Internet has promoted a culture of content sharing and the social media provides new kinds of online resources (e.g. social network sites, blogs, wikis, virtual communities) that allow users with common interests to meet, share ideas, and collaborate (Arteaga Sánchez, Cortijo & Javed, 2014). According to Kirschner and Karpinski (2010, p. 1239), "socializing via the Internet has become an increasingly important part of young adult life". For the purpose of this study, social media refers to a group of new online "media" -social networking, text messaging, shared photos, podcasts, streaming videos, wikis, blogs, and discussion groups- which make it possible for virtually anyone to create, share and access content (Render, 2010; Williams, Crittenden, Keo & Mccarty, 2012). To Williams et al., (2012, p. 130), social media technologies have engendered new ways of interacting.

Based on the findings, students did not embrace a single form of social media and tend to employ a range of tools for communication and these tools did not replace another but, rather, becomes integrated into a bundle of media use that includes online and offline forms of communication. Also, students tend to embrace new technologies and adopt them as part of their communication tool. To Quan-Haase & Young (2010), this suggests that "the adoption and use of digital technologies follows social trends, where one medium becomes popular among users and reaches a peak of high penetration, and then daily use becomes steady, or even diminishes, as other media start gaining popularity" (p. 350). For example, WhatsApp and Facebook had very similar uses and fulfill similar communication and socialization needs. Facebook is used to find out about academic and social events, friends' activities, and social information about peers, meanwhile WhatsApp allows students to be in the "social know" (one-to-one real-time conversation and, one-to-many). Also, Facebook integrate with the learner's existing tools and enable them to gradually adopt for example other communication tools (e-mail, video calls, message boards, chats).

This research found that communication, collaboration, and resource/material sharing were the three principal educational uses of social media. For examples, learners were using some social software tools (in particular Facebook) to express and exchange their diverse

experiences and perspectives. Online communication and collaboration technologies have been found to be effective in achieving educational objectives and to enhance the learning experience (Arteaga Sánchez et al., 2014; Brady, Holcomb & Smith, 2010; Gray, Chang & Kennedy, 2010). Learners seamlessly integrated few different communication hardware (mobile phone, laptop, tablet) and applications (Facebook, Twitter, WhatsApp, Skype) into their daily lives (both social and academic); however, the amount of time on these technologies varies.

According to their responses, students' social sphere is important: they have some sets of friends and acquaintances, as well as college-related contacts with whom they have daily interactions. For that reason, they used some digital technologies (e.g. personal e-mail) to arrange time to meet them. Besides, learners report both planned and serendipitous meetings with classmates and utilised the communication and content resources of Facebook for both course and non-course interactions. These results point to the obvious social benefits of online social networks, but more specifically to the frequent occurrence of serendipitous social meetings facilitated by Facebook (Barkhuus & Tashiro, 2010). According to Barkhuus & Tashiro (2010), Facebook have the potential to combining offline community with online community: "the use of online social networks together with other means of communication, as part of an offline life where face-to-face socialization occurs with the same people as communicated with through online social networks" (p. 2).

According to our findings, learners' acceptance, use and perception of digital technology appeared to be mediated by several variables: technological proficiency or the lack thereof, positive/negative attitude, willingness to use technology and social influences. According to Maclean and Elwood (2009, p. 164), willingness to use technology is "essentially the preference for using technology vs. a non-technology medium when both media are available". For example, some students mention still using a paper and pencil to takes notes in class vs. using a computer. Students evidenced differences levels of technological proficiency. For example, most of the respondents are familiar with at least some of the tools of social software even though they do not use them actively (e.g. blogs, wikis). According to the findings, in general students exhibited a positive attitude toward using some specific devices (e.g. laptop, mobile phone, tablet) and softwares/applications (e.g. Internet, Facebook, G-mail/Hotmail, WhatsApp). For example, Facebook and WhatsApp

were frequently mentioned communication tool, but it use was determined by the free online access provided by the university. For that case, perceived usefulness and perceived cost-effective tool both have direct relationships with a positive attitude (Beurer-Zuellig & Meckel, 2008).

Some students identified that their use of, and access to some digital technologies (e.g. mobile phone, WhatsApp and Facebook) was influenced by their classmates. According to Agosto, Abbas and Naughton (2012, p. 1110), "members of a group develop both implicit and explicit accepted behaviours, attitudes, and beliefs, and social rules that group members are expected to follow"; and may influence students' attitudes toward the choice and use of some digital technologies (Agosto et al., 2012; Cheung, Chiu & Lee, 2011; Cho, 2011). The location of family members and friends also influenced students' use of communication technologies (e.g. video calls via Skype). Bryant, Sanders-Jackson, and Smallwood (2006) had demonstrated that young learners were quite willing to learn new communication technologies in order to maintain relationships with their peers outside of school/college/university. These findings are also in line with recent studies on ICT perceptions and practices (Agosto et al., 2012; Arteaga Sánchez, et al., 2014; Cheung, Chiu & Lee, 2011; Cho, 2011; Waycott, Bennett, Kennedy, Dalgarno & Gray, 2010).

6.5. Main two themes: Digital technology and new generation of students

The findings in the integrative literature review revealed 46 terms related to the notion of this supposedly "new generation" of students in the digital era with a high affinity and tendency to use digital technology, of which the term "digital natives" has been the most prominent in the past decade. During the interviews, nearly one quarter of students have heard a term/name to define this new generation (digital natives, Millennials) and more than half of students did not consider this definition represented them.

Contrary to the assumption that treat the net generation as a homogenous group (Prensky, 2001; Tapscott, 2008); the findings evidenced that at least when describing net generation students as users of social software, they were not one uniform group but rather a generation of different three subgroups: (1) a small group of "non users" of some social software (e.g. SNS, blogs, wikis) and/or rarely use; a small group of "not interested" (e.g. Facebook), and (3) the largest one of "users" (e.g. Facebook, Twitter, WhatsApp) social

software for communicating and networking on a daily basis. This finding is in line with Valtonen et al. (2010) results.

Students feel comfortable with digital technologies and using technology for communication is part of students' lifestyles. Internet use has led to more communication with distant ties as well as to overall more ties maintained (Hwang, 2011). This result is similar to the findings in Finland (Valtonen et al., 2010; 2011) and USA (Kirschner & Karpinski, 2010). The Internet tool most used by the students to communicate with classmates is Facebook followed by personal e-mail.

Use of digital technologies for information and communication (for social and academic purposes) are more mainstream although students still reported different frequencies of use according to some specific activities. Some communication technologies (e.g. Skype, Google Hang out; WhatsApp, Viber) help students to communicate over long distances, connecting people with mutual interests regardless of physical location. Some respondents have mentioned that they have relatives and friends abroad and it seemed that digital technologies (e.g. video calls via Skype) have made it much easier for students to communicate with family, friends or acquaintances.

The data revealed that the students are using tools in a variety of different ways to communicate (face-to-face interaction, e-mail, social networks, mobile phone, instant messaging and text messaging) with peers and professors. The vast majority of the surveyed students prefer a face-to-face conversation with both professors and peers above any other form of communication. Qayyum (2010) found that students felt that talking in person was a quicker and more effective channel of communicating with professors for course-related issues than using ICTs. Face-to-face communication remains important, despite the development of much less expensive and more flexible electronic ways of communicating (Winger, 2005). Face-to-face is considered the richest medium for conveying meaning and it supports all the different types of communication cues, such as verbal (e.g. spoken), paraverbal (e.g. intonation, voice), and non-verbal signals (e.g. body language, gestures and facial expressions) (Van der Meijden & Veenman, 2003; Winger, 2005; Kira, Nichols & Apperley, 2009).

The term ''digital divide'' has traditionally been used to describe the gap between higher socio-economic groups and lower economic groups' access to the social and organisational

resources needed to use technologies effectively (Coyne, Stockdale, Busby, Iverson & Grant, 2011; Pearce, 2013; Waycott et al., 2010). More recent definitions have included inequities in how people use computing tools and how skilled they are which can vary as a function of income, age, ethnicity, gender, education level, or geographic location (Barron, Walter, Martin & Schatz, 2010). According to Hope Cheong (2008), this concept defined by "conventional access and computer ownership terms, seems to be a transient, even irrelevant, concept in this information age" (p. 772) considering as a "myth".

Prensky (2001) has suggested that there are age-related differences in technology use and skills, creating a digital divide between generations. The results suggest that the technological knowledge of the students is not what would be expected for representatives of the Net Generation. The findings of this study do not support the claim that there is a substantial gap between more technologically adept younger students and their older classmates. Indeed, both used many of the same technologies in their everyday lives, with computer, mobile phones (WhatsApp), the Internet, e-mail (personal and institutional account) and Facebook. but this should not lead to the conclusion that the new generation of students has developed sophisticated technological abilities as sustained by other authors (see for example Oblinger, 2003; Oblinger & Hawkins, 2005; Oblinger & Oblinger, 2005; Prensky, 2010; Tapscott, 1998; 2009). Also, there were no significance differences between the percentage of male and female students who used the above-mentioned technologies. Contrary to popular claim that digital natives are a generation of tech-savvy young people immersed in digital technologies, the findings showed that the range of technologies students used for academic and social purposes is rather limited. Some students come to the university with some digital skills and the majority of them do not have high levels of competence across a wide range of devices and applications. For example, they did not use multimedia authoring packages to create or generate information. They are avid users of social networking tools (for academic and social use) but infrequent users of other digital technologies. Many other technologies that are often cited as having educational potential, such creation of audio/video, writing a blog/wikis, building websites, listening to podcasts, using RSS feeds, using technology as a personal organiser are used infrequently or not at all by the majority of participants in this study. Being familiar with digital technologies does not entail being able to use them in a competent way (Li & Ranieri, 2010).

Besides, the interviews revealed that all the respondents owned personal computers (few students have tablets) and mobile phones. It is important to note that students are likely to carry with them other devices (e.g. iPod or MP3 players). Some students preferred to leave their laptops at home and some of them bring their laptops to the university and taking advantage of ubiquitous wireless network on all of the campuses (Tarragona, El Vendrell and Tortosa). Almost all students used their smartphones to access Internet, both on and off campus, for academic and social purposes. Consequently, they are able to work in more than one location and need to blend their use of personal technologies (e.g. laptops, mobile phones, tablets) with those provided by the institution, for example, transferring files between locations on a USB memory stick, having access to course information and learning resources via a mobile device in any location. These results do demonstrate high levels of ownership of these technologies (particularly laptops and mobile phones), and access to broadband networks. The ownership of these technologies could be a variable relating to social and academic influence on the decision to adopt and use a specific technology (e.g. WhatsAppp for communication purposes). These findings are congruent with other studies of higher education student access to and use of ICT (Czerniewicz, Williams & Brown, 2009; Hope Cheong, 2008; Margaryan, Littlejohn & Vojt, 2011).

Overall ownership of technology by students has shifted dramatically in recent years towards mobile devices and laptops (Clark, et al., 2009; White, Beetham & Wild, 2013), however this rapid change in hardware ownership should not be mistaken for a fundamental shift in students' approach to learning (White et al, 2013). For example, the majority of students were the owner of a smartphone; however they used their phones almost exclusively for communication purposes. University teachers and educational practitioners should pay attention to the ownership of handheld and mobile devices by students and should stimulate lecturers to consider more innovative use of these technologies in teaching.

Besides social networks and personal e-mail, the students use text-messaging (or short-message-service/SMS via mobile) and instant messaging (or Internet Messaging/IM) to connect to classmates, friends and relatives: they can have a private one-to-one real-time conversation and, one-to-many, satisfying two major needs forming and maintaining individual friendships and belonging to peer groups (Boneva, Quinn, Kraut, Kiesler &

Shklovski, 2006; Neo & Skoric 2009; Quan-Haase, 2007). IM and SNS were used considerably more often for contact with peers than with professors. Besides, all the students who have smartphones used WhatsApp to communicate with classmates about schoolwork or projects. According to students' responses we deduced that telephone contact dropped considerably because of the interactions with mobile applications (e.g. WhatsApp, Facebook, e-mail), especially for classmates and friends. Classic phone calls were in general with family and relatives. Findings from this study reinforce the results of previous studies (Boneva, et al. 2006; Neo & Skoric 2009; Quan-Haase, 2007).

Students' responses showed that convenience and low cost, entertainment, coordination, and fashion were motives for SMS (in particular WhatsApp). This is in line with previous findings where students were motivated to use SMS by its convenience, its low-cost, and its utility for coordinating events (Bryant et al., 2006; Leung. 2007). Despite the service charges for SMS and IM, these are cheap as compared with voice services. For these students, mobile messaging began as a way to save on the cost of telephone calls. Mobile phones were a constant presence in the students' lives, the landline telephones is only used at home. By offering fast-paced, inexpensive, online communication, texting provides individuals the opportunity to remain connected to their social network from virtually any place or situation where this technology is supported (Bryant et al., 2006; Skierkowski & Wood, 2012).

6.6. Implications for Education and Future Research

Four major implications may be inferred from this study. The first one is that the multitude of terms used, and ensuing conceptual confusion surrounding the concept of "digital native" and its affiliates, resulted in an unfocused and unproductive debate. The use of a unifying concept (without people continuously suggesting new terms that are hyped) will streamline and lead to a hopefully more focused and productive discussion. It is more fruitful to discuss what the needs are of digital learners, how staff can respond to those needs and what they need to know to be able to do so, and how technologies can be designed that are responsive to the needs of the digital learner. We consider that it is important to bring together academics, policy makers and practitioners from many different backgrounds in order to consider the contexts and consequences of use of digital technologies for digital learners. The so called "Digital Natives" perspective seems to be

inappropriate or insufficient to describe the population of current learners, because some features of the widespread expression "digital natives" and many associated assumptions have been discounted (Rapetti & Marshall, 2010; Rapetti & Cantoni, 2010a). There is no absolute definition of digital native: it will vary amongst individuals, societies, regions and nations, and also over time. There are a number of variables other than age that may help us understand the nature of students' use of digital technologies. Despite the general belief that "digital natives" show greater willingness and ability to use technology, the analysis of the literature demonstrates a clear mismatch between the confidence with which claims are made and the evidence for such claims (Bennett, Maton & Kervin, 2008). Generalizations based on "generational differences" are not useful for discussions concerning teaching and learning. Thus, "while we can now say with certainty that generation is not relevant" (Bullen & Morgan, 2011, p. 63), it is necessary to consider other variables besides age that can help us understand the nature of the use of digital technologies by students. To understand the implications for those who learn, we must develop a comprehensive understanding of how learners use digital technologies, focus on the implications of being a learner in a digital era and try to develop a comprehensive understanding of the issues that take into account factors such as age, gender, education, experience, social inclusion and exclusion, culture, institutional context, subject discipline, learning design, and socio-economic background.

Students are seeking help outside of class over formal options (e.g. talk to professor, go to the library). The second implication is that educators and institutions need to consider ways to help foster and support these informal channels; for example, it would be useful to learn what factors affect students' decision to seek help through informal channels and if formal/informal help-seeking is improving student achievement (Qayyum 2010). In regard to digital technology, the authors consider that it is essential to design good instruction based on the students' learning needs by using technologies that are program-relevant (Bullen & Morgan 2011), how faculty can respond to those needs focus on the implications of being a learner in a digital era.

The third one is that the findings showed lack of homogeneity in technology adoption patterns. The students have exhibited clear preferences towards using the Internet as a medium for communication and social interaction and, in most cases, used it with great frequency in their everyday lives (academic and social purposes). It is necessary to conduct

more research from different points of view in order to gather a more holistic and scientific view on this new generation of learners and their characteristics. We still need some reflection about how to transfer digital skills and practices from private life and leisure time, to formal learning context.

The value that student placed on digital technology depends to a large extent on the pedagogic relationships that are established around it, for example, "on how students are given access to the skills and competencies they need, how far they can control the process, and how far they can enter into a dialogue with their peers and professors" (Buckingham, 2007). It also depends, more broadly, on the social contexts that surround it – on the motivations of the students, on the ways in which cultural production relates to other aspects of their lives, on the audience for their productions, and so on. In all these respects, we would argue that the school has an absolutely vital role to play.

Also, we suggest that universities need not rush into implementing digital technologies in teaching and learning contexts to satisfy a perceived demand by students, or technology advocates. Digital technologies could have a significant potential to support learning in formal educational domains; however, their effective use requires students to move beyond using tools for social purposes and gain an understanding of how tools can be used to support learning. The educators and institutions need to provide learners some possibilities to make use of their skills and knowledge as part of their learning. It is important to identify the important role that faculty have to play in assisting learners in appropriating and making effective use of Web 2.0 and mobile technologies. According to Buckingham (2007), it is necessary to address the skills and competencies that are required rather than simply adding digital competence to the curriculum menu, or hiving off ICT into a separate subject. This could be a way of addressing the educational challenges of the digital age.

Finally, we can say that generation is not relevant and age is not a simple predictor of technology use. How learners use digital technologies is a complex issue that goes much deeper than age. To understand the implications for those who learn, we must develop a comprehensive understanding of how learners use digital technologies, focus on the implications of being a learner in a digital era and try to develop a comprehensive understanding of the issues that take into account factors such as age, gender, education, experience, social inclusion and exclusion, culture, institutional context, subject discipline,

learning design, and socio-economic background. Moreover, while research around learners in the digital era is just beginning and may need more critical examination – and the body of theoretical literature in education that explores concepts and characteristics around learners is still growing – it is critical that we move beyond the superficial dichotomy of "natives" and "immigrants", focus on the implications of being a learner in a digital era, and "try to develop a comprehensive understanding of the issues that take into account the diversity of cultural and institutional contexts" (Bullen & Morgan, 2011, p. 63).

6.7. Limitations of the Research

This study faced some limitations. First, the integrative literature review was limited to English language sources and relevant publications may exist in other languages, which may contain useful information. Second, the participants may not answer honestly, or may not have good insights on their own habitual practices and thus may not answer accurately. The data collected relies on honesty, openness, and motivation of respondents. Third, many students were in a hurry to reach their next class during the interviews; as a result, they did not provide long responses. Fourth, this study assesses a specific group, students attending a public university. The participants in this study were not selected at random, they were students currently enrolled in the Rovira i Virgili University at Tarragona (Catalonia, Spain). This homogenous and convenience sample therefore is only generalizable to those with the same traits. The students utilized in this sample were students in the Faculty of Educational Sciences and Psychology - of the degrees of Pedagogy, Social Education, Early Education and Primary Education and these findings may not generalize to other students, especially those who are not college-bound, or to university students at different types of colleges/institutions. However, it can be considered as an indicator to be used for future research endeavours. Finally, this study was a first attempt to understand how university learners use digital technologies and what are the implications of their use for Higher Education. A vast amount of research remains to be done in this area. Technology is pervasive, and has become an integral, part of the lives of today's youth. Future researchers should investigate these study findings across a broader student population; informants with more diverse backgrounds should be included.

6.8. Conclusions

This section summarises the main research findings during the intergrative review, online survey and the interviews.

The literature review has demonstrated an extensive theoretical and terminological diversity related to the notion of the "digital native". A variety of 47 terms have been proposed as well as a multiplicity of definitions: some similar, others quite different and many of them redundant. The exposure to technology is a critical element in determining at least some of the characteristics attributed to these students. Common to the multitude and proliferation of similar and/or related concepts to describe these students, is that all of these concepts suggest somehow the idea of a digitalized/technologized generation (Rapetti & Cantoni, 2010b). For that reason, we propose to unify these concepts under the term "digital learners". In our view the term digital learner is the most useful term, because it offers a more global vision of the 21st century student (see Chapter 2, Table 7).

The students do not fit in the digital generation profile and they did not identify themselves as digital natives. Regarding study habits, students prefer to learn by themselves, work independently and to study at home. This finding is in contrast to the prevailing "net generation" discourse which suggests students prefer collaborative approaches (Prensky 2010). The supposed "Net Generation aged" and the older students spent almost the same time on the same basic technologies. Students are evidently comfortable with using technology and some digital technologies are an integral part of their lives in higher education; and they are used to performing various tasks simultaneously. These results are consistent with the "net generation" discourse (Prensky 2001, 2010; Oblinger & Hawkins 2005). They used these technologies in areas such as personal communication, entertainment, academic and social interaction. While students generally have expertise in the use of some (largely conventional) digital technology (softwares and devices), their understanding of how to use these tools for academic purposes is limited.

Students' opinions on technology are generally positive for communication, however there is still overwhelming preference for face-to-face contact over all other methods for both academic/school and social communication. Most of the students surveyed in this study see social networks as more about connecting and interacting with friends than for academic

communication. Using technology for communication is part of students' lifestyles and the results show also a preference for synchronous communication (below face-to-face conversation). While mobile phone, e-mail, instant messaging, text messaging and social networks are part of the daily routine, videoconferencing (e.g., Skype, traditional conference calls or some other platform) use is less frequent. These findings suggest that students still choose to use face-to-face communication in preference to computer-mediated forms of communication.

To summarise, our students are using social networks (Facebook, Twitter), mobile phone (WhatsApp), and e-mail for the following purposes:

- To develop, maintain or reinforce existing relationships (e.g., find information about other people; to meet new people; to send or post a message on my friend's wall; to stay in touch with friends; to find out what acquaintances or friends are doing now)
- To communication (e.g., online communication between real-life acquaintances and friends; communication with many people at the same time).
- To be entertainment (e.g., it's fun, cool; downloading music, watching video, playing games).
- To pastime (e.g., to relax, to get away from pressures and responsibilities; to occupy my time).
- To get and/or share information (e.g., facts, links, news, knowledge, ideas).
- For social information-seeking (e.g., to feel involved with what's going on with other people; to experience social connection; to organise social gathering).
- For learning purposes (e.g., to find help with school work; to submit word processed assignments).

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List of Appendices[2]

Appendix A: Initial Contact Invitation

- Invitación a estudiantes vía correo institucional / URV Moodle – Fase I
- Invitación a estudiantes vía correo institucional / URV Moodle - Fase II

Appendix B: Quantitative Instrument

- Cuestionario sobre la comunicación entre estudiantes y los hábitos de estudio

Appendix C: Qualitative Instrument

- Guía de la entrevista semiestructurada

Appendix D: Codebook

- Carta de Invitación para la Validación de Códigos y Categorías:
  - Dr. Guerrero
  - Dra. Sanabria
- Protocolo de Validación de Códigos y Categorías
  - Protocolo de Validación de Códigos y Categorías: Entrevista 04 Tarragona
  - Protocolo de Validación de Códigos y Categorías: Entrevista 08 Tarragona
  - Protocolo de Validación de Códigos y Categorías: Entrevista 12 Tarragona
  - Protocolo de Validación de Códigos y Categorías: Entrevista 16 Tarragona
- Guía de la entrevista semiestructurada
- Transcripción de 4 entrevistas (selección aleatoría)
  - Entrevista 04 Tarragona – 17 de diciembre de 2012
  - Entrevista 08 Tarragona – 17 de diciembre de 2012
  - Entrevista 12 Tarragona – 29 de enero de 2013
  - Entrevista 16 Tarragona – 5 de febrero de 2013
- Anexo 01: Descripción de dimensiones, categorías y códigos
  - Anexo 02: Matriz de dimensiones, categorías y códigos
  - Anexo 03: Convenciones de Transcripción

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[2] All the Appendices' content will be find in the attached CD.

- Constancia de validación de categorías y códigos
  - Dr. Guerrero
  - Dra. Sanabria

Appendix E: Interviews' Transcription

- Entrevista 01 Tarragona – 29 de noviembre de 2012
- Entrevista 02 Tarragona – 29 de noviembre de 2012
- Entrevista 03 Tarragona – 14 de diciembre de 2012
- Entrevista 04 Tarragona – 17 de diciembre de 2012
- Entrevista 05 Tarragona – 17 de diciembre de 2012
- Entrevista 06 Tarragona – 17 de diciembre de 2012
- Entrevista 07 Tarragona – 17 de diciembre de 2012
- Entrevista 08 Tarragona – 17 de diciembre de 2012
- Entrevista 09 Tarragona – 21 de diciembre de 2012
- Entrevista 10 Tarragona – 21 de diciembre de 2012
- Entrevista 11 Tarragona – 21 de diciembre de 2012
- Entrevista 12 Tarragona – 29 de enero de 2013
- Entrevista 13 Tarragona – 29 de enero de 2013
- Entrevista 14 Tarragona – 29 de enero de 2013
- Entrevista 15 Tarragona – 29 de enero de 2013
- Entrevista 16 Tarragona – 5 de febrero de 2013
- Entrevista 17 Tarragona – 5 de febrero de 2013
- Entrevista 18 Tarragona – 18 de febrero de 2013
- Entrevista 19 Tarragona – 18 de febrero de 2013
- Entrevista 20 Tarragona – 4 de marzo de 2013
- Entrevista 01 Tortosa – 19 de febrero de 2013
- Entrevista 02 Tortosa – 19 de febrero de 2013
- Entrevista 03 Tortosa – 19 de febrero de 2013
- Entrevista 04 Tortosa – 19 de febrero de 2013
- Entrevista 05 Tortosa – 19 de febrero de 2013
- Entrevista 06 Tortosa – 19 de febrero de 2013
- Entrevista 07 Tortosa – 19 de febrero de 2013
- Entrevista 08 Tortosa – 19 de febrero de 2013

- Entrevista 09 Tortosa – 19 de febrero de 2013
- Entrevista 10 Tortosa – 19 de febrero de 2013
- Entrevista 01 El Vendrell – 16 de enero de 2013
- Entrevista 02 El Vendrell – 16 de enero de 2013
- Entrevista 03 El Vendrell – 16 de enero de 2013
- Entrevista 04 El Vendrell – 16 de enero de 2013
- Entrevista 05 El Vendrell – 16 de enero de 2013
- Entrevista 06 El Vendrell – 16 de enero de 2013
- Entrevista 07 El Vendrell – 16 de enero de 2013
- Entrevista 08 El Vendrell – 16 de enero de 2013
- Entrevista 09 El Vendrell – 16 de enero de 2013
- Entrevista 10 El Vendrell – 16 de enero de 2013

Appendix F: Report of all Codes and Categories

Appendix G: List of all the Codes and Categories with their Quotations