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The University's Strategy behind the Implementation of Mobile Technology in Education & User Adaptation

La Stratégie poursuivie dans l'enseignement supérieur dans l'implantation de la Technologie Mobile pour l'enseignement et l'adaptation des utilisateurs

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an award at this, or o	in this thesis has not been pr any higher education institution material previously published »	on. To the best of my kno	wledge and belief,
	d donner aucune approbation ons doivent être considérées co		

"The only source of knowledge is experience."

 $A_{lbert} \; E_{instein}$

To my brother, Benjami
Without whom this dissertation would never have seen the light of da



This journey has taken years. Looking back in gratitude at the people who encouraged me to embark on this adventure. The completion of this doctoral dissertation would not have been possible without the support of many great individuals.

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Titre:

La stratégie poursuivie par l'enseignement supérieur dans l'implantation de la technologie mobile pour l'enseignement et l'adaptation des utilisateurs

Résumé: Les études empiriques sur les technologies mobiles dans le cadre de l'éducation sont rares. Selon la revue de la littérature, différentes études théoriques critiquent les modèles actuels d'acceptation et d'adoption de la technologie mais peu d'études ont été menées sur le terrain. Il existe également peu de données empiriques sur la stratégie de l'université en matière d'adoption et de mise en œuvre de la technologie mobile.

Nos propres recherches confirment le manque de telles études empiriques, en particulier en ce qui concerne les réponses des utilisateurs à la technologie mobile et leurs stratégies d'adaptation. De plus, la revue de la littérature suggère un manque de consensus théorique sur l'adaptation de la technologie mobile dans l'éducation.

La théorie montre que l'éducation a besoin d'une vision holistique de l'adoption de la technologie mobile et de la recherche de ses différents aspects et composants. L'objectif de notre recherche est de comprendre la stratégie de l'université pour adopter et mettre en œuvre la technologie mobile.

Cette recherche se structure autour de deux questions principales :

- Pourquoi la technologie mobile est-elle utilisée dans l'enseignement supérieur ? (au niveau stratégique)
- Comment la technologie mobile est-elle utilisée dans l'enseignement supérieur ?

Cette thèse est une recherche exploratoire. Afin de laisser la théorie émerger des résultats empiriques, cette thèse est inspirée de la théorie enracinée.

Au total, deux études de cas ont été menées. Deux écoles d'ingénieurs françaises ont été choisies comme nos terrains de recherche.

- Première étude de cas réalisée par observation directe pendent 6 mois dans une école d'ingénieur A (1155 heures d'observations) comprenant 193 étudiants et 88 enseignants.
- Deuxième étude de cas réalisée par observation directe pendant 4 mois dans une école d'ingénieur B (704 heures d'observations) comprenant 115 étudiants et 29 enseignants.

De plus, 15 entretiens semi-directifs ont été réalisés avec des professeurs en charge du projet de la technologie mobile, le directeur de l'université, le directeur du département et le personnel informatique et administratif. Toutes les données ont été codées et analysées.

Au cours de cette recherche, nous avons constamment comparé nos résultats, les données codées, les incidents émergents et les concepts émergents pour générer des catégories et les comparer avec les résultats des terrains de recherche.

Les apports principaux peuvent être classés en quatre catégories :

- Utilisation de la technologie mobile (selon les réponses des étudiants et des enseignants).
- Une analyse des perceptions du participant sur la technologie mobile adoptée.
- ➤ Une analyse des activités d'adaptation des participants (relatif à TI, aux tâches et l'individu) et trois phases du processus d'adaptation (au niveau individuel, organisationnel et du groupe).

➤ Une étude de la stratégie principale de l'université vers l'adoption de la technologie mobile et des moyens engagés pour soutenir les changements en vue de l'appropriation de la technologie mobile.

En conclusion nous préconisons des implications managériales et théoriques et différents axes de recherche qui pourraient être développés ultérieurement en vue d'affiner le travail réalisé pour cette thèse et aussi afin de tester et généraliser les résultats aujourd'hui obtenus.

Mots-clés:

Technologie mobile, Education, Théorie de Coping, Adaptation de l'utilisateur, Stratégies de l'université



Title:

The University's Strategy behind the Implementation of Mobile Technology in Education and User Adaptation

Abstract: Empirical studies of mobile technology in education are scarce. According to the literature review, different theoretical studies criticizing the current models of technology acceptance and adoption are seeking for changes, but not many research works have been conducted in the field. There are few empirical data about the university's strategy in adoption and implementation of mobile technology as well.

This research confirms the lack of such empirical studies, especially regarding user's responses to mobile technology and their adaptation strategies in education. Hence, more rigorous research is needed to understand the perceptions and adaptation process of university' participants. Furthermore, the literature review suggests a lack of theoretical consensus on adaptation of mobile technology in education.

Theory shows that the education needs a holistic view of mobile technology adoption and investigation of its different aspects and components. Few research works were conducted in investigating a whole organizational implementation.

This dissertation aims at understanding the strategy of university for adopting and implementing the mobile technology.

This research is articulated around two main research questions:

• Why is mobile technology used in higher education? (at the strategic level)

How is mobile technology used in higher education?

This study is an exploratory research in order to allow the theory to emerge from the empirical results and this research is inspired from the Grounded Theory.

In total, two case studies were conducted. Two French engineering universities were selected as our fields of study:

- First case study is carried out during a 6-month direct observation at engineering university A (equal to 1155 hours) including 193 students and 88 faculty members.
- Second case study is carried out during a 4-month direct observation at engineering university B (equal to 704 hours) including 115 students and 29 faculty members.

In addition, 15 semi-directive interviews were conducted with professors in charge of mobile technology project, the university' director, head of the department as well as IT and administrative staff. All data were coded and analyzed.

During this research, we constantly compared our findings and the coded data to the emerging incidents and to the emerging concepts with the purpose of generating categories and comparing with the findings acquired from the fields of research.

The main contributions can be classified into four categories:

- ✓ Utilization of mobile technology (according to students, faculty members use),
- ✓ An analysis of the participant's perceptions of the adopted mobile technology
- ✓ An analysis of participant's coping activities (IT related, Task related and self-related) and three phases of adaptation process (individual, organizational, and group level)
- ✓ A study of the main university's strategy behind the adoption of mobile technology and how far it supports changes towards the appropriation of mobile technology.

The conclusion brings managerial implications, theoretical implications and some recommendations for further studies in order to deepen the research and to answer several hypotheses issued from our results.

Keywords:

Mobile Technology, Education, Coping Theory, User Adaptation, University Strategy

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GENERAL INTRODUCTION

Around the world, 6.5 million mobile device contracts exist; making tools like Smartphone and Tablets are an indispensable and necessary part of life. How can this technological shift benefit to students in classrooms, though? That seems to be always the subject of debate; some people claiming more technology is needed for students while others say that learning is being sacrificed for the sake of flashy technology.

What are the consequences for education? The educational policy in the field of digital technology, in the noble sense of the term must have the sole purpose of reducing the gap between "the promise" and the actual, average and statistical use of digital technologies (today, a real disaster). It is necessary to avoid the distraction as much as possible. Restrict the advertising presence and the purely playful side (I do not speak of "serious games" educational games, I am talking about "entertainment", the exact term used by Obama)

"How the IPAD contributes to the shrinking of knowledge"²

"With iPods, Ipads, Xbox, and other Playstations, information becomes a distraction, a diversion, a form of futile fun, rather than a tool that opens up possibilities, allowing true empowerment."

"How Google contributes to shrinking knowledge; the information is becoming a distraction, a diversion"³

"In reality, the one who goes on the Internet enters a distraction business, in the first sense of the word, which is the diversion. After a few minutes, he is likely

³ Barack Obama, President of the United States, May 10, 2010

¹ On May 11, 2010 by Thierry klein, founder and president of Speechi association in contribution with the French newspapers "Le Monde, Libération, Les Echos.

² Thierry Klein, Tuesday 11 May 2010, Speechi

to end up doing something other than research (read the stock market, sports scores, chat on MSN ...)"⁴

The vast majority of ICT users (including actors) totally confuse the potential of technologies (the "promise") and the actual use that is made of it in general.

In the part of a series on the "high-tech educational bet" (in which several American experts are trying to bring their vision on what the school will look like in 10 years), Matt Richtel in the New York Times says "For the benefit of whom is the supply of technology at school? One of the most important contemporary educational movements" which aims to equip classes and students in computer science, to allow students to learn at their own pace ... but also to reduce the number of teachers, conscientiously". "Schools are spending millions of dollars to acquire technology, while cutting budgets and firing teachers without demonstrating that this approach improves basic learning."

Technology has no effect, in 1997, a committee for science and technology convened by President Clinton issued an urgent call for the need to equip schools with new technologies. In this report, the committee pointed out that research about the impact of technology on educational outcomes was insufficient. This did not prevent the committee from urging the schools to appropriate the ICT. ICTE (Information and Communication Technologies for Education) respond that the results show how much technological bidding blinds schools.

Researchers at the University of Southern Maine have shown that student test scores have been improved as a result of children's notebook equipment. "But is it the effect of the introduction of technologies or training that teachers have received? In 2009 the study of the US Department of Education on online courses has pointed out that policy makers lacked scientific evidence on their effectiveness. Larry Cuban, professor emeritus of education at Stanford, said "the technologies did not justify the big investments they received". "There is not enough evidence to show the slightest trend". For Karen Cator, director of the educational technology

⁴ Thierry Klein, President of Speechi, September 30, 2009.

office at the State Department of Education, test results provided an inadequate measure of the contribution of technology in schools. Many schools already had high results before mobile technologies: does this mean that is it harder to progress even with Tablet?"

However, the journalist noted that the enthusiasm which is found in the classes with ICT use, has not weakened. For the EESC (Economic, Social and Environmental Council), France still has "big efforts to be made" to develop "digital pedagogy" within higher education institutions. According to them, "Digital pedagogy is a challenge for higher education".

At local and global level, universities are dealing with competition at different levels (Collis & Van Der Wende, 2002; Krause, 2005). In this global competitive educational system, innovative universities are changing their strategies in order to promote a better chance to stay pertinent in the new knowledge age. In recent times, the impact of technology on educational system is clear. ICT plays an important role in today's universities processes in meeting challenges that are driven from competition, society and university budget (Oblinger et al., 2005).

Published reports by EDUCAUSE highlighted that over 90% of all responding American universities and colleges are invested a significant amount of funds in information technology (Hawkins & Rudy, 2008) and also 95% of higher education institutions in the UK have established one or more learning management system for students and faculty use (Browne et al., 2006).

The French president François Hollande has announced a new digital plan for French schools in 2015, teaching and learning through new technologies would be the priority. Then in January 2015 the French Minister of Education Najat Belkacem has declared that 15,000 Tablets being given to schools since 2010 and would increase to 130,000 in January 2015 and has later announced that 3.3 million French college students will be equipped with the digital Tablets in January 2016.

Universities set their strategies with respecting to their educational and financial goals. Providing digital educational environment and IT devices to faculty users help universities to achieve the desired financial returns. In a short while, universities make fairly large investments in technology based on what they believe about teachers and students need (Oblinger et al., 2005). Nevertheless, the question that arises is that universities sizable investment is really based on the needs or wants of students and faculty users. How universities understand which type of technology will be useful for students learning and faculty members? Do technology investment will be sufficient for an effective educational environment?

It is important that we do not adopt the technology for achieving technology and financial goals but rather for enhancing student's learning and more importantly the pedagogy of the university (Krause, 2005).

"In academic contexts, it is worthwhile being explicit about how and why ICTs will and will not be used in your course. Whenever possible, find out what colleagues are doing with ICTs. If your practices are different, let students know why this is the case. If you don't, students will no doubt raise the issue with you at some stage. Take time to be explicit about your goals for student learning in the class and the role technology plays in achieving those. Students will respect the fact that you have taken the time to think about the issues and explain your approach, even if perhaps not entirely satisfied in terms of getting what they wanted online." (Krause, 2005)

Investing in mobile technologies is becoming universal. Many schools in different countries such as Canada, USA and France started to invest in Tablet and leasing it to university's participants. The following news shows some of these schools and universities' projects in mobile technology:

- No more pencils, No more books-just a Tablet. Every sixth grader at Sacramento Country Day School in California will receive an iPad (CBS NEWS/June 2013)
- o Every year, Polytech University in France lease 350 iPads to its 3rd year students

- IPads project for Winnipeg high school students started in January 2013 for the first time in Canada, leasing about 3000 Tablets
- St. Catherine's High School in Racine, Wisc. (USA) says: By 2012, the bigger goal is to equip all students and teachers in different grades (6-12) with iPads instead of textbooks

Empirical studies of mobile technology in education are scarce. More rigorous research is needed in order to understand the perceptions and adaptation process of students and faculty. Mobile technology in education and learning still is in its infancy (Motiwalla, 2007).

Literature shows few empirical data about perception and adaptation of university's participants relating the implementation of mobile technology. There are few empirical data about the university's strategy in adoption and implementation of mobile technology as well. Therefore, there is a lack of research in understanding users' responses to mobile technology and their adaptation strategies in education.

Our research aims to understand the university's strategy behind the adoption of mobile technology and how far it supports the participant's appropriation to the implemented mobile technology.

This research is articulated around two main research questions:

- Why is mobile technology used in higher education?
- How is mobile technology used in higher education?

The focus of our research is to understand this complex and dynamic emerging phenomenon. We will see in Chapter 2 that a qualitative approach is justified for issues depending on the actors' experience (Wacheux, 1996). The research belongs to the **constructionism** in research design. This dissertation is an **exploratory**

research which is inspired by the **Grounded Theory** in order to allow the theory emerges from the empirical results that gathered on the field. Two **Case studies** have been conducted with several data such as 10 month observations (1155 hours and 704 hours) and 15 semi-guided interviews were coded. In addition, we explain why we conduct our research based on nonsystematic observation.

Relating to the problem statement, this study focus on students, faculty and administrators of university in order to understand their perceptions of mobile technology and factors that influence their adaptation process. Understanding the relationships between the adoption factors and the perceptions of users will help us to better identify the adaptation strategies and their consequences. As well, this research helps to better understand the components of user adaptation and better prediction of user's reaction to mobile technology implementation. Achieving these objectives will provide adequate answers to the research questions and provide the proposed solutions to the problem statement.

Significance of the Study

There are many failed IT implementations in different organizations and educational institutions which are related to the human and not technical issues. The main contributor to these failures is the lack of enough consideration to the needs of the users and their performance at work. Users' perceptions of mobile technology can influence use, adaptation efforts and ultimately the performance.

This study contributes to the body of knowledge in the fields of mobile technology and user's adaptation process by providing needed information for their development and implementation. It benefits the universities' administrators and participants through the following areas.

• In order to increase the success of mobile technology implementations and better enhance participant's performance, university administrators can incorporate user's appraisal and adaptation strategies into technology implementations. Empirical evidence and information from this study will

help the university to take more efficient decisions and establish policies regarding implementation of mobile technology.

- In order to increase fiscal effectiveness, universities can use this study to make effective decisions regarding technology investments. As well, better understanding user's perceptions and adoption factors influence their adaptation strategies that can ensure smarter mobile technology implementations as well as IT fiscal success.
- In the global educational competition, universities can be in the forefront of innovation by understanding the needs and actions of participants in connection with the mobile technology implementation.
- Student loyalty may increase when their perceptions are understood and integrated into the university system.
- This study helps decision makers and faculty members to understand the emerging systems and mobile technologies.
- This study can be extended to other fields like businesses in order to train their mobile workforce progressively.

This research does not investigate university participant's beliefs, attitudes, and intentions to use mobile learning through extended use. Therefore, the findings of this study has to be considered as an evidence in order to explain how the research factors influence usage behavior at initial adoption and impact user's adaptation.

The unit of analysis is the individuals at the universities. Each participant's response is treated as an individual differently several times. The research subjects are male and female participants. The confidentiality and anonymity are preserved for all participants.

In order to understand the context in which mobile technology have emerged and evolved, firstly we study the societal context presenting digital technology and its impact on society and education. Secondly, we focus on mobile technology in university and mobile learning definitions. The educational uses of mobile technology are discussed. Educational and pedagogical issues are investigated as well.

We briefly indicated stakeholders including students, university faculty, administrators and directors. Furthermore, we present how authors link IT events to adoption, acceptance and appropriation.

Our main interest of this study is *Mobile technology and Education*. This research aims to highlight why and how universities adopt and use mobile technologies. The main focus of this study is to understand the user adaptation to mobile technology as literature shows a distinct link between IT adoption strategy and user adaptation to mobile technology (Chapter 1, Chapter 5 and Chapter 6).

The participants who are involved in this research are from university environment as we aim to understand their use and perceptions about mobile technology. Some additional interviews have been conducted outside our fields of research (two engineer universities), at a Business School. In fact, our attention was driven to this school because of their failure in mobile technology implementation after one year.

In order to conduct this research, two universities were visited, as well different individuals with different positions (students, faculty members, staff, directors etc) in the university environment were observed and interviewed. All our field results are based on university's participants' behaviors and responses. To better understand our research, the dissertation begins with the literature pertinent to the study (Part 1 of Chapter 1) and then Part 2 presents the empirical results. However, as our research is inspired from the Grounded Theory, this dissertation structure is not faithful to our own chronology. We started with our field research and then conducted regular theoretical studies to understand our empirical findings. Our studies have been built upon these constant back and forth between theory and reality.

Research architecture

This document consists of two parts including six chapters.

Part 1 presents our initial literature review and the research design:

Chapter 1 presents the literature review to understand mobile technology, the context at the societal level and at the organizational one. Then we focus on the concept of mobile learning.

Chapter 2 is divided into two sections and states the problem statement, introduces the research design, the research epistemology and the methodology used. Then, the reasons for choosing the conducted case studies through observations and interview are expressed.

The **conclusion of first part** helps to define the main questions of our study which are answered and discussed in Part 2.

Firstly, we study the universities' participants' interactions with the given mobile technology. Then we observe their reactions and perceptions to mobile technology. Therefore, we highlight different coping activities between mobile technology and individuals. Finally, we study the strategy of university for mobile technology adoption thus, we try to understand how far it supports changes towards mobile technology appropriation.

Chapter 3 is a description chapter presenting our 10-month observations in two case studies (university A and university B). We describe the mobile technology utilizations of students and faculty members in different situations and places. We explain in details the uses, perceptions of our observed individuals about the given mobile technology and its changes over time.

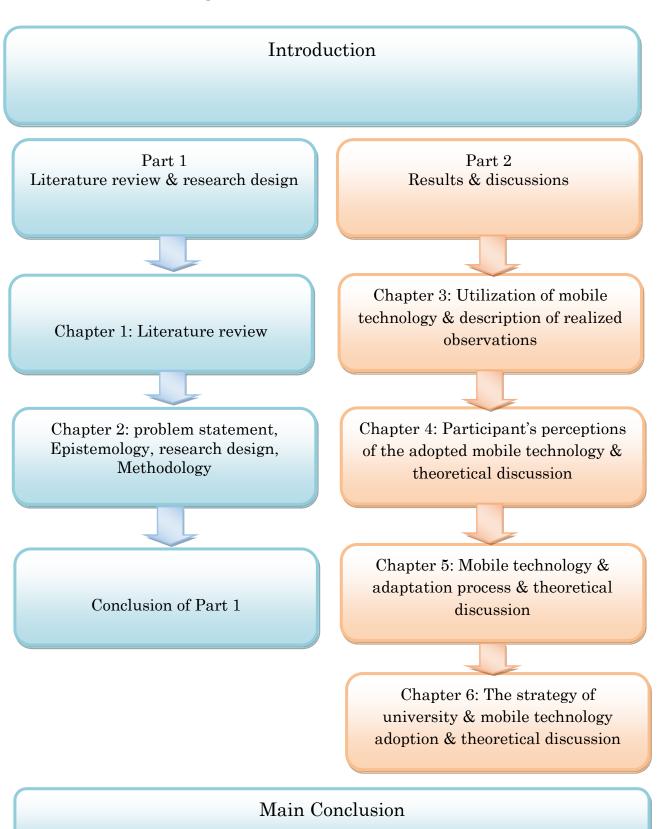
Chapter 4 presents results explaining the perceptions of university's participants about the implementation of mobile technology and the way that they perceive the induced changes brought by the implementation of mobile technology. Furthermore, this chapter presents different appraisals of university's participants relating to the adoption of mobile technology by the university. Then a conceptual presented framework and a theoretical discussion is emerged from our studies. It presents different aspects of *user appropriation* compared to the empirical results.

Chapter 5 analyses the responses types of modifications that are made by the university's participants in the process of adapting to the given mobile technology and the consequences of their adaptive behavior. In addition, the significance of activities at the group and organizational levels are discussed. Then, a new framework is inspired from the literature review and our field results in order to understand the continuous process of integration and adaptation of mobile technology in education.

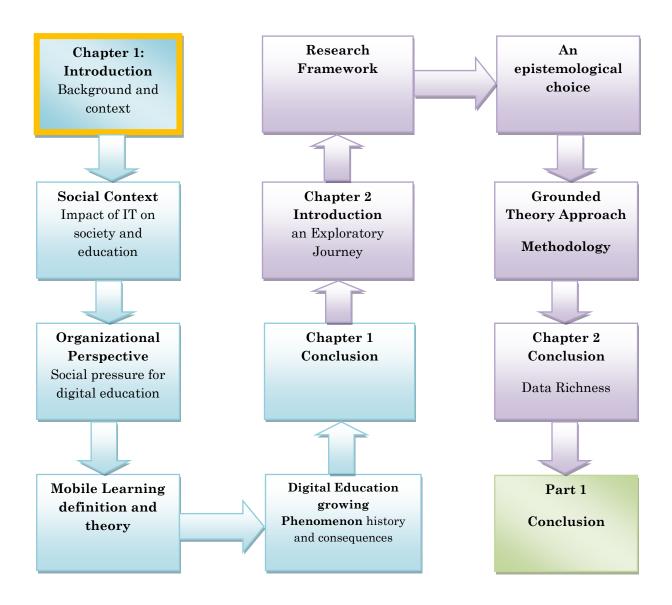
Chapter 6 presents the university strategy for the adoption of mobile technology and about how far it supports changes towards mobile technology appropriation. For this purpose, the faculty members and university directors in charge of mobile technology project were interviewed. We further compare these hidden strategies to a theoretical framework.

Conclusion, the last part summarizes the main results, the discussion, the main contributions, the limitations of this research, and finally the further research recommendations are expressed.

Figure 1 - Research Architecture



PART 1



CHAPTER 1. Mobile

Technology and Education – Research context

INTRODUCTION OF CHAPTER 1

Generally, this chapter presents the role and impact of mobile technology on society and the education system. The first part of this chapter presents the impact of information technology on society and the educational system. It presents history and advancement of information and communications technologies and factors that have led to the information driven economy and society.

The second part of the chapter dedicates to the social impact and pressures for digital education. The stakeholders, roles and challenges that they face, are presented as well.

The third part of this chapter explains the evolution of the education and learning system: e-learning and mobile learning. The research on mobile learning, its definition, challenges and benefits are discussed.

The last part explains digital education as a growing phenomenon, its consequences and issues that affect human factors and mobile technology.

1.1 The impact of Information Technology on Society and Education

Technology has impact on all aspects of life from the individual level to the organizational and societal levels. Nowadays, technology and human sphere affect each other in society (Ragus, 2006). The impact of information technology varies considerably to revolutionize aspects of society, economy, educational systems, people and global environment. In some extend, it plays a major role in defining gaps between human generations (i.e. the digital generation). The last century changed the nature, speed of human progress and achievement because of technological innovations. Technological advances have made the world smaller since industrial revolution. However; the telecommunication revolution were introduced fundamentally by different progresses.

New inventions and telecommunications technologies (i.e. the telephone, communications satellites, etc.) reduced the time and space of transactions and communication. This revolution has had a profound impact on people and society. The introduction of personal computers (PC) and the beginning of the digital revolution brought a significant impact on societies, trade, commerce and education. Educational systems quickly adopt computers and integrate them into the educational system at varying degrees.

The next step in the evolution of the digital age was Internet. Internet made a significant impact on society, the economy and global communications by starting a new path in the information age. At the beginning, it has developed as a research network for government and later on universities could connected to this research network. It was later kept in an open system format to develop participation of scientists, universities and businesses for progress. Internet became mainstream in society by introducing the World Wide Web (WWW).

The invention of the World Wide Web (WWW) made the delivery of information available to everyone, everywhere (De Freitas & Levene, 2003) and facilitated the adoption of the information. In 2007, the number of Internet users increased to one billion compare to 4.5 million computers users in 1995 and only 500 computers were connected to the Internet in 1983 (Paxson, 1994; Walrand & Varaiya, 2000; Tanenbaum, 2010). In the twenty-first century, the individuals need to know Internet exploration strategies and Internet navigation skills as new literacy models (Bianco & Freebody, 1997).

Internet has made a fundamental change in the nature of the information value chain. The Internet has changed the visibility of the processes in the information value chain. Visibility means both information about processes and the capability for interacting with these processes. Because of this visibility, the Internet enables the emergence of online communities and makes possible more rapid and complete learning (Yang & Mason, 2001).

The information revolution or the electronic revolution (e-revolution) has introduced new models, challenges and opportunities for individuals, governments, educational institutions and businesses. The electronic revolution connected in social, economic and government systems through the creation of e-mail, e-government, e-commerce, e-banking and e-learning.

While the e-revolution had occurred, the information revolution developed new social, economic and educational models. For the same intention as the e-revolution, the mobile revolution has been evolved (Wagner, 2005). Advancements in computing technologies further allowed the development of smaller and cheaper mobile devices, then the mass adoption of mobile technologies like mobile phones, PDAs, portable game devices were facilitated.

The growth in use of mobile technology has been revolutionary and the adoption of mobile technology becomes a global phenomenon. The number of mobile technology users is growing worldwide and it was over 3.25 billion at the end of 2007 (Ridley, 2007). Adoption rates of mobile technologies are five to ten times higher in other countries compare to the U.S. and Canada which remain more PC centric (Prensky, 2001). Mobile phone use in Europe is far more prevalent than in the U.S. (Wentzel, 2005). The desire of the society for technologies associated with the mobile revolution that is shaping the next edge of the knowledge age and economy (Wagner, 2005).

In the last decade, the technological environment has noticeably changed with the help of various technologies available for individuals like mobile phones network and wireless internet access in different places such as universities, companies, airports etc. According to Eurostat, the mobile phone has been highly (42% each year) adopted in the European Union from 1995 to 2003. The penetration rate of mobile phones has been reached to 80% in the European Union.

"A mobile world, a world of all mobilities", this is the world that can be portrayed today, when the mobility combines the time, distance and space; where the real and the virtual are confused" (Kaplan & Lafont, 2004). Signs of these transformations, the latest innovations in the field of communication networks and information processing tools have led to the development of technologies that is called "mobile".

Mobile information technology (IT) regroups different types of devices such as mobile phones, laptops, personal digital assistant (PDA), or the Tablet PC. These devices are associated with networking of multiple information resources. It is defined as an interconnected set of technological, social and organizational

elements (Lyytinen & Yoo, 2002). These technologies are bringing a physical and social mobility for actors.

Many individuals use their own mobile technologies every day for their own purposes such as mobile phones, personal digital assistants (PDAs) or laptops. Many people use their own devices when their companies are slower to adopt and provide them. However, some employees use them but they do not want to be equipped with these technologies, fearing subjugation.

This multi-contextuality is related to two fundamental dimensions of human experience: space and time "Anywhere, anytime". Inducing redial respect to time and space, in fact, mobile technologies are as catalysts for more profound changes (Kalika et al., 2013). Mobile IT goes beyond the organizational boundaries and is frequently used in contexts other than the organizational one.

Nevertheless, mobile technologies appear to be particularly ambiguous tools and their effects cannot be predetermined (Arnold, 2003; Cousins & Robey, 2005). Mobility, ease of access and comfort of mobile technology make it useful for a wide range of learners such as employees (mobility workforce) and students who have stopped by the formal and traditional educational system (J. Attewell & Savill-Smith, 2009; Naismith et al., 2005; Traxler, 2007).

Apparently, there is opposition between the expected benefits and the unexpected social consequences of mobile IS. Thus, when management practices are reinventing themselves around mobility, it is necessary to consider the issues generated by the mobile IS and the renewed management methods on which they are based. These technologies are likely to bring a new form of organization, in the sense that the work is no longer includes as a place but as an activity that can be exercised outside the traditional space and time frames.

Mobile technology revolution was developing new social, economic, and educational models to take advantage of the widespread adoption of mobile technology. Evolution of mobile models has brought new opportunities and challenges for businesses, governments and educational systems. M-commerce instead of e-commerce and e-learning is becoming m-learning; online banking is becoming m-banking and other products of mobile technologies like short messaging systems (SMS) and Personal Area Networks (PANS). In fact, finding information and knowledge rather than knowing, it is becoming the characteristic of learning (Traxler, 2007). The new economy boasts that consumers have unlimited information to choose among businesses and retailers. Companies recognize the needs of customers through personalization and customization which is an important part of the e-commerce and m-commerce (Schubert & Leimstoll, 2004). Individuals are no longer satisfied with information, which are imposed them. However, mobile technologies use is facilitated by the knowledge economy.

Similarly, for the educational environment, students have access to unlimited amount of information by using different modes of communication and learning that can control their education. In the traditional education system, educating students and conducting research were the goals of higher education (Alexander, 2004b).

Higher educational systems have had a profound impact on society and the economy by creating innovations through research whereas the businesses influence the educational system. Therefore, the interaction between the economic and educational systems extremely influenced by the technology evolution (Boylan, 2004). Infusion of technology into the educational systems has become an essential for educational institutions to stay relevant in society. Mobility is not a new concept in fact, mobile technologies have been served in economy furthermore the mobile technology is used for learning and teaching in

order to enhance the educational experience of the student in order to reach them more than before.

1.2. Social pressure for digital education

In these days, the role of universities is fundamentally redefined and the situation for the higher education is changing. The changes have brought a set of new challenges and opportunities for universities. The future for the higher education can be framed in two ways. Firstly, the change is considered as a perfect storm that is caused by the convergence of numerous disruptive forces and secondly, it is a way that is filled with opportunities (Hilton, 2006). The way that higher education chooses to respond to these challenges and disruptions will define its landscape during the next decade.

One generation's technology is taken for granted by the next. Computers, Internet, online resources and new mobile technology are simply the way that things are done. The members of the net Generation; never realize to do things without the Internet (Oblinger et al., 2005).

Since the early 2000s, new forms of training and knowledge transfer have emerged thanks to the development of ICT. Based on this new paradigm, several universities have launched online schools in which anyone can learn about anything at any time for free. Massive online open courses (MOOCs) are much more than online courses. It provides a new interactive way to develop, structure, and share knowledge among learners. Despite the success of MOOCs, researchers have identified some limitations such as the course completion rate is relatively low; course adaptations for beginners and advanced learners is not optimized; the quality of the teaching. The serious games have helped to bridge the limits of massive open online racing (Allal-Cherif & Bidan, 2017).

New generation has different concept of literacy which is completely digital and different from standards of literacy such as reading and writing (Kimber et al., 2002; Looney & Sheehan, 2001).

Information and communication technology (ICT) is a force that has changed many aspects of the way of our life. The past decades has been changing a lot in different fields such as medicine, tourism, business, banking and engineering, because of ICT. Today's these fields operate so different compare to the past. However, education has experienced less change and influence than other fields which has been explored by some researchers (Collis & Van Der Wende, 2002; Soloway & Pryor, 1996). The lack of influence of ICT in education contains some factors: a lack of funding support for purchasing technology, a lack of training among practitioners, a lack of motivation and no need of ICT adoption as teaching tool among teachers (Starr, 2001). Nevertheless, in recent years, other factors have appeared that encouraged universities and its practitioners to adopt ICTs. These factors are as follows:

- The developed needs towards exploring efficiencies or opportunities in order to deliver flexible program (Oliver & Short, 1996),
- The growing use of the Internet for facilitating information access and communication (Oliver & Towers, 2000),
- The capacity of technology to provide support for the needs of learners (Kennedy & McNaught, 1997).

The specificity of mobile IT is the ability to communicate, to transmit information and have an access to various services in unreachable places and times.

Indeed, teaching devices and methods have evolved widely. Thus, until the late twentieth century, college students, high school students, employees and citizens were meeting in training places, classrooms and auditoriums. They were listening to a teacher or a trainer, in order to exchange and assimilate knowledge. Nowadays, the teaching devices continue to multiply, they have especially diversified and more often, they have organized remotely.

In recent years, these developments are all more important because of the economic concerns of educational institutions that encouraged them to reconsider their pedagogy policy and also to consider technological solutions such as elearning and m-learning. Overall, these evolutions invite the educational actors to think about other modalities rather than the classical development of lectures.

In fact, mobile learning is one of the new technologies which is base on new educational system in order to responds to the needs of university's participants (students and faculty) and incorporates new resources in education.

There are different definitions of mobile learning in existing literature review. Pinkwart et al. (2003) defined e-learning as 'learning supported by digital "electronic" tools and media' and mobile learning as 'e-learning that uses mobile devices and wireless transmission'. Quinn (2000) expressed it earlier as a learning method that takes place with the help of mobile devices. Some other researchers describe mobility in terms of the learner and not the device (Sharples et al., 2005; Traxler, 2007).

Some others have more philosophical view who define mobile learning as a communication tool among people (Laouris & Eteokleous, 2005). Therefore, M-learning is the subject of current research in different areas such as education, business and technology. Some researchers in education believe that mobile learning enhance the learning, success of today's students and bringing a link between today's students and university with educational paradigms (Alexander, 2004a; Attewell & Savill-Smith, 2009; Sharples et al., 2005; Trifonova, 2003; Watson & White, 2006). Mobile learning is not relatively researched to the comparisons the literature review in online learning (Bringland & Blanchard, 2005).

The research of Peters (2007) highlighted that mobile technologies were commonly used in some sectors in business, however they are rarely used in education. Many education and training providers realize the utility of mobile learning, but its adoption for educational use is limited. The reasons of its adoption limitation can be the teacher's ability, the cost of mobile devices, cost of required IT infrastructure, smooth change of educational institutions and particularly mobile devices that are not designed for educational purposes. The educational institutions force to involve mobile technology into their education process.

In addition, a structured framework has to be developed in order to include all aspects of learning organizations, it is possible due to ICT advancements and technology investment strategy which is adopted by educational institutions (Ragus, 2006). The experiments of mobile learning help to define its role and to define the way that will be more applicable in the educational system. The early experiments show the convenience, mobility, ease of use and access of mobile learning. Mobile learning application can be effective when it is used in the right context and subject. Some subject and context are naturally fit into the mobile learning paradigm. (Keegan, 2002; Little, 2006; Ragus, 2006; Trifonova, 2003).

Today's, students of new generation create considerable challenges for universities in fact, these students ask for a set of visions, expectations and demands from the educational system which are different from those that universities already experienced. There are several researches who discuss all issues of higher education that have been created by the students of new generations. Another issue is to know if the universities are ready for the challenges which have been brought by global competition, tighter budget and student empowerment (Alexander, 2004a; Collis & Van Der Wende, 2002; Gururajan, 2002; Krause, 2005). The above expressed issue has to be highlighted by finding the answer of "how do educational institutions have adapted to what are the real drivers of their motivation?

Crozier (1995) points out that technical invention is not sufficient. He indicates that technical innovation has to be able to constitute the development of interactions between "all the links in the chain of human relationships, from scientific knowledge to discovery, from its development to its implementation". More recently, some researches (Orlikowski, 1992, 2002, 2008) in the perspectives of those of Giddens (1984) have shown that it is not difficult to consider phenomenon of technology appropriation. Thus, it is relevant to study how learners use and engage to mobile devices.

Kvavik (2005) indicates that universities have potentials for improvement in the use of learning technologies. In fact, there is a gap between the university's perceptions, the perceptions of students and faculty members about technology. It is important that universities understand the technology perceptions of students and the faculty members in order to help them in their future decisions about technology investment and implementation. Universities need a significant and deep understanding of the real needs and demands of students and faculty members especially the new generations of students.

Universities are facing difficulties when it comes to technology. In these days, online learning universities, private schools and the global competition put pressures on universities and force them to change their educational and financial strategies in order to attract more students with smaller budget. Implementation of technology plays an important role in their strategies (Collis & Van Der Wende, 2002; Duderstadt & Womack, 2004; Gururajan, 2002; Krause, 2005).

Prensky (2001) states that the biggest problem of education is students who are called as "digital natives" and the gap is between the ICT experiences of student and university faculty. He states that the current pedagogical system does not respond to the student's demands from the educational system concerning different delivery modes of lectures and administrative information. It is not only

in terms of time and location but also interactivity, instantly delivered educational materials and increased multimedia learning (Carlson, 2005; Lam & McNaught, 2006).

In the setting context of digital universities, Isaac (2008) identifies different brakes for using e-learning devices. First, he identifies strategic brakes which seem to be linked to insufficient reflection on the emerging issue, in particular, collaborative work. Secondly, there are organizational and financial obstacles due to the lack of resources and inequality access to digital resources.

In order to meet the needs of new generation of students, many teachers also need to shift their existing teaching system to another one which is more adapted to the knowledge age (Moran, 1999; Peach, 1997). Many researchers believe that changes are needed in the whole educational system at different ranges from a considerable level to revolutionary (Alexander, 2004a; Barone & Wright, 2008; Kimber et al., 2002; Oblinger et al., 2005).

The university administrators who are not aware of the needs of their stakeholders and society change, believe in continuing the formal educational system to educate today's students as the same way of the traditional students.

Following the revolutionary changes in the educational system, the universities reconsider the roles of professors, pedagogy and learning methods (Hilton, 2006; Jafari et al., 2006; Johnson & Lomas, 2005; Long & Ehrmann, 2005; Wedge & Kearns, 2005). The role of the teacher evolves and also the role of tutor are emerged (Caraguel, 2013). New educational pattern shifts the role of teachers from deliverer of knowledge to facilitator and sharer of information. With the help of these new paradigms, Prensky (2005) underlines that universities can not only achieve the better educational results but also can improve the learning outcome of students.

Ragus (2006) indicates that higher education needs a holistic view of m-learning and investigation of its different aspects and components. Few studies were conducted in investigating a "whole-organization" implementation.

In the educational institution, every participant has different needs and perceptions. The role and application of mobile learning must meet the requirements of all university's participants such as students, faculty, directors and university staff such as IT staff and administrators. Additionally, each group of participant has their own perceptions of mobile technology and specific role in their institution (Jafari et al., 2006).

The willingness of university's participants for accepting mobile devices likely varies. It is thus essential to investigate user requirements before the implementation of a system. University directors need to incorporate student and faculty members' perceptions into the technology investment strategy. The scope of this research is to focus on the perceptions and adaptation process of students and faculty in connection with mobile technology in education.

There are few empirical data about the significant impact of mobile technologies on individual's perceptions and their adaptation. Moving into the 21st century, these factors and many others are bearing strong forces for the adoption of ICTs in education and a large scale changes in the direction. The education is planned and carried changes due to the opportunities and affordances of ICT. Apart from those factors, universities are willing to adopt new technologies to increase the students' learning experiences (Barone & Wright, 2008).

Information technology is woven throughout the life of new generation but probably they never think of it as technology. Nowadays, many digital tools such as eBooks, Facebook, YouTube, Myspace and Dropbox used by new generation which are called new digital "Knowledge society". (Kimber et al., 2002; Looney & Sheehan, 2001).

The new generation of students is facing a global job competition though they require their education more than ever and look for a university base on their needs and expectations (Carlson, 2005; Collis & Van Der Wende, 2002; Krause, 2005). Implementations and using the different types of mobile technologies are rapidly increasing in schools and universities worldwide (Naismith et al., 2005; Watson & White, 2006). In addition, progressive and innovative thinking can be helpful in attracting new students, especially the mobile generation and their loyalty can be increased if their perceptions are incorporated into the university system.

Literature shows few empirical data about perception and adaptation of university's participants relating the implementation of mobile technology. Furthermore, according to the literature review, different theoretical studies criticize the current models such as TAM and TDI and seeking for changes but not many research have been conducted in the field.

1.3. M-Learning: Definitions, Challenges

Mobile learning has multiple definitions in the literature like "an extension of elearning", "mobile learner preferences and pedagogy that supports a flexible learning paradigm of anywhere/anytime", "highly portable that is user-centered" (Watson & White, 2006; Laouris & Eteokleous, 2005; Quinn, 2000; Ragus, 2006; Alexander, 2004b; Parsons & Ryu, 2006; Kambourakis et al., 2004; Traxler, 2005; Sharples, 2005). Different definitions of m-learning are the predominant theme in these definitions. Other definitions like "m-learning as an extension of elearning" point out that m-learning demand unique technological (mobile devices) and pedagogical paradigms.

The high interest in mobile learning research include the rapid progress in technologies that is a unique demand for m-learning as well as advancements in broadband wireless networks, capacity of the new generation of mobile devices and the fact that mobile telephones are fully embedded in life and social practices (Wagner, 2005). According to some researchers, the mobile learning is moving from a theory into providing a valuable contribution to the learning opportunities (Watson & White, 2006). Many contributions have been made to the body of knowledge on m-learning. However, many other researchers have been studied in the form of exploratory articles, and the literature is mostly presented at international conferences (Traxler, 2007; Laouris & Eteokleous, 2005; Quinn, 2000; Ragus, 2006).

Several national and global organizations, consortiums and universities sponsor research and conferences have conducted research pilots and studies employing different technologies and implementations at different levels. The studies conducted at different ranges from college to university and wide experiments in Europe more than in US in order to add to the body of knowledge. Many researches in mobile learning were conducted in different continents, which are still rapidly evolving. However, there is a lack of rigorous empirical research and it is very limited.

The equivocal aspects of mobile technologies cannot be predetermined, either on the social interaction level or on the management level. The undetermined characteristic of mobile technologies clearly appears in the use of the mobile phone which is the most used mobile technology in the world. "Mobile technologies like mobile phones, laptop computers are always with its user and have numerous advantages in terms of access to information, personal safety" (Jarvenpaa & Lang, 2005, p.7). However, they may have consequences on the individuals in terms of creating a disturbance and disrupting conversations because of their presence at any place and anytime.

Mobile learning has been shown as a success in pilot studies throughout the globe (Wentzel et al., 2005; Watson & White, 2006). These studies are into many universities, using different technologies that vary from very limited scope to others which aimed at achieving campus wide adoption. The contribution of these studies is about understanding the success or facing challenges of mobile learning and education. Field trials researches have mainly studied a particular mobile technology and its possible use in educational environment. These case studies have investigated technical characteristics of mobile learning, developing mobile applications for course delivery and implications for learning and pedagogy (Little, 2006; De Freitas & Levene, 2003; Watson & White, 2006; Alexander, 2004b; Ragus, 2006; Wentzel et al., 2005).

Key Benefits and Challenges

The studies of some researchers indicate that mobile technologies or devices can support learning activities for different settings and ages. The quality of traditional lessons are enhanced by adding the approach of mobile learning (Naismith et al., 2005). Mobile technology provides unique learning opportunities that are personalized and can be used anywhere anytime (Attewell, 2005). Research highlights that mobile learning is more interactive; it involves more communication and collaboration between actors. Caudill (2007) states that mobile devices offer flexible and easy access to learning resources, as well the personalized and secure content (Turker et al., 2006).

Mobile technologies have the ability to facilitate learners' generated contexts and content (both personal and collaborative) by providing personalization, which makes it different from the traditional learning environment (Cochrane & Bateman, 2009). The mobile technology provides social learning environment for learners and can be considered as social technology.

Students perceive that adoption mobile technologies enhance learning better than other technologies. In the adoption of mobile technologies for learning, the gender does not influence the perception of undergraduates (Adegbija & Bola, 2015).

E-learning offers the classroom outside of its physical boundaries, increase communication and collaboration among learners and between learners and trainers inside and outside the institution. Mobile learning allows to have a fieldwork outside the classroom to deliver the course (De Freitas & Levene, 2003).

Despite the many advantages of this method, there are challenges to overcome whether technical, pedagogical or administrative. According to the study of Keegan (2002), there is a lack of wide spread adoption of mobile technology in educational system whereas learners use mobile phones extensively. The challenges were mainly related to the technical aspect of mobile technologies like the screen size of the mobile devices as well as the cost of them.

Many faculty members have doubt that technologies improve and facilitate learning in higher education. However, the researcher identified some factors which affect the adoption of technology by faculty members: lack of institutional support, unreliability of the technology, difficulty to learn, lack of knowledge of how to use, low level of past experience and wasting time (Butler & Sellbom, 2002).

According to Naismith et al. (2004), mobile technologies in education provide a support for learning and teaching and their use is not restricted to extracting them for learning activities.

1.4. Digital education growing phenomenon

Current digital technologies offer the institution particularly interesting opportunities for change, in particular, rethinking its organization, operations

and methods, base not on the succession of techniques on the market, but specificities of human activity and learning in social sectors such as education and training (Albero, 2011).

However, academics are taking the opportunities, which are offered by each technological generation to show that it is possible to teach and study at the university according to other models and other arrangements of human skills and technical means (Charlier & Henri, 2010).

Despite the institutional advances, the technical innovations of all kinds and engaged individual achievements in the field, the relations between pedagogy and technology continue to be a problem in many French universities. This situation is not due to the inability of the actors, but to the fact that the changes in knowledge brought by the digital revolution and globalization processes facing the thought and action patterns which deeply embedded in the institution's history, structures and habits. At University, the relation to technology seems as ambivalent as the educational relation and their relationships continue to maintain vast deceptions as well as remarkable opportunities (Albero, 2011).

CONCLUSION OF CHAPTER 1

The purpose of this chapter was firstly to gain insight in the existing literature regarding the implementation of mobile technology in education and to study the emerging questions.

The study of the literature review in chapter 1 helped us to understand that the information revolution or the electronic revolution has introduced new models, challenges and opportunities for individuals, educational institutions and businesses. The information technology influences all aspects of life from the individual level to the organizational and societal levels. The growth in use of mobile technology has been revolutionary and the adoption of mobile technology becomes a global phenomenon. The interaction between the economic and educational systems extremely influenced by the technology evolution. Infusion of technology into the educational systems has become an essential for educational institutions to stay relevant in society.

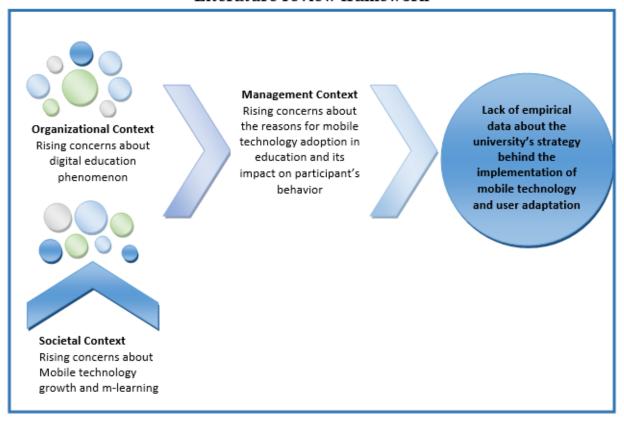
However, academics are taking the opportunities, which are offered by each technological generation to show that it is possible to teach and study at the university according to other models and other arrangements of human skills and technical means.

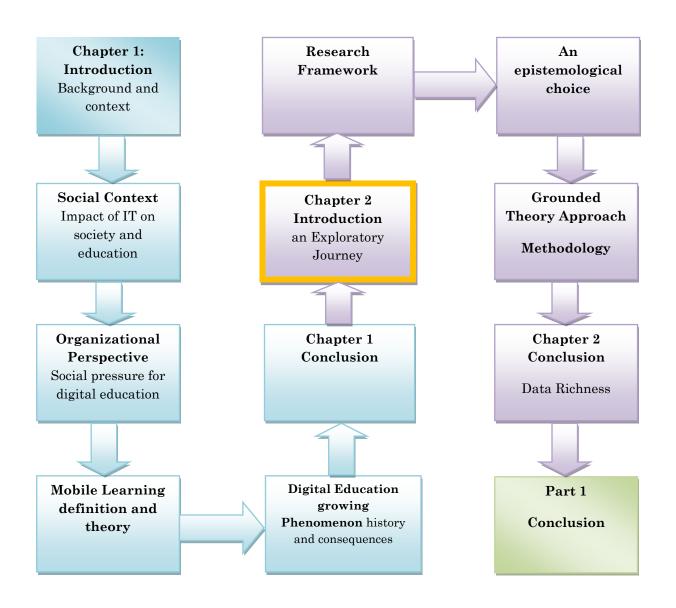
Despite the institutional advances, the technical innovations of all kinds, engaged individual achievements in the field and the relations between pedagogy and technology continue to be a problem in many French universities. Universities are facing difficulties when it comes to technology. In these days, online learning universities and the global competition put pressures on universities and force them to change their educational and financial strategies in order to attract more students with smaller budget. Implementation of technology plays an important role in their strategies.

As literature links mobile technology implementation to managerial decisionmaking and to organizational priorities, we further gave an overview of university's strategies in adoption of mobile technology.

Our literature review studied the growth of digital education phenomenon and how it spreads worldwide. It further presented the various studies in mobile learning. One of the main conclusions of this literature review is that more rigorous empirical research is needed to understand the perceptions and adaptation process of university's participants. Furthermore, the literature review suggests a lack of theoretical consensus on adaptation of mobile technology in education and the strategies behind adoption of mobile technology in universities.

Literature review framework





CHAPTER 2.PROBLEM STATEMENT, EPISTEMOLOGY & RESEARCH METHODOLOGY

INTRODUCTION OF CHAPTER 2

While the previous part proposed the presentation of each central term of the research in groups, it is about to bind them in this second part. Generally, with the help of methodology, we propose to study how university's participants interact to the implementation of mobile technology, especially in the university context.

However, the discussion between the field and the literature was constant during the research, it was necessary to stop at a moment to give the research problem. It was built step by step, according to the findings obtained by the field and the understanding achieved with a return on the literature.

The purpose of this chapter, first of all it is about to propose the construction of the research question along with the construction of research design.

This chapter consists of two sections:

The first section (section I) deals with the construction of the research question as well as presenting the research epistemology.

The second section (section II) presents the research methodology.

Emergence of the research question and research methodology

Following the literature review, it appears that the chosen research question raises a recent concept (the relationship to the mobile technology) in a less explored context (the university). Therefore, this research is primarily in the logic of discovery.

The adopted approach is related to theoretical construction. This construction follows the principles of the grounded theory of Glaser and Strauss (1967), which means that the research question has really emerged from the dialectic between

the field and the theory. Thus this section suggests linking the emergence of the research questions with the step-by-step construction of the methodology. Although problem statement and methodology are presented one after the other, however, they have evolved together.

Considering these objectives, in the first part of chapter (Section I- chapter 2), after presenting the research framework, an explanation of the epistemological positioning of the research will be proposed. The second part of the chapter (Section II- chapter 2) then can logically be used for the research methodology. Indeed, as specified by Wacheux (1996), the researcher is placed between three poles (epistemological, theoretical and technical) which must ensure its consistency. A connection between these three poles then makes it possible to shed light on the choices made and the continuous approach.

INTRODUCTION OF SECTION I

The goal of this research is to understand the utilization of mobile technology in education. It flows from the problem statement, the specific epistemological choices. Indeed, the objective of the research is the construction of an integrative theory, it follows that a large place given to inductive reasoning. This chapter is composed of two parts. Once the research question as well as the conceptual choices specified (2. l), the epistemological position resulting from the research questions is proposed (2.2).

2.1. Emergence of the research question

The approach followed during this research was not linear but really circular. The emerged research question as presented in this chapter; was built and refined during the confrontation with the field. The goal remains exploratory and descriptive above all. It is a question of developing a global diagram explaining the relationship between university's participants and mobile technology utilization. Specific hypotheses are not developed or tested. On the other hand, more specific research questions are presented. The research question is presented in three stages. As a first step, the general framework of research is stated in the most possible holistic perspective (2.1.1). In a second step, the relevant research questions are determined, conceptual choices made as well as research design (2.1.2).

2.1.1. General framework of research

The research question is part of a fairly broad and general framework: it is about to understand and describe the uses of implemented mobile technology by university's participants consisting students and faculty members.

It appears that the research question has been built and evolved following discoveries made in the field. It follows specific epistemological choice that it seems necessary to specify.

Throughout the inquiry, our purpose was to understand from empirical data why mobile technology is implemented and used in education, what are the perceptions and actions of participants towards such an implementation and what is the modifications base on these different perceptions. The grounded theory helped us to open up to all possible answers emerging from the research field (Glaser & Strauss, 1967).

2.1.2. Problem Statement

After reviewing the literature, our main conclusions in chapter 1 is that mobile technology is adopted and used in education base on institutional purposes. The built theories are too rational and mostly disconnected from individual logic of adoption and their real issues during integration with implemented mobile technology. There is also management issue that has to be considered.

Our outline introduced in the Chapter 4 summarizes the different approaches found in literature about utilization of mobile technology which is defined as two steps process in ICT use (Zaltman et al., 1973). Adoption is a complex phenomenon, which appears with the interaction between individuals and organizations. Depending on this interaction, different kind of adoption may have seen. There is primary and secondary adoption. When the organization decides to adopt a technology, this is called primary adoption. The implementation and adoption of technology by the individuals would be the secondary adoption.

In fact, the traditional frameworks in IS such as Theory of the Diffusion of Innovations (TDI) (Rogers, 1976) and Technology Acceptance Model (TAM) don not take into consideration that the adoption decisions for implementing of technology generally taken at the organizational level, so that the individuals do not have choice to accept or reject the technology. Such an implemented innovation would be considered as an IT disruptive event especially when adoption decisions are made at the organizational and division levels, rather than at the individual level (Gallivan, 2001, p. 51).

According to the Folkman (1992), when a disruptive event occurs, every individual asks himself "what is at stake for me in this situation?", "what would be its consequences?" and "what its personal importance and relevance?"

Most of the researchers in IS have been studied the adoption and appropriation of mobile technologies within the firms separately but we have found not much empirical research to understand the adoption and appropriation process of mobile technologies diffusion within education by analyzing the interaction between the individual, organization and mobile technology.

Our research integrates the models of use and adoption of mobile technology with Coping theory which provides a rich understanding of a wide variety of user behaviors occur before, during and after the implementation of a new technology. Throughout our theoretical and research field, we could not find any research studying participant's uses, perceptions and reactions to the adoption of mobile technology in education that occurred at the institutional level. Literature review strongly suggests that universities must understand the user's behaviors such as technology acceptance, avoidance and appropriation. What are the different kinds of usages at individual and organizational level? What are the reactions of users to the adoption of mobile technology? How individuals, appropriate mobile technologies?

As we have found no empirical research done in order to better understand the participants' perceptions and reactions before, after and during the implementation of mobile technology in education then we decided to go in the field and gather information directly from those participants (faculty members, students, and heads of departments).

Our first purpose during our research is to gather empirical data about the universities' participants, namely: *how universities use mobile technologies?*

To answer the first question, we observed the universities' participants during 10-months in order to better understand their uses, behaviors, perceptions about the adopted mobile technology at the individual and institutional level.

We first started our study on our first field of study which took 6 months (1155 hours of observation) to see what is going on in an engineering university which have been implemented a mobile technology for two years and see the utilizations of the participants. The first field of study helped us to clarify our vision about their uses and find a link between their way of use with their perceptions about such an implementation. Then we took a step backward and find out their critical view over the adoption of mobile technology before and at the time of its implementation.

The second purpose of our research is to evaluate from the field *how universities* use mobile technology. That is better to say, how universities' participants adapt to answer this question we conducted further research to evaluate two aspects adoption and appropriation. We wanted to find out how adoption makes impact on their uses and appropriation of the implemented mobile technology.

After understanding their uses, perceptions in the process of adoption then another question raised "How do university's participants respond to induced changes that brought by the implementation of mobile technology?" Which needed more discovery. Then we conducted another study in the second field of study. Furthermore, our findings raised the second question: What kind of modifications needed in the process of adaptation of mobile technology in the university context? Which is completing the first answer of the first question as well.

Furthermore, as our findings confirmed that individual's adaptation to the implemented mobile technology require the entire support of the organization before and after the implementation. We conducted additional research with 15 semi directed interviews on the strategy of the university as to understand how the main strategy does supports and influences the adaptation process.

This stated problem is researchable as it can be answered by qualitative carried out studies in universities that have implemented mobile technology. The applied

methodology could be repeated in different educational institutions, with new population in order to add new results and compare the findings. The contribution is relevant, as no empirical research has been done on these specific topics.

Main question: why & how mobile technology is used in higher education?

- Why is mobile technology used in higher education?
- How is mobile technology used in higher education?

Sub questions:

- What are the uses of mobile technology in University?
- What are the participants' perceptions of the implementation of mobile technology?
- What are the reactions of participants to the mobile technology induced changes?
- What kind of modifications made in order to adapt to new environment?
- What kinds of modifications are desirable at University to incite mobile technology adaptation?
- What is the university's strategy towards mobile technology implementation?

Several steps will be taken to answer these questions. The research will focus on high education specifically universities and their integration into mobile technology implementation. Our purpose is to answer several broad questions from fieldwork.

For this research, as there is almost no previous empirical data on the same topic, we chose to conduct a qualitative research as "qualitative methods offer ways to explore and investigate an obscure problem and to generate testable hypotheses while quantitative methods offer ways to verify findings and to test hypotheses" (Laws and Mc Leod, 2006, p.3) that will be explained in the further section (Section II). Our purpose is to observe universities, their participants and their implemented mobile technology in order to understand the phenomenon from the point of view of participants as well as to get a clear understanding of its particular social and institutional context.

2.1.3. Research design

The following figure summarizes the different steps to answer our developed questions:

University's strategy & Mobile Technology

Participant's response to the changes

University participant's perception assessment

Figure 2 - Research design

In order to answer our research questions, although we decided to conduct our research according to the Grounded Theory (Glaser and Strauss, 1967), we first review the literature to see what is going on about mobile technology in society and education. However, Grounded Theory has a high value on the contextual setting and gaining knowledge of the context and the day-to-day events. According Glaser (1967), the researcher should get an understanding of the literature before conducting the empirical studies as it may help to refine the topic. The main idea is not to try to confirm or verify an existing theory but allowing the theory to emerge from the fieldwork.

2.2. Epistemological choice

This research is located in the logic of discovery; it is based on epistemological choices specific to this type of approach. It is then necessary to specify the epistemological choices resulting from the research question defined previously. This epistemological positioning essentially answers three questions (Girod-Seville & Perret, 1999): What is the nature of the knowledge produced (2.2.1.)? How scientific knowledge is generated (2.2.2)? What are the values and status of this knowledge (2.2.3)? These are the three points that we will develop here, while stating that "epistemology is not situated before science (rejection of any foundation procedure), nor above science (rejection of any priori judgment of truth), it needs to follow and support the scientist's approach " (Péquignot, 1990).

2.2.1. The nature of knowledge

Asking the question about the nature of knowledge is when to wonder about the reality of it. According to the objectivists, there is an independence between the object (reality) and the subject who observes it. That being said, the observation

of the object by a subject must not change the nature of the object. In addition, the positivists believe that, in this external reality, there are unchangeable and almost invariable laws that must be revealed. The knowledge produced is then contextual and objective. On the other hand, the relativists concern that knowledge can only be approached through the human spirit, even if the latter uses methods and materials giving him the illusion of distancing with the observed object. The reality (or the observed object) is always dependent on the observer. If the world could be existed independently from our presence, then we could only understand it through our eyes and emotions. It is therefore unrealistic to seek to know reality objectively; it is more likely to speak of interpretation or constructed by a researcher following the perspective that will be adopted "(Strauss & Corbin, 1994, p. 279).

The researcher then plays a role of social mediator between the world of research and the corporate world: "theorization is not only an abstraction; it is also a distorted encoding of the sensitive experiences of the researcher or actors" (Wacheux, 1996). The produced knowledge is recognized as subjective and contextual instead of universal. It remains provisional and limited in time.

Weick (1989) recalls that any theory is guided by realized choices of the researcher (so it is always at least partly subjective). Indeed, when a problem arises to the researcher, it develops different scenarios (variation), choose some that seem likely to him (selection), then retains one (retention). Therefore, the entire process is guided by the researcher's representations, according to the selected criteria. Since we cannot go directly to reality, we must be aware of the dissociation between the observed reality and its measurement and thereafter try to represent a problem in the most precise and relevant way possible, by expanding the scope of possibilities (from both a theoretical and methodological point of view) in the variation phase.

Watzlawick (1978) distinguishes two aspects of reality. According to the author, an aspect would be objective in the sense that it relates to the physical properties of things and "is intimately related to a correct sensory perception, in the "common" sense or to a verification objective, repeatable and scientific, whereas the second aspect concerns the attribution of meaning and value to those things upon which the communication is based" (p. 137). And while the first aspect of reality may lead to consensus and can be accepted or refuted as a result of evidence, in the second aspect, speaking about what is "really" real would be absurd.

As Berger et al. (1994) argue that the question of reality always implies a "social relativity": reality (the second order, according to Watzlawick (1978) differs according to the context and role played by individuals. Our work is situated in a relativist conception of knowledge, or in the second order of reality according to Watzlawick (1978). Indeed, we do not consider that we will discover a truth that already exists prior to our observations. On the contrary, we will try to interpret the representations of students and faculty members and other actors interviewed, to build our own representation of what we call the appropriation to mobile technology. This concept of appropriation to mobile technology probably does not exist outside our own perception, but it has an interest from the moment it makes sense, where it sheds light on the role played by the implementation of mobile technology in the daily life environment of university's participants specifically students and faculty members.

As a result, we do not deny the interaction or dependence or existing between the object under study and ourselves, as well as our role in the eventual change of the observed fact: "By changing what he knows about the world, the man changes the world he knows. By changing the world in which he lives, the man changes himself" (Goudge & Dobzhansky, 1961). We are very much aware that our research subject, then our perception, can have an influence on the actors that we are going to meet because "we cannot not influence" (Watzlawick, 1978).

2.2.2. Construction of knowledge

Based on interpretivism, knowledge is built from the understanding of the meaning that actors give to reality. Two levels of understanding are then distinguished: firstly, it is a question of considering the way in which individuals interpret their own world, and then the way in which the researcher interprets the subjective meanings that underpin the behavior of the individuals he studies. Girod-Seville and Perret (1999) summarize the act of understanding as "to find the local meanings that the actors give, that is to say the meanings located (in space) and dated (in time)". The authors specify that this definition of understanding is shared by constructivists, except in two points: the researcher participates in the creation of meaning, the path of knowledge is then built as and discoveries.

Moreover, the constructivists suppose that we must consider the objective of the researcher teleological hypothesis (Le Moigne, 1993) which highlights the fact that the construction of knowledge is dependent on the intentionality of the subject. As far as the journey of knowledge is concerned, we are in a stage of theory construction. Although we presented this work as steps for educational purposes, these were not established in such a categorized way. Indeed, the research question only appeared at the end of the journey, the subject only evolved as the process progressed and frequent back and forth between the fields and the theories of various domains to which we have referred.

The observation cannot be kept down to its total dependence on theory, as the critics of inductivism do: "Observations and experiments are made to test or to shed light on a theory, and only the observations related to it are worthy to be noted" (Chalmers, 1987, p. 67).

As we explained in the first part, the world of appropriation is complex and we want to understand comprehensively the complexity of the mechanisms of the appropriation with the mobile technology. As we consider that the research question is the result of our work on the field and its confrontations with existing theories, we are more in the perspective of interpretative research.

This perspective is more justified that we do not have well established theory in IS allowing to realize the global role played by the implementation of mobile technology in the learning and working environment of university's participants and even less in the university context. This object is new; it is particularly necessary to choose the logic of discovery. As Koenig (1993) regrets, the theory-building stage did not receive the attention that it deserved "as if the development of the theory mattered less than it's testing" (p.7).

However, as Chalmers (1987) states: "It seems to me that the history of a concept whether it is "the chemical element", "the atom", "the unconscious" or any other, begins with the emergence of a concept in the form of a vague idea, and continues with a progressive clarification phase, when the theory integrates accurately and becomes more consistent" (Chalmers, 1987, p. 134).

This concept is often born of analogies or metaphors have been taken from the related fields which make sense through back and forth between the theories and the observations that are made successively. Discovery allows creativity, and then creativity has to be justified by new experiences (Louart & Penan, 2000). That is why; Weick (1989) advocates the freedom of the researcher, so that he does not lock himself into a specific methodology but on the contrary inventive and multiplies paths lead him to the construction of his theory.

Our adopted approach is the discovery one, giving a large space to the field, playing an important role in the construction of the research object. However, we will follow the principle of abduction more than induction, since we will make very frequent returns to the theory to better interpret new facts provided by the field. Like the interpretativists, the focus is on the construction of meaning from the representation of the actors.

2.2.3. Value and status of knowledge

The question about the value of knowledge comes from the question of the criteria that will confirm the research. The choice of these criteria must be appropriate to the approach and the nature of the knowledge produced: "the applications of positivist criteria can be both limited and inconsistent for an interpretative research" (C. J. Thompson, 1990, p. 28). The principles of validity and reliability of positivist research are difficult to ensure for an interpretative or constructivism research since we consider that the meaning is constructed by the actors according to the objectives of the researcher, in a given context.

For interpretativists, a search is justified if it has an idiographic character (that is to say, if it makes sense in a given context: we look for particular cases and not for general laws). To achieve, the researcher must develop an empathic character, it means that he must seek to work on the interpretations of the facts given by the actors rather than focusing on the facts themselves. Therefore, if the research is carried out by another person in a different context, his discoveries will undoubtedly be different without creating a problem. Weick (1989) emphasizes the importance of creating meaning in the construction of theory. He opposes the idea that a theory has the ultimate goal of problem solving and its accuracy is verified by its own validation which eventually becoming an aim in itself. According to the author, a theory must first be relevant. Therefore, theorizing is not just a preliminary "true validation work" but is becomes the main part of any verification in science (Weick, 1989, p.524).

Furthermore, as stated by Glaser and Strauss (1967), the research evaluation criteria must also depend on the objective pursued. This is the theory generation instead of the verification of existing theories then the requirements are not the same. The goal of the generated theory is that it "works", it is useful in generating categories and properties that are appropriate for specific or general problems, that it provides reading keys coming out of common sense (Glaser and Strauss, p.31).

The real test of constructed theory becomes its practical utility for analyzing, understanding and changing situations. Therefore, the goal of interpretative research is to provide a dense description of an experience and the evaluation of research is consistent if it is based on perceptual criteria (Thompson, 1990). Thus, Weick (1989) proposes that the construction of theory is considered to be guided more by plausibility concern than validity. According to the author, taking into account the fact that speculation generated during construction are chosen based on how the plausibility is found, this judgment is based on the following criteria:

- l. It's interesting: it's the emotional point of constructing the theory. It is essential. It is a substitute for validity. This criterion shows that existing knowledge cannot answer the question asked and the new theory brings a new problem, not yet addressed or brought a new point of view;
- 2. It is obvious: this criterion can be both a source of meaning and insignificance. As the notion of evidence is relative, it is about looking at a hypothesis which, although it may seem trivial in one area, sheds light on another;
- 3. It is linked: interest is sparked when unexpected relationships are discovered;
- 4. It is reliable: we are interested here in the narrative form of the hypothesis discovered, in the search for link in a particular context. The hypothesis is accepted if it brings a missing element to the story;

- 5. It is beautiful: some hypotheses may have been retained because they held the sensitivity of the researcher;
- 6. It is real: this test relies more than the others a search for adequacy of the theory constructed with experience and practice. Weick (1989) states that, these criteria show how a theory is constructed through the representations of the researcher. These guide him and allow him (through metaphors) to notice a complex and dynamic reality. According to the author, "the fact that the construction of theory requires the use of representations is its strength and not its weakness" (p.529). The researcher must be aware of the burden of his representations in the speculation selection process in order to construct the theory with what Weick (1989) called a "disciplined imagination".

CONCLUSION OF SECTION I

The goal of this research is to construct a theory about the appropriation of students and faculty members to the adopted mobile technology. Many characters intervene, interact and play a role in the appropriation of university's participants within the implemented mobile technology. These are the peers, media, society, institutions and the university (director/ top management).

This appropriation is considered primarily in the university context, when a specific mobile technology adopted by the university and expected to be accepted and used by the students and faculty members. Our research question is part of a relatively new theory and in a new context (the students, faculty members and the university context), we propose to situate our research in a logic of discovery and theoretical construction.

If "the role of theory is to change the world view (the paradigm), it requires a break, an "abduction" that brings a new vision which repeats provisionally and communicates the interpretation of the researcher" (Dubois, 2000, p. 6). We understand that the theory that we are going to construct will be the product of actors' representations and we will approach through our own representations.

Aware of the burden of our representations in this research, we will try to develop a methodology that noticing as much as possible, a methodology that opens the field of possibilities to locate us in "the disciplined imagination" of Weick (1989).

The purpose of this research is to explore and describe the implementation of mobile technology by universities and its adoption and appropriation by their participants. This research is **qualitative research** (Giordano, 2003), A

qualitative approach is justified for issues that depend on the actors' experience. This means that researchers are more oriented on "behaviors, life stories, social interactions, organizational functioning or social changes" (Wacheux, 1996, p.32).

The research belongs to the **constructionism** in design research (Cross, 1999). Our research is a constant inquiry based on **interpretivism**. Our purpose is to understand from the field why universities adopt mobile technology, what are the uses by their participants, what are the induced changes and how participants respond to the induced changes in order to adapt to the new environment and mobile technology.

This implies for us a need to conduct research on the following (Wacheux, 1996):

- The stakeholders (faculty members, students, administration staff, director/principal),
- The environment,
- The implications (strategy and education).

In further, to structure our research, Section II of Chapter 2 addresses the methodology. Our research aims to understand what is going on at universities towards the implementation and utilization of mobile technology.

For this purpose, we conduct a qualitative exploratory research based on the grounded methodology. The goal of our research is to answer two main questions:

- Why is mobile technology used in higher education?
- How is mobile technology used in higher education?

INTRODUCTION OF SECTION II

In the light of the problem, this research is based on the logic of discovery. Consequently, as Maffesoli (1999) points out, "methodology is constructed on a case-by-case basis: we cannot think of it until we do the research". It can be described as a adjusting with the subject itself. Thus, while the research questions emerged in the course of the confrontation with the field, it was the same for the research design, which was constructed, step by step.

The problem has emerged from the field, and we have followed theory of grounded theory (Glaser & Strauss, 1967). This one recommends a number of methods which have been used to meet the theoretical objectives which have emerged as the research progresses.

This chapter describes the methodology used. It is presented in three stages. The first stage is the general methodology of research, namely the grounded theory of Glaser and Strauss (1967), as well as the principles that follow from this methodological choice (2.1.). Theory building researchers can combine several data collection methods like interviews, observation and archival sources (Eisenhardt, 1989, p. 536). We have not found empirical research done to understand the actors' perceptions and reactions towards the mobile technology in the university and thus, we decided to go in the fields of research and collect the information directly from those actors (faculty members, students, principals and staffs as well).

A second stage will be presented, successively, each of the stages realized on the ground of preliminary way. Two case studies carried out in two universities during 10 months. These are composed of the observation of faculty members, students, directors and a few administrative staffs (2.2.).

In the third stage, the final phase of the research will be presented, namely, 15 semi-directive interviews were conducted without constituting a "confirmatory" phase, based more on proposals from the literature review and the previous phases (2.3.).

2.1. Followed methodological principles: grounded theory

The appeal of this methodology is justified by the fact that we don't have prior research, the constituted theory, neither on the appropriation of university's participants with mobile technology, nor on the role of university in the adoption of mobile technology.

First part (2.1.1) is about to explain firstly the fundamental principles of the grounded theory of Glaser and Strauss (1967) and secondly to define the methodological lines followed (2.1.2.).

2.1.1. Grounded theory of Glaser and Strauss (1967)

Glaser and Strauss (1967), observing a lack of emergence of new theories in sociology, proposed a so-called "grounded" theory whose aim was mainly to provide a guide for researchers to use their creativity while following a theoretical development process. Grounded theory has been applied in various studies (Douglas, 2006; Goulding, 1998). Despite its adoption in various studies in the field of sociology, there is a lot of discussion about its difficulty for novice researchers who adopt it. Huehls describes how challenging is to understand the reverse process:

"The process reverses the order of empirical research – hypothesis generation followed by data collection. The idea that theories can be generated from data

-let alone qualitative date - contradicts the scientific tradition they were taught in elementary school science" (Huels, 2005, p. 328).

The aim of grounded theory is to produce interpretations that explain social phenomena. The starting point in the logic of grounded theory is "to escape the theoretical blinders of the dominant sociology, it is necessary to establish in the first place a theory arising from the interpretation of the data" (Glaser and Strauss, 1967, p.38).

The authors distinguish two types of theories:

- Substantive theories: concerning a field, studied in a particular time and context,
- Formal theories: concerning a concept,

The theoretical path follows the elaboration of a substantive theory (very linked to a particular context) towards the elaboration by generalization of a formal theory that would become context free. Moving from one theory to another requires the sharing of substantive theories on the same studied concepts in different situations.

In logic of discovery, a researcher must first generate a theory related to the context. A theory contains several elements:

- -The categories: the conceptual elements of the theory (a variable such as "mobile perception");
- -The properties: aspects of a category;
- -The hypotheses: the supposed (and not tested) links between properties and categories discovered.

The constructed theory is not limited to emphasizing causal links but also to the discovery of conditions or processes. It allows the connection of concepts in a dense way. It mainly allows the description of patterns of interactions and their evolution among different types of actors (Strauss & Corbin, 1994, p. 278).

These are taken from the field, but are built by an abstraction made by the researcher. Once we have developed an understanding of the context studied, we seek in existing theories, those that make it possible to bring additional keys of reading to the discoveries. Thus, on the one hand, the data are not forced to adapt to a theory that would have been first. On the other hand, the theories invoked from the observed facts can be multiple in various fields. According to the authors, this method of research allows enlarging both theoretical and methodological boundaries.

According to the authors, the researcher leaves the field with a problem and a general theoretical perspective. The precision of his problem will emerge from the field of study. During this period, "theoretical sensitivity" will enable it to ask questions according to its observations. That is why the process of data collection (which group to study, how much, how to do) cannot be designated in advance: It will depend on the emerging theory. The process is actually iterative, data collection, analysis and review of the literature is being jointly. The theory is constantly being developed in the process of improvement.

Initially, data collection however is the main phase, whereas in the end, research is more governed by analysis. Indeed, initially, the researcher notes everything that he notices on the field. Then, once he starts asking assumptions, refining his work, he seeks to test the hypotheses that arise through new groups met. His attention then focuses on more precise points. Thus, the aid of reading relevant theories on the subject, relationships begin to be born and a theory to emerge. The theory is formed in the mind of the researcher on the basis of what Glaser and Strauss (1967) calls "the method of constant comparisons." This comparison

was made. Two levels: first, it is a question of comparing the different incidents highlighted in the speech of a given respondent. In other words, we try to establish links between categories and properties discovered in a specific case. The second step is to compare the respondents to each other. This is how the theory can be more easily generalized.

Comparison can be an endless process of research However; the researcher follows the principle of saturation then he can stop collecting data when new respondents no longer bring him the discovery of new properties or relationships. At the end, the theory takes shape and meaning, so then it would be publishable and shareable.

The method of "constant comparisons" is used in numerous qualitative studies of hermeneutic (Maykut et al., 1994). As Maykut et al. (1994) point out: "words are the way that most people come to understand their situations; we create our world with words; we explain ourselves with words; we defend and hide ourselves with words". Thus, in qualitative data analysis and presentation: "the task of the researcher is to find patterns within those words and to present those patterns for others to inspect while at the same time staying close to the construction of the world as the participants originally experienced it.

According to Maykut et al. (1994), this method consists of going from the individual to the general, in two steps: the researcher finds a holistic understanding of each interview and compares iteratively with each other to take notes of differences and similarities. Any kind of information can be used for the construction of the theory like quantitative data, notes, interviews, documents, observations, etc. Glaser and Strauss (1967) argue that a researcher often develops a theory with his ideals and the value of his social class, or popular myths, without being aware of it. One way to limit the effects of these ideals is to multiply the sources of data and to focus on different actors.

As stated by Strauss and Corbin (1994), grounded theory is eventually used in a very open way by researchers from many different fields. In fact, they invent specific procedures, the grounded theory requires an adaptation to the specificities of the research object and the studied field. Grounded Theory is also often combined with other methods such as ethnography (Pettigrew, 2000) or phenomenology. Therefore, once the principles of grounded theory recalled, the following paragraph is devoted to the methodological principles used in this research.

Grounded Theory in a simplified four-stage model of theory development (Idrees et al., 2011, p. 192):

- The uncertainty stage: where the initial data gathered.
- The emergence stage: where the core categories emerged and link to theory development.
- The ambiguity resolution stage: where the grey areas are cleared up in the emerging theory.
- The maturity stage: where the literature appeared from the discussion of findings.

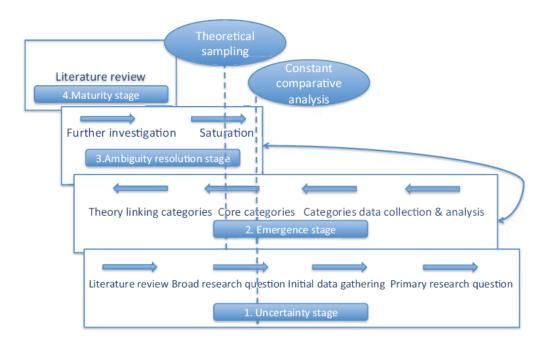


Figure 3 - Research Design (Source: Idrees et al., 2011, p.192)

2.1.2. The maintained methodological principles

The design of the research was truly constructed step by step according to the discoveries made in the field of research and after the confrontation with theories of very diverse fields. It is all about the researcher's experience and how he gives meanings to the different events (Huberman & Miles, 2003; Wacheux, 1996). However, it is possible to delineate three steps in the methodology implementation. The first step consists in understanding a particular context, which is university or the introduction to mobile application usage in the classes. Once this context was considered, the question of the relationship to the mobile application will be arising.

This conceptual question constitutes the second stage of research. Finally, the third step lies in the reconciliation of context (university's participants and the university) with the concept (the relationship with mobile technology).

These three steps are presented briefly in order to associate them with the principles of the grounded theory, the methodology discussed later in this chapter.

2.2. Description of preliminary phases

Although we consider that the entire realized work is exploratory, we call here "prerequisites", the phases that have helped to achieve the "final" phase, that is to say the case study. These phases represent a first immersion in the field. They aim to provide first results to refine the research question, and the methodology of the upcoming case study.

2.2.1. Definition and objectives of observation

Observation is a technique widely used in the management science study (Ghiglione et al., 1998; Michiels- Philippe, 1984; F. W. Taylor, 1911) and especially in the field of analysis and systems business. In order to better correspond to technological choices with organizational strategies and choices (Gavard-Perret et al., 2012, p. 165). The observation refers to a mode of data collection by which the researcher observes processes or behaviors that take place within an organization for a specific period of time (R.-A. Thiétart, 2003, p. 238).

Observation is characterized by a double nature. Indeed, observation can be seen as a technique or as a strategy. Observation can be considered and understood as a technique for the collection of visible and / or audible primary data insofar as it

corresponds to an experimental approach to the study of a particular phenomenon.

2.2.2. Observation: preliminary data collection & exploratory investigation

In our literature search, observation represents a strategy of preliminary data collection and exploratory investigation. It corresponds to a participating observation and floating observation as well.

The method of floating observation is unorthodox way of investigation and getting information. In such a method we are supposed to stay responsive without focusing on a particular object. Pétonnet (1982) claims that in this way, we can get information from knowledgeable people through the chance encounters.

The participant observation characterizes the situations in which the researcher participates in the activity of the observed persons. The researcher has the double cap of professional and observer. The observer then has an internal point of view with a privileged access to certain observation data. He relies on his own professional experience, his intimate knowledge of the organization has adopted the culture and codes, to perform its collected data and conduct analysis. The advantages of this observation position stay in the relevant perspective and the ability to work on issues with strong strategic topics for the field, and therefore inaccessible to the external observer. It is also the possibility of rapid and effective access to the institutional component of the situations and observed problems, which can escape novices or external observers. On the other hand, the position of the internal observer does not always give the freedom of movement offered by an external observer position, and it can also amplify the behavior biases of the observed persons, especially if the internal observer occupies a

hierarchical position which leads him or her to judge or evaluate the observed persons.

The participant observation can be part of a "action research" (Steele & Liu, 1983) or "research-intervention" (Hatchuel & Moisdon, 1984), whose principle consists in introducing a change in the organization to observe its effects.

It is the form of observation that aims to provoke the deepest interactions with the observed persons, going so far as to modify their activities internationally in order to investigate the research question.

The researcher who opts for observation as a mode of data collection must first define the situation as well as the sample that should be observed; the mode of data collection, the observation equipment used, and the mode of observation processing, position of the observer and duration of observations (Evrard et al., 2009, p. 139).

2.2.3. The observation

The first aspect of the method used, is the observation. The first choice to be made in terms of observation concerns the position to be adopted. It is difficult to know whether the presence of the observer changes the situation and behavior in the classroom. According to Dubey in(De Ketele & Postic, 1988), if the faculty member's behavior changes as soon as he feels observed, the students quickly find the behavior naturally. In any case, the observer must explain his role and objectives in relation to the class and decide whether or not he will participate in the work of the group (Kohn & Nègre, 1991).

2.2.3.1. Sample selection (Research sites)

In order to provide a preliminary result, case studies were conducted in two French universities. The three main reasons of our choice are as follows. First, both universities had adopted the mobile technology (iPad) since 2013. During our past 10 month's observations, we have been observing the user adaptation behaviors (Tyre & Orlikowski, 1994, 1996). Second, the way that they used the device at both universities had wide range of latitude and autonomy in their work which was important for studying adaptation efforts relating to the technology and their work regularity. Third, the mobile technologies were customized and their usage was strongly encouraged in both universities. The third reason importantly concerning the study of how assessment of the perceived consequences of the new technology might have changed the way users adapted. At both universities, users had very limited control in the pre-implementation phases of their mobile applications project (iPad project) which would be explained in the following section.

University A (First case study):

University A is a public engineer's school, part of the main university. The school is accredited by the CTI (Commission for Engineering Titles) to deliver the engineering degree in 6 specialties. These degrees are available in initial and continuing education under student status and for 3 of them, also through apprenticeship. Its' engineering degrees which are also recognized internationally through the EUR-ACE label jointly issued by the European Network for Accreditation of Engineering Education. It has 1049 students (including regular and apprenticeship students) in 10 specialties (including 141 students in apprenticeship), 110 permanent professors and 49 administrative staffs (including IT staffs). The majority of the faculty members in this school are between the age of 40 and 50. We selected 193 forth year regular students out of

288 in 4 specialties and 88 permanent professors out of 110 had been under study during our observation.

Since the beginning of the academic year 2013, it has been a year of the touch Tablet for university A. Every year, at the beginning of the school year, the school equips the 350 students with an iPad who enter to the 3rd academic year. Their objectives are to develop new learning methods in relation to current digital tools and to ensure that all students have access to the necessary information for their studies.

This Tablet is entrusted to them for the duration of their engineering program, in support of the educational innovation program which led by the teaching team.

The school A purchased its Tablet from Apple Company including two free training sessions for professors. To ensure the proper management of its fleet and spread of some 1,200 iPads, the school, in 2015, is equipped with a monitoring tool (MDM: Mobile Device Management).

This MDM solution allows:

- Purchase applications through the Volume Purchase (VPP) program and assign/remove users,
- Provide users with pre-settings via configuration profiles, for example:
- ➤ Lock devices or reset their password, remotely delete accounts or managed data, or completely erase a device,
- ➤ A professor would be able to lock the iPad to his students on a single application,
- Accurate inventory of the iPad fleet and reports.

University B (second case study):

School B is one of the French Grandes School in engineering. School B trains high-level engineers and their graduates often dominate the private and public

sectors of French society. Its general training prepares them for the professions of production, research and management in the different fields of engineering. The internationalization, competitive intensity and rapid evolution of technologies in the industry, are the factors that are taken into account in the training of its engineers through:

- An important part of corporate training and strong links with major industrial groups,
- Strong support for research
- Support for the transfer of technology and the upgrading of structures with an industrial pilot unit, a technology hall

School B delivers degrees in 6 specialties which are available in initial and continuing education under student status and also through apprenticeship. It has totally 350 students, 40 permanent professors and 130 permanent researchers. The majority of the faculty members in the school are between the age of 35 and 55.

Since 2012, this school decided to make a digital pedagogy revolution with a touch-screen Tablet for every student engineer. Every academic year, students receive an iPad to train the future engineers. School B believes that the evolution in its pedagogy methods can enhance good digital practices, creativity, innovation and student responsibility.

"In the framework of pedagogy improvement, since September 2012 we introduced digital Tablet to modify our teaching way in this engineering school. We made this choice for having a pedagogy method which is more active and make students more active in their programs. Tablets are bought by the university and they are lent to each user. For the moment the project represents a development year by year and currently it is the first engineering school which benefit from digital Tablet" says professor in charge of the ICTEs mission.

At the beginning, the school is distributed Tablets to 15 students of apprenticeship then in September 2014, they equipped 100 regular students of the fourth year of engineering with Tablet (iPad) along with new apprenticeship students. All of the 40 permanent professors and IT staffs are equipped with Tablet as well. The school purchased Tablet from Apple Company including two free training sessions for professors. According to the nature of every subject, they bought the appropriate applications as well with the cost of 1, 4 or 10 euros.

In September 2014, the school decided to implement mobile device management (MDM) thus; it made the required changes (installing server component, new computer engineer...) in the IT department of university as well. MDM is a way to ensure professors stay productive and do not breach corporate policies.

The school can control activities of the students and professors by using MDM products/services. MDM primarily deals with corporate data segregation, securing e-mails, securing corporate documents on devices, enforcing corporate policies, integrating and managing mobile devices including laptops. MDM implementations may be either on-premises or cloud-based. A professor would be able to lock the iPad to his students on a single application in the lecture or an open book exam.

Observation is the only method that was not prepared during the other exploratory phases. That's why we made a preparation of observation during the month of November 2014 in the meeting with the principal of the university and the iPad project responsible. This preparation made it possible for us to decide the role to be adopted and the categories on which to carry out our observation. The result of our preparation had been transferred to the professors by the university's principal. As a result of this methodological exploration, it appeared that we would present ourselves to the students as "a student doing work on mobile technologies" and our role would be presented as independent (we will not intervene at any time). Placed at the back of the classroom, we could easily take note: peer interactions, reactions of some students and mobile technology usage.

Using a class plan with the names given by its professor, it was easy to identify each student.

In addition, the observer can combine observation with interviews as part of an investigation strategy. This investigation strategy consists of being vigilant and attentive in the observation of the activity influenced by the context in which it takes place (called: located activity), people, physical, institutional and organizational contexts, the mobilized resources, the encountered problems, the actor's problem, the involved situations. These necessitates the full meaning of the researcher, who is the tool for gathering data in order to understand the research field (Arborio & Fournier, 2010; Gavard-Perret et al., 2012; Olivier de Sardan, 1995).

The purpose of the observation was to contextualize the research: to take into account the environmental data such as the atmosphere in the classroom when using Tablet (relations between users and mobile application, relationship between the professors and students) and the comments made by the students and professors.

2.2.3.2. The observed situations

According to the table 1, our observation was not only limited to the classroom but also we had a wide range of observation during different situations like break time, lunch time, project time, professor's meetings and laboratory. By observation the situations for a while, interesting information is floated to us. We could collect different kind of information related to each situation. Observation outside the classroom could be very helpful for collecting more data (real perceptions of individuals about mobile technology, interaction between individuals, mobile technology and organization). The observation took place in both fields of study during our full time observation (university A and B). The table 1 shows our observation in university A which has started on 20th

November 2014 and continued until the close of the academic year, 30th of May 2015.

Table 1 - Time spent (in hours) for observation of each situation during six months in university \boldsymbol{A}

Situations	Class (Theory)	Class (Practical TP/TD)	Project	Break (short break &lunch time)	Faculty members Meetings	Total hours without holidays
Hours	291	295	275	289	5	1155

The following table (Table 2) presents five different situations where observation has been constituted and data has been collected. Above table shows our full time observation during four months in the university B. The observation took 4 months from 15th December 2015 to 15th of April 2016.

Table 2 - Time spent (in hours) for observation of each situation during six months in university \boldsymbol{B}

Situations	Class (Theory)	Class (Practical TP/TD)	Laboratory	Break (short break &lunch time)	Faculty members Meetings	Total hours without holidays
Hours	178	158	187	176	5	704

We proposed to be present mainly at the time that the professors and students were using iPad (mobile technology) but sometimes we were attended the classroom without any utilization of iPad as well. This type of observation, called "non-systematic" (De Ketele and Postic (1988), since observation is not only a

means data collection, but also a source of additional information, allowing to take into account variables that could not be systematized and to flush out possible disruptive variables. We didn't chose systematic observation because it is often used in the case where we have very specified objectives or very specific hypothesizes to be verified. The emphasis on observational technology has sometimes led to an oversight or lack of support for issues of relevance, validity and transferability.

De Ketele and Postic (1988) assumes that the individuals being observed believe themselves to be in a natural situation when they are subjected to experiments. If the students are still in class in front of their professor, the "disruptive effect" is weak because we keep the usual and familiar character of the natural situation. According to the authors, this type of manipulation is recommended when we want to demonstrate rare behaviors.

2.2.3.3. Realization of the observation

The observation took place differently according to the classes and different places. At the beginning, we had asked some professors to contact us when a session with usage of mobile technology (iPad) was scheduled. As the professor was free to use iPad as he wanted, then our observations became irregular. Indeed, few professors never used iPad in their sessions while others often use iPad. We stayed in the class for the whole day, even if the course lasted only one and half hour, but we stayed in the university for the whole day. This is how we went into the same class, same professor but second group of students. Spending time with students and professors outside the classroom helped us to present in their discussions and collect their comments, remarks and critics about Tablet in their university, their satisfaction or issues etc.

After first week of observation, we could check the planning of all the programs of the university A (first field of study) online for the academic year 2014-2015. We decided to choose 4 programs out of 7 as the sample of our observation. These four programs were providing totally different subjects except some general courses like languages skills which were common among them. As we explained above some professors never did engage with iPad project (it means in which mobile technology was not used) and we observed their regular course (students).

Our intervention to university B was arranged by contacting one of the professors of the school who put us in contact with the responsible of Tablet project. In a scheduled meeting with her and the director of the school department, our intervention purpose and the usefulness of our research for their school as well explained. After one week, they made me a placement agreement (including school e-mail address) for duration of 6 months then we received a building badge entry and a Tablet as well.

We could find all necessary information including the teaching subjects, professors' names, classroom number and timings from the online planning of the school.

2.2.3.4. The Observed participants

The following table (Table 3) shows the numbers of students and professors in four different selected programs which have been observed during six months in the University of A. Participating in these four programs have given wide range of population which would let to collect various data. We could see also the perception and relationship of different groups of students and professors relating to the utilization of their mobile application. The observed students were the students of the fourth year of engineering. We decided to observe this level of students because they had already one-year experience in using mobile

application (iPad) in the university. We selected those programs which were in very different fields so that the professors weren't the same except some of them which has been counted and presented only once in the table below.

Table 3 - Number of observed participants and selected programs in University ${\bf A}$

Programs	A	В	C	D	Total
Students (Figures)	35	59	55	44	193
Professors (Figures)	22	21	22	23	88

The following table (Table 4) presents the selected sample for our observation in the University of B. the university B has totally 40 professors and we could observe 29 of them. This university stated their iPad project since 2014. The students are divided into two categories: apprenticeship students and regular students. We observed the second year apprenticeship students and second year regular students as well.

Apprenticeship students had two-year experience of using iPad in the university while regular students had one year less experience comparing to them. The following table shows you the number of participants that we selected them for observation. Regular students were divided to the smaller groups of 25. We were observing the same class several times for observing all the groups.

Table 4 - Number of observed participants and selected programs in University B

Programs	Apprenticeship	Regular	Total
Students (Figures)	15	100	115
Professors (Figures)	7	22	29

2.2.3.5. Observation tools

We have used note-taking as a means of producing a corpus of useful data for the analysis of the research object (Gavard-Perret et al., 2012, page: 197).

The used instruments for observation are as follows: the daily, the critical incidents and the logbook. In daily we are noted all sorts of assessments which are not encoded yet. The activities are presented in narrative form. This tool is especially recommended when observing a new world. The daily is then used to describe how the professor gave the course using iPad, how, in which level, for which kind of activities, facing which kind of issues. Student's behavior and activities relating to use of mobile technology was also under study.

Critical incidents are a technique used when we want to note significant actions or words on a specific topic. It is recommended not to use this technique to a multitude of topics. Therefore, we noted only as an incident critique anything said by a student on iPad, whether in class, in the lecture, outside the classroom, during group project. It is then specified: the place, the moment, the names of the speaker and the way of expression.

The logbook is a very rich diary with objective to report interpretations and feelings of the researcher. This technique is particularly interesting in an inductive research and where the subjectivity of the researcher is not denied.

In practical terms, the daily and the critical incidents were contained in a joint book and the logbook in a separate notebook.

The logbook was being used retrospective. We mainly pointed out the emotions felt by the actors (professors and students), the additional information given in a part (for example when we find out information about a particular student or a professor) and the "theoretical intuitions" (that means assumptions of links being based at that moment on an observed fact). This Booklet always available, the information can be handwritten at any time, but when we were isolated. Sometimes it was very difficult to find a right moment for taking notes of what we heard for example being in a casual discussion of students at the break time or lunch time.

We especially noticed very personal information for example how we felt in a given class. For example, we could tell whether a professor was touching us or whether someone else was terribly afraid of us.

However, during periods of observation, we constantly had the daily hand. Each visit to a class was noted:

- The kind of activities (eg taking notes, reading, quiz ...) that users (students, professors) do with iPad,
- The name and type of the course given by the professor (theory, practical),
- The reactions of each student related to the usage of iPad during the lecture (what we call "critical incidents"),
- The particular behavior of professors,
- The exact time that spent in each activity by students and professors

In class, we were at the back of the room, on a small table apart. We could move during group work. We never intervened unless the professor took us against our will. However, despite our interest we intervened in the "critical" discussion which happened sometimes about disability of iPad in that lecture because it seemed to us that the discussion was too much of an objective; few professors asked our opinion several times.

In the lecture, we strolled to observe certain groups from far away and sometimes to get closer and to try listening to certain dialogues since they were about the iPad. We talked with the students only if they came spontaneously to us, we did not want to represent a burden for them.

In addition, before and after classes, we tried to collect information from participating professors, other professors in the university as well as directors. The objective was then to allow a habituation to our presence in the university (which is relatively fast because any intruder is easily detectable in the university) and to take informal information about everyday life in the university so we soak.

Professors, for example, explained us the way they use Tablet in the class and which kind of issue they face sometimes or how useless is to have iPad in the class. Although this practice was not very "scientific", it is important in order to build confidence among the educational staff. Indeed, the reluctance of a professor towards our work could have negative consequences on our relationship with students.

2.2.4. Data analysis

Data analysis is carried out through the use of categorical thematic analysis, which makes it possible to give meaning to the data collected.

2.2.4.1. Ethical considerations

Kozinets (2002) points to the importance of ethical considerations as an essential step in data analysis (O'Reilly, 2007). The guarantee of the anonymity and the confidentiality of the data gathered in the university.

2.2.4.2. Returning to Members

Return to members materializes with some presentation of the results of our research to members of the community to solicit their interactions, feedback and comments (Kozinets, 2002; O'Reilly, 2007). We do not choose to return to the members because we do not choose to reveal our presence, affiliation and identity as a researcher

In total, our observations in university A (first field of study) covered 134 days (Full day) and 80 days in university B (second field of study). As we were present in the class, out of class, at break time, lunch time, meetings, group projects and laboratory.

2.2.5. Timetable of carried out case studies

The real work done during the case study is summarized in the following table:

Table 5 - Timetable of carried out case studies

Period											
20 th Nov. 2014	Observations hours in the first field of study (University A) (Total hours 1155/ Total days 134)										
To 30 th May 2015	(The	ass eory) 1 h	`	Class Practical, TP/TD) 295 h		Proje 275			ti	&lunch me) 3 9 h	Faculty members Meetings 5 h
15 th Dec. 2015 To	Ob	Observations hours in the second field of study (University B) (Total hours 704 / Total days 80)									
15 th April 2016	(Theory) (Practical, time) n						Faculty members Meetings 5 h				
20 th Jan. 2016	In	Individual interview with 15 participants of 3 universities (A, B and C) (Transcription: 122 pages) Average time for each interview: 35 minutes									
To		University A University B University C									
28 th May 2016	3 Professors	1 Principle	1 IT staff	1 Person in charge of iPad project	1 administrator	1 Person in charge of iPad project	3 Professors	1 Principle	1 IT staff	1 administrator	1 Person in charge of iPad project

2.3. The qualitative study

The next level of our qualitative research constituted of semi-directive interviews. The semi directive interview: presentation, definition, objectives and legitimacy of using this method.

2.3.1. Presentation and definition of semi-directive interview

Interviews represent ways of collecting and analyzing diverse data. They provide direct information on the phenomenon studied (Bares & Caumont, 2004; Hlady Rispal, 2002, p. 117). The interview is defined as "a conversation with a goal" (Kahn & Cannell, 1957), "a face-to-face interview where an interviewer aims to encourage a speaker to produce a speech on a Theme defined in the framework of a research "(Freyssinet-Dominjon, 1997). It refers to an interpersonal encounter that leads to a primarily verbal interaction, thus promoting the co-production of the data. These data are based on representations stored in the memory of the interviewee and which are reconstructed throughout their verbalization. These data can "inform us first about the thinking of the speaker and secondarily about the reality that is the subject of the discourse" (Albarello, 2006). The discourse produced by the interview is the continuation of a concrete or imaginary experience (Blanchet & Gotman, 2007).

2.3.2. Objectives and legitimacy of the use of semi-directive interviews

The interview represents a research method appropriate to a context or a situation where the reference world is ignored, or that one does not want to decide - in priority - the system of internal coherence of the information sought (Blanchet & Gotman, 2007). Moreover, it is perfectly adapted to the study of individuals and small groups. Individual interviews are particularly adapted for the purpose of demonstrating individual differences, exploitation of confidential subjects or complex individual processes (understanding, evaluation, decision, appropriation, immersion, mental imagery ...) (Gavard-Perret et al, 2012).

Semi-directive interviewing is the most widely used form of personal interviewing in management sciences and is characterized by a degree of introspection / depth of exploitation of the average respondent, as well as an average degree of directivity / intervention of the investigator (Gavard-Perret et al., 2012). The interview reveals the logic of an action and its operating principle. It exposes the elements that make up the phenomena studied and the rationalities specific to the actors, those from which they move in a social space. It thus reveals the processes and the "how" takes place (Blanchet & Gotman, 2007). This is the case of our study, which aims to understand how and why the various actors in the university use mobile technology.

In addition, the researcher must take into consideration certain operational considerations in order to carry out his interviews, such as: ensuring the diversity of socio-demographic profiles, favoring the diversity of profiles in relation to the object of the study. Ensuring that the semantic saturation is achieved following the analysis of the data collected, in the case where an additional interview does not provide any new information (Gavard-Perret et al., 2012).

2.3.2.1. Steps in the survey based on semi-structured interview

The first step of the survey based on semi-directive interview corresponds to the development of the interview guide.

2.3.2.2. The development of the interview guide

Semi-directional interviewing is carried out using a guide (or grid / canvas) of interview which consists of a list of topics / subjects that will be discussed with the respondents. The interview guide corresponds to "an inventory of the topics to be addressed during the interview and to facts which, at one point or another of the exchange, will be the subject of an intervention Investigator does not spontaneously approach them"(Freyssinet-Dominjon, 1997). This list of themes is carried out according to the objectives and the characteristics of the survey, based essentially on the questions that constitute the problem (Fenneteau, 2002).

An interview guide had previously been prepared according to the literature review of ICT adoption and appropriation which is constructed based of the result built from the empirical data collected and analyzed from our observation of research fields.

The researcher relies mainly on the chain of ideas of the respondent to evoke one theme before another. The citation order of the themes is not imposed. However, the interviewer must ensure coverage of all the topics in the interview guide. Indeed, these themes must be cited by the interviewer if the respondent does not address them spontaneously (Evrard et al., 2009). The interview guide usually consists of four parts following the funnel principle in their scheduling: The first part corresponds to the introduction (exposition of the general theme of research by fostering a favorable climate for the respondent. This general theme is followed by a presentation of the familiar theme of "warming" related to the activity of the respondent, his company ...), then the centering of the subject

represents the second part of the guide (guiding the respondent towards the heart of the subject), then deepening refers to the third part of the guide (free and in-depth expression of the respondent) and finally the conclusion constitutes the last part of the guide (Summary of responses and verification with respondent of the meaning of the answers, while ensuring that the respondent has nothing to add and then collecting his / her impressions) (Gavard-Perret et al., 2012). In addition, the interviewer must encourage a free expression of the respondent through his exposure to open and diversified tasks, deepening his answers, presenting new problems in relation to the subject - according to his answers and its confrontation with its contradictions. He must reopen with the respondent [the reminders are used to solicit the interviewee on aspects of that subject he dealt with too quickly or superficially (Chaudat, 1997) to stimulate his speech by encouraging them to perform reformulations (Gavard-Perret et al., 2012).

2.3.2.3. Access methods to the field of study and data collection

This study can be represented by the development of semi-directive interviews with the different categories of actors, namely professors, administrators, IT staffs, principals of education department and responsible of iPad project.

It should be noted that the selection of our sample follows the approach of selection by reasoned choice, that the sample size corresponds to 15 respondents, that the approach used for the sample is an iterative approach, and the sampling strategies chosen are the suitability strategy (Huberman & Miles, 2003).

Fifteen semi-directive interviews were conducted in the three universities (two are the same as our field of studies) with an average of 35 minutes per persons (lasted from 35 to 60 minutes). 7 semi-directive interviews were conducted in university A and 7 in university B. one interview only was carried out in

university C. This exploratory study was carried out between 20 January and 28 May, 2016. The place of interview was decided by respondent, either outside or inside of the premises of the university. One of the interviews was held via phone. We constructed our sample by snowball effect (by acquaintances), taking care to obtain a rather diverse sample in terms of gender, age, profession, role and responsibilities: we interviewed 6 women and 9 men; 8 persons between 30 and 40, 6 between 40 and 50 and 1 over 50 of different subjects were interviewed. Respondents are as follows:

- 2 administrators (selected from both universities (A and B)/ fields of study)
- 2 IT staffs (selected from both universities (A and B)/ fields of study)
- 2 principals of education department (selected from both universities (A and B)/ fields of study)
- 3 responsible of iPad project (1 selected from university A, 1 selected from university B, 1 selected from university C)
- 6 professors of different programs (3 selected from university A and 3 selected from university B)

These respondents constitute a varied sample composed of respondents from 3 universities in France (A, B and C) having different responsibilities in the university. It should be noted that we have chosen to focus on those who were mostly involved in the project of mobile technology (iPad).

Our interview guide takes into consideration the different functions performed by respondents. Aim of the interviews was to obtain information about perceptions of users (professors, staffs, principals) relating to the use of mobile application in the university. Questions were mostly referring to the determinants and reasons for organizational/personal IT adoption. Questions were centered on the relationships between organizational actors using mobile technology (it's perceived goal, or "spirit", its consequences and its equivocal potential), on the

organizational properties likely to influence the interaction between mobile technology and individuals. We focused on the environmental pressure as well.

More especially, precise questions were asked from respondents about the reasons for mobile tool adoption by universities, the origins of the mobile technology adoption decision, the role played by major actors in the adoption process, the goals sought by the mobile technology implementation, the allocation process of mobile devices within universities, the context of use (voluntary or mandatory), the relations between users and the initiators of mobile technology adoption of the university, the reactions of individuals vis-à-vis the introduction of mobile technology, the usage of mobile tools developed by individuals, and the users' perceptions about the use of mobile devices. Some other questions relating to the advantages, disadvantages and impacts of mobile technology on management, organization, processes and work situations were also the main questions of interviews. These questions were in the direction to understand the processes of adoption and appropriation of such mobile technology in education environment.

In addition, our method of data collection corresponds to face-to-face semidirective interviews and telephone interviews. These collected data allow constituting a corpus which will be the object of analysis and interpretation of the results. It should be noted that the interviews were recorded by means of a tape recorder. This tape recorder is a means of not distorting the comments of respondents (Evrard et al, 2009).

The interviews were tape recorded and transcribed in full (constituting a corpus of 115 pages, single-spaced, police 12 for a total of 12 hours of interviews). They were analyzed through a coding procedure.

They were the subject of a thematic analysis in order to identify the different types of practices and the different attitudes of the professors, staffs and university principals towards the utilization of mobile technology.

Informal discussion was held with professors and students before and after the observation which were drafted and also we took into consideration all the emails which have been exchanged between the principals and professors.

2.3.2.4. Preparation of interviews

All professors and principals of universities A and B were contacted by knowledge except the responsible of the iPad project of the university C. Among the 6 professors interviewed, 2 were women and 4 men, 3 were novice professors and 3 experienced professors, 3 were teaching mostly for practical subjects and 3 were professors of theoretical subjects.

2.3.2.5. Conducting interviews

At the beginning of the interview, we asked the respondents to define the mobile learning, like Luisi (1999) and to talk about how they do with mobile applications in their pedagogy. The whole interview was semi-directive. In addition to questions relating to the perception, usage and impacts of mobile technology, the questions centered on the reasons of adoption and also deployment of mobile technology.

The followed methodology was iterative, the interview guides were not identical to each other, but have evolved over time. Indeed, after each interview, a reflection was carried out in order to improve the following ones.

2.3.3. Analysis of interviews

The analysis of the interviews was carried out in two stages using the "Constant comparisons", as in Fournier (1998) and as suggested by Glaser and Strauss

(1967), firstly our analysis resulted in a summary of 2-3 pages about the situation of each user (professor, director and etc.), in which the relationships with mobile technology evoked by the user were described and how these marks were combined with the factors of adoption.

To analyze the data, we will use the analysis of categorical thematic content according to the steps recommended by Bardin (2007). Remember that these steps are: "pre-analysis", "exploitation of material" and "processing, inference and interpretation of results".

2.3.3.1. The pre-analysis

Pre-analysis is the first step in the analysis of thematic content, which aims to systematize the initial ideas with the aim of arriving at a structured analysis plan (Bardin, 2007). It is therefore a question of selecting the documents to be analyzed (which corresponds to the interviewees' comments and answers), to constitute the corpus (by grouping together the answers to the questions in the guide of interview), to read the text in order to define the objectives of the analysis and to establish the coding rules.

This analysis made it possible to try to understand each case in depth, and secondly the summaries were compared to allow a second analysis, the aim of which was to define the relationships between organizational actors on the technology used and on the organizational properties as well. The main lessons learned from this exploratory phase are both theoretical and methodological. The research could be developed from a theoretical and a methodological point of view.

2.3.3.2 Reading the text

Reading the analysis documents let come to your impressions and directions that can guide the researcher (Bardin, 2007). The researcher therefore performs repetitive readings of the chosen corpus while keeping in mind the research objectives and the consistency of this corpus with the problem and the central question of research. Thus, the objectives of analysis become more precise as we read. The readings of the corpus also favor the emergence of several ideas of coding and categorization that will be taken into account during the development of coding and categorization.

2.3.3.3 Coding

Remembering that coding constitutes a step of dividing the contents of the speech or the corpus into units of analysis and then classifying them into defined categories according to the research object (R. Thiétart, 2007). We will choose to adopt the method proposed by Glaser and Strauss (1967) who recommends using the inductive coding method or "open coding", which favors the division, examination / evaluation, comparison, conceptualization and categorization of data (Strauss & Corbin, 1990, page 61).

Open coding takes place in four stages: naming the phenomena studied (first conceptualization: passing a given, an idea, an event or an incident into a concept); Discover the categories (grouping of the closest concepts or observations); To give a name to the categories (a name proposed by a researcher) and to develop categories (definition of properties -characteristics and attributes and dimensions of the categories developed above).

For clarity, the description of the analysis of the case study as well as the exploratory phases will be presented in the next chapter in conjunction with the presentation of the results.

CONCLUSION OF SECTION II

The methodology established according to the principles of the grounded theory of Glaser & Strauss (1967), the design of the research has evolved according to the analysis and the results of the previous phases. If qualitative research, conceptualization is ongoing and iterative manner based on findings (Kohn & Nègre, 1991), this was the process of development of research design which consists of several stages.

The carried out tasks are from various kinds of qualitative method (observations, interviews), which is used for exploration. Each type of data is used together, in order to generate a theory. In other words, to serve as mutual support which, dealing with the same subject, make it possible to refine the theory under construction.

All the carried out methods are summarized in the following table:

Table 6 - Summary of all the performed tasks

	Principal Objectives	Means
1. First case study	- Knowing the uses of	- Observations in the first
	mobile technology (iPad)	field of study, University A
From 20th Nov.	among students and	(Total hours 1155/ Total
2014 to 30 th May	faculty members	days 134)
2015		- Class (Theory)- 291 hours
	- Recognize their	- Class (Practical) 295 hours
	experience of using iPad	- Project 275 hours
		- Breaks 289 hours
	- First comprehension of	- Faculty members
	the attitudes of students	meetings 5 hours
	and faculty members	

	towards the implemented	- Observe 193 students &88
	mobile technology (iPad)	faculty members
2. Second case	-Understanding the	- Observations in the second
study	perceptions and behaviors	field of study, University B
Social	of faculty members and	(Total hours 704/ Total days
From 15 th Dec. 2015	students about the	80)
to 15 th April 2016		<i>'</i>
to 19 April 2010	implementation of iPad	- Class (Theory)178 hours
	Decembring the second	- Class (Practical) 158 hours
	- Recognizing the occurred	- Laboratory 187 hours
	changes in the educational	- Breaks 176 hours
	environment of students	- Faculty members
	and faculty members	meetings 5 hours
	-Understanding their	- Observe 115 students &
	behaviors and responses to	29 faculty members
	the implementation of iPad	
3. Interviews	-Preparation the following	- Individual interview with
(faculty members	interviews with the	6 professors, 2 IT staffs, 2
& principals, staff)	(faculty members &	administrators, 3 professors
	principals, staff)	in charge of iPad project, 2
From 20 th Jan. 2016	, ,	principals
to 28 th May 2016	Responding to all of the	1
· ·	research questions	- From 3 universities (A, B
	1	and C)
	- Understanding the	(Transcription: 122 pages)
	strategy of universities	(=====================================
	towards the	
	implementation and	
	diffusion of mobile	
	technology (iPad)	
	tecimology (if au)	

CONCLUSION OF CHAPTER 2

In the light of the problem, this research is based on the logic of discovery. Consequently, as Maffesoli (1999) points out, "methodology is constructed on a case-by-case basis: we cannot think of it until we do the research. It can be described as a tinkering with the subject himself. Thus, while the research questions emerged in the course of the confrontation with the field, it was the same for the research design, which was constructed, step by step.

The problem has emerged from the field, and then we decided to structure our research around two main questions:

- Why is mobile technology used in higher education?
- How is mobile technology used in higher education?

This research question gradually developed after the confrontation with the field and the deepening of the literature in various fields. We have proposed the establishment of a pluralistic methodology, although mainly qualitative component, in order to answer a research question remains exploratory.

Then we built up our research around the following sub questions:

What are the uses of mobile technology in University?

What are the participants' perceptions of the implementation of mobile technology?

What are the reactions of participants to the mobile technology induced changes?

What kind of modifications made in order to adapt to new environment?

What kinds of modifications are desirable at University to incite mobile technology adaptation?

What is the university's strategy towards mobile technology implementation?

In view of the fact that the problem concerns a concept that is still unclear (the relationship to the mobile technology), which is applied to the particular individuals (the faculty members, the student, the principals and other users), in a specific situation and still little studied (the university), the grounded theory seems justified. Indeed, as Glaser and Strauss (1967) indicated: "The strategy to build a theory that can prove of a great importance is to work in non-traditional fields in which little technical literature exists. It is also a strategy to escape the chains of existing theories and contemporary insistence" (p.38). As the results from our literature review present a lack of empirical research about mobile technology in education and university's strategy in this regard, we decided to conduct a qualitative and exploratory research based on the Grounded Theory (Glaser & Strauss, 1967). This methodology deepen our understanding of the fields and let the theory emerge from our findings. This one recommends a number of methods which have been used to meet the theoretical objectives which have emerged as the research progresses.

The objective of the section II of this chapter was to present the work carried out jointly with the construction of the research question. The research question and the methodology have been the subject of separate parts but for presentation purposes, both have been built in interrelation with each other.

The Grounded Theory can be challenging in many ways for a PhD research: it is time consuming and the burden of data may create some confusion. To avoid some confusion, we used an adapted methodology purposely designed for PhD research to present the different stages and conducted actions in detail. This methodology is structured with four usual steps of the Grounded Theory as follows:

- 1. Uncertainty Stage
- 2. Emergence Stage
- 3. Ambiguity Resolution Stage
- 4. Maturity Stage

The purpose of this approach is to focus on the empirical field of research, to get an understanding of each university and university's participants at the individual and organizational level in order to be able to link all findings back to theory. In Grounded Theory, validity is not an issue but instead it should be judged by fit, relevance and modifiability.

During **the uncertainty stage**, we conducted a pilot study to understand what is going on in an engineering university (university A) which has been equipped with mobile technology (Tablet) since 2013. Firstly this was done through one month direct observation in one of its program including 36 students and 21 faculty members. Then we selected other 3 programs including in total 193 students and 88 faculty members and the time of our observation extended into 6 months equal to 1155 hours.

To select our field of research during the emergence stage, we conducted a survey in France among universities where schools and universities are going to implement the latest mobile technology. We selected one another engineering university (university B) which has implemented Tablet since 2014. Our case study carried out through 4 months (equal to 704 hours) direct observation in two programs including 115 students and 29 faculty members. During our research, we constantly compared our findings, the coded data, to the emerging incidents and to the emerging concepts to generate categories and to compare with the findings from the first field of research. We verified our findings with the preliminary result to extend our research and analysis to relate the empirical results to the growing theory.

During the third stage, **the ambiguity resolution stage**, further research was conducted. 15 additional interviews were conducted to understand how far the main university's strategy towards the adoption of mobile technology supports changes towards mobile technology appropriation. Some part of our data from the

previous stages and our fields of study coded and categorized in this stage to help in understanding the main strategy of universities in adoption of mobile technology.

The maturity Stage, during the last stage of our methodology, we compared our findings to existing theory. For each result, different theories were compared and various adapted models have been created.

The conclusion of this chapter (section I & section II) sets the stage for the presentation of research results in part 2.

CONCLUSION OF PART 1

The purpose of Part 1 was firstly to gain insight in the existing literature regarding the mobile technology implementation in education and to study the emerging questions. Secondly, it presents the questions and the methodology that will help us to answer them.

The study of the literature reviewed in Part 1 chapter 1 helped us to understand that the information revolution or the electronic revolution has introduced new models, challenges and opportunities for individuals, educational institutions and businesses. The information technology influences all aspects of life from the individual level to the organizational and societal levels. The growth in use of mobile technology has been revolutionary and the adoption of mobile technology becomes a global phenomenon. The interaction between the economic and educational systems extremely influenced by the technology evolution. Infusion of technology into the educational systems has become an essential for educational institutions to stay relevant in society.

However, academics are taking the opportunities, which are offered by each technological generation to show that it is possible to teach and study at the university according to other models and other arrangements of human skills and technical means.

Despite the institutional advances, the technical innovations of all kinds, engaged individual achievements in the field and the relations between pedagogy and technology continue to be a problem in many French universities. Universities are facing difficulties when it comes to technology. In these days, online learning universities and the global competition put pressures on universities and force them to change their educational and financial strategies in order to attract more students with smaller budget. Implementation of technology plays an important role in their strategies.

As literature links mobile technology implementation to managerial decisionmaking and to organizational priorities, we further gave an overview of university's strategies in adoption of mobile technology.

Our literature review studied the growth of digital education phenomenon and how it spreads worldwide. It further presented the various studies in mobile learning. One of the main conclusions of this literature review is that more rigorous empirical research is needed to understand the perceptions and adaptation process of university's participants. Furthermore, the literature review suggests a lack of theoretical consensus on adaptation of mobile technology in education and the strategies behind adoption of mobile technology in universities.

In order to structure our research, Part 1 Chapter 2 lays out the methodology. Our research aims at understanding what is going on at universities and how mobile technology is used in universities. For this purpose, we conduct a qualitative exploratory research based on the grounded methodology. The goal of our research is to answer two main questions:

- ➤ Why is mobile technology used in higher education?
- ➤ How is mobile technology used in higher education?

Various approaches were combined to answer our questions: case studies, observation and interviews. Several results emerged and each result was compared to theory. The following chapters will present our results and discuss the theor as well.

PART 2. FIELD RESULTS AND DISCUSSION

Once the problematic and the methodology explained, a last step and not least, consists in the analysis and the presentation of the results of the research as well as their discussion.

The presentation of the results requires several stages, corresponding to the multiplication of the research questions. A first global analysis highlights the presence of the mobile technology (iPad) in the daily school life of students as well as the work environment of faculty members. Following this analysis, a presentation of some selected observed situations and a selection of university's participants met is carried out. At the end of this contextualized presentation and a first global analysis, an attempt is proposed to understand the relationship between the implemented mobile technology (iPad) and the university's participants.

As we proposed in the first part to focus on the students and faculty member's daily life in the university without having a specific approach, it follows that we leave a large part of the presentation of the results to the raw speeches of students and faculty members. Therefore, many university participants' quotes are transcribed in the text, the way to get us closer to their concerns and their vocabulary. This is justified by the fact that we are trying to first approach the understanding of the mobile technology implementation through their own eyes, before proposing a subjective understanding of all cases observed.

In order to evaluate the interest of this theoretical construction, a discussion is then necessary to propose the contributions and the limits after having compared the results of the research with those of previous researches.

This section consists of four chapters.

The first chapter (Chapter 3) is dedicated to the description of the first general observations concerning mobile technology, as they appear in university participant's daily lives, as well as to the precise description of the carried out

case studies in two universities (A and B). This chapter plays an introductory role in the results section. As we started our research in the field of study through observations without a theoretical approach so the aim of this chapter is to describe, without trying to analyze.

The second chapter (chapter 4) is devoted specifically to the results explaining the perceptions of university's participants about the implemented mobile technology and the way they define mobile technology. Further this chapter shows the different was that university's participants assess the situation in which mobile technology involved.

The third chapter (chapter 5) is divided into two parts. The first part explains the actions taken by university's participants in response to the adoption of mobile technology and more precisely understanding the types of modifications they made in the process of adapting to mobile technology. The second part discusses not only adaptation at individual level but also adaptation at group and organizational levels which are essentials in the process of adaptation to mobile technology. Further this chapter, the consequences of adaptive behavior of university's participants is discussed as well.

Following the presentation of these results, we understand the university's strategy for the adoption of mobile technology and how far it supports changes towards mobile technology implementation and adaptation of its participants. This is the purpose of chapter 6. In addition, a review of the literature is necessary in order to evaluate the contributions and limits as well as the implications of the research.

PART 2

CHAPTER 3: Utilization of mobile technology

What is going on in the university? And how do university's participants use the given mobile technology?

Description of the realized 6-month observations (fields of study)

<u>Aim:</u> to describe two case studies without trying to analyze, play an introductory role in further result sections



CHAPTER 4: Participant's perceptions of the adopted mobile technology

How do university's participants perceive the induced changes brought by mobile technology?

Previous data (6-month observations- first field of study)
Discussion



CHAPTER 5: Mobile technology & Adaptation process

What are the actions taken by university's participants in the adaptation process of mobile technology?

Previous data + 4-month observations (second field of study)
Discussion



CHAPTER 6: University's strategy & mobile technology adoption How far does it support changes towards mobile technology appropriation?

Previous data + 15 interviews



Main Conclusion

Main results, Discussion, Theoretical and managerial implications Research limitations and perspectives

CHAPTER 3. DESCRIPTION OF REALIZED OBSERVATIONS

INTRODUCTION OF CHAPTER 3

This chapter plays an introductory role in the results section. As we started the research in the field of study through observations without a theoretical approach so the aim of this chapter is to describe, without trying to analyze. Some selected stories of the students and faculty members encountered during the case studies in the observed situations during 214 days. We try to transcribe the experience of students and faculty members in the discourse (the atmosphere in the class, the relationship between students and mobile device, the role played by the professor, the way of using mobile technology, the way of giving course with Tablet, etc.) as we have perceived it, with all the subjectivity that implies.

This offers the reader a first contextual understanding of the conducted study. It allows realizing the subjective aspect of research, in fact each classes, each situation, each student, each professor has specificities. It is important to underline them first, before erased them in an integrative model. The analyses based on the cases will be presented in the following chapters.

This chapter is presented in two stages. We describe the different observed situations of first case study (University A).

Generally we tell anecdotes of the students daily life and faculty member's work environment of the first case study in which the mobile technology implemented (3.1).

3.1. Place of implemented mobile technology in daily environment

Upon completion of the preliminary studies, it is appeared how implemented mobile technology is seen and used by students and faculty members. The objective of this part is to realize played role of the mobile technology in daily environment of university's participants. It is an introduction to the result of the meaningful case studies.

All types of data have been used to evoke the presence and utilization of mobile technology (iPad) in daily environment of university's participants: the observation in class, in laboratory, break/lunch time and meetings, informal chats and semi directive interviews (during the preliminary study and the case studies).

In preparation for giving the results which are mainly acquired from the case studies, it seems necessary to write about two studied universities in which the cases took place. These descriptions are essentials to understand the contexts in which the mobile technology has been used because the actions and reactions of students and faculty members are often changing. Therefore, they are difficult to control, as it might be a case in an experiment. The following sections are the reminder of the experimental part of the case studies. The descriptions of the situations are realized from the realized observations in the field of study.

The results of the analysis of collected data about the implementation of mobile technology in studied university (university A), are presented in three parts: the first part is dedicated to data restitution which demonstrate the utilization of mobile technology (iPad) in daily life of students and faculty members (3.1.1). The second part is dedicated to the perception of students about the given mobile technology (3.1.2). The third part relates to the utilization, experiences and perceptions of faculty members about the implementation of mobile technology (3.1.3).

First case study is conducted in university A which is a French engineering university proposing programs like Science in Information Management, Materials, Microelectronics and Automatic, Water Science and Technology, Biological and Agri-Food Engineering, Food Industries Science and Technology, Mechanics and Interactions. Since the beginning of the academic year of 2013, this university adopted Tablet touch (iPad). The observations took place in four selected programs during 6 months. The observed students were the students of the fourth year of engineering. 193 students and 88 faculty members were the participants of our study. We made the choice to describe in this chapter the story of a selection number of situations, students and professors do not bore the reader.

3.1.1. The role of mobile technology in daily life of participants

The implemented mobile technology intervenes in different moments in daily life of the students and faculty members. Through observations in the class, laboratory, during project time, break and lunchtime and meetings and informal interviews (chat), we have noted different circumstances. During each circumstance, the mobile technology intervenes in the activity of students and faculty members. The mobile technology is appeared in the expressions, class work, activities and the discussions in and out of class.

3.1.1.1. Class work

The impressions of students about the given mobile technology (iPad) have appeared in their comments/talks and class works as well. This part shows the utilization of iPad in practical and theoretical classes.

A: During theoretical and practical classes

One of the best evidence of the distraction aspect of the given mobile technology during lecture has been found in comments of students and faculty members. According to the conversations during small quiz and presentation, the distraction is clearly appeared. They show that extra efforts to use iPad applications don't let the students to focus enough to the lecture. Not only iPad doesn't make the lecture easy for them but also it brings more confusion. More time takes to connect to the application for a short quiz, sometimes takes more than 15 minutes, which is considered as wasting time for the professor. The professor used Nearpod app of iPad to share the contents with students, evaluate their level of participation and receive their results in real time.

Marina (after 10min trying to send her drawn answer in Nearpod app. of iPad): "I can't send my answer, I can't get connected, is it only my problem or anyone else?"

The other students: "same for us".

Professor Mr. smith (try to get connected with MacBook):" sometimes we have this kind of limitation".

Maria (the only students who draw her answer in Nearpod app/ addressing Max): "it is fun; I wish we could do the same for other quiz".

Max (addressing Maria): "I don't think so, it is just wasting time, and we can do the same on paper".

After 15 minutes everybody got connected to Nearpod app and professor asked them to draw their answer and send it to him.

Kevin and Jonson (confused and nervous, saying to each other):"I can't draw it in iPad, can you do it?"

Jonson (saying to Kevin while closing his iPad and connecting with PC of TP room): "I'm tired of this (means iPad)"

Megan, Pierre and Rémi drawn their answer on the paper and took a picture with their iPad then sent it through Nearpod Apps, they said to each other: "it's easier and faster to answer rather than drawing with iPad's apps".

Lucie and Alex drawn their answers on the PC of TP room and sent it to their iPad by using Gmail and Facebook then sent it to professor through Nearpod apps, Lucie: "I found the way to send it finally".

During six months of our case study, we observed few professors who kept using one application in iPad (Nearpod app) for sharing contents or exercises with students. They found it interesting but at the same time, they faced difficulties in the way of monitoring the students during quiz or exercises. They weren't able to block the students' iPads only on one application, then they were obliged to walk around in the class to monitor their students' practices. By using this application, they intended to develop an interactive relationship with all of their present students in the class in real time but they didn't have the necessary control on their online practices. Another exciting limitation is for those students who weren't present in the class and they expected to connect to the related application and do the exercises at the same moment with their colleagues. Nomad students weren't able to connect because the user authentication information was only shared with the present students in the class.

As we observed, mostly iPad is used as a notebook or a library, which help them easily to take their documents, books everywhere. Mostly professors send documents to students by e-mail or share them in intranet then students are able to download them and use their PDF files to edit during and after lectures. In the course of banking and finance, 24 students presented in the class; students used their iPad to download the questions, read them and answer them on the paper and few students were using iPad calculator which wasn't enough functional in their finance class.

Professor Mme. Marie (addressing students):"I sent you the questions by e-mail, download them then answer them".

In addition, they couldn't also receive the file by e-mail so they couldn't use iPad in the lecture.

Professor Mme. Marie (mocking) said "normally there is not a big use of iPad in the class, you receive the content of the lecture/exercises by e-mail and you do all calculations on paper, it seems no need of applications in this lecture".

Sina, the student (with low voice, smiling): "he forgot that we can play interesting games with iPad" he kept playing games till the end of lecture.

In the course of Microbiology, 24 students presented for practical lesson and classroom equipped with computers. The professor took 30 minutes of the course to take a short quiz (5 minutes). During 3 hours practical session, students didn't work with iPad except 5 minutes quiz. The conversations among students show that they don't find mobile technology useful in a practical course and the technology isn't fit to their needs and expectations. At the same time, the professor find out application e-clicker of iPad helpful to evaluate the understanding of students about each part of the lecture.

John (Student/program Microbiology and automatic): "Most of our classes are practical. In fact there is nothing to do with iPad"

Marine (Student/program Microbiology and automatic; addressing her colleague): "what we can do with iPad, nothing..."

Sam (Marine's colleague/mocking): "we can build our robots with it hahahaha"

Professor Ms. Sophie: (program Microbiology and automatic) "We cannot use iPad as a teaching tool; it is more a tool to evaluate my students at the beginning of every session, make an excel and sharing it with other colleagues and work on it at the same time"

Professor Mr. Ali: "I use iPad apps to get some short quiz at the end of the lecture, to know how much they understood from my lecture because I don't really have time to make questionnaire. I still give lectures in a classical way, using iPad takes a lot of time".

Laboratory assistant: "sometimes getting the percentage of their answers allows us to evaluate the level of student's knowledge about the taught topic".

In the class of IT management program, with the presence of 21 students, the professor Ms. Anne asked students for 10 minutes quiz. The quiz took 30 minutes of the course because of the difficulty in drawing answers in iPad and its submission on intranet.

Professor Ms. Anne (addressing students): "submit your answers on intranet".

Michael (student/addressing Ms. Anne): "can we send you by e-mail?"

Professor Ms. Anne (addressing students): "No that would be difficult for me to recognize whose file is it".

Classmates helped each other to send the files on intranet.

In the course of Mobile Robotics, 22 students were in the class, the classroom is equipped with computers and the professor use his laptop. Moodle is recommended to the students by the professor. Moodle is an open source learning management system which is available in App Store. Moodle didn't work and the professor wasn't able to share the needed file with students.

Professor (Robotic/ exhausted): "we must stop using these tools and focus on our lecture, it doesn't work as usual".

Celine (Student/addressing professor): "send us the file by e-mail please"

Ralph (Student/ addressing his colleague): "I got what to do. You write the answer on paper, we take a picture of it then send it to him (by e-mail)"

Antoine (Student/ addressing his friend): "by tomorrow, I must bring my laptop rather than iPad, there is no point in bringing it".

One of the best evidence of the lack of skills in using the given mobile technology has been found in a class where the professor except using the existing applications to share documents with students, he uses social media to do that.

Professor Mr. Mathieu: "I am going to share this file with you on Facebook".

Sina (Student/joking): "Facebook is the old fashion; let's switch to Instagram, haha".

We are observed that there is no use of iPad in some classes, not by the professors neither the students. Sometimes the prohibition of using iPad in the class is asked by the professor.

Professor Mr. John and Ms. Anne (addressing to students): "close your iPads please, I respect your choice but I don't want to see any iPad on your desk, we don't need that for my subject".

Professor Mr. Jacque: "We don't have time to play around by using iPad, I teach this course for the past 10 years in a classical way and it was always going very well".

In the first case explained earlier, some students don't have the needed skill or they couldn't find out the functionality of the given mobile technology. Whereas some of them don't see iPad fit to their learning needs and expectations. In most cases, the students focus on the entertainment and administrative aspect of this mobile device because they didn't have the possibility to work more seriously with iPad in the class (with instructor) and learn its functionality.

The following graphs demonstrate the most common uses of iPad among students during the class theory, class practical, presentation, breaks and projects. We present a sample (one and half-hour lecture) of their regular activity.

Figure 4 - Types of iPad uses and its time among students (Boys) in one and half hour lecture

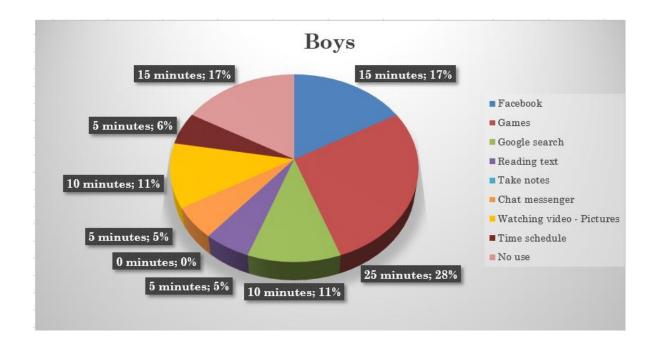
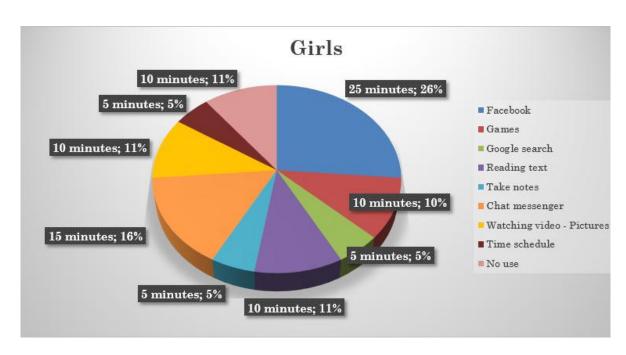


Figure 5 - Types of iPad uses and its time among students (Girls) in one and half hour lecture



We find that the students spent times on social media like checking Facebook notifications/ pictures, Instagram, chatting messenger or different search engines (Google etc.) for searching unrelated websites (news, e-commerce websites etc.) or games application; playing games individually or in group (group of same students in the class) or sharing sites like YouTube for watching videos. The other uses of iPad relates to reading documents (related to other courses), taking notes and checking their daily timetable (time and classrooms of other courses).

The above graph compares the average time that girls and boys spent on the indicated uses. The girls spent more times (average 25 minutes) on social media (Facebook and messenger) compare to boys (average 15 minutes) whereas boys pass more times for playing games (average 25 minutes) compare to girls (average 10 minutes). Moving from one link to another or one application to others leads to distraction and losing the concentration of students. The students spent average 7 minutes out of one hour and thirty minutes for reading; the given mobile technology diverted their attention from lecture to other activities because of its easy access to Internet and various available applications.

3.1.1.2. During Presentation

Presentations of 12 groups in IT management course. 2 groups presented their power points (PPT) with the help of their laptops, 8 groups use their paper notes while presenting their ppts and 2 groups had their iPad in hand while presenting their ppts. The students were supposed to listen to the presentation of every group and by the end of each, evaluate them online.

Marina (member of group A) was checking her Facebook notifications through her iPad at the time of her group mates' presentation and she lost her attention in the middle of presentation. At the time of the group A presentation, other 9 groups used their iPads for playing games, checking Facebook, chatting with messenger, searching on Google but for revising their project ppts, they always used their laptops. For the evaluation of group one, other 9 groups could not properly evaluate them because of losing attention during their colleague's work presentation.

The above evidence shows that the students prefer their laptop for learning and working purposes whereas they use iPad for entertainment and administrative motives. It is essential to explain that sometimes it is not the choice of students, the classical nature of their classes and homework doesn't allow them to develop their relationship with the given mobile technology, as shown in the following case.

The IT management class; 12 students were presented in the class. The professor divided students to 3 groups, the students received a book to read and prepare their presentation.

Hugo (loud voice/ asking professor): "can we have the electronic version of this book".

Professor Mr. Jean (addressing students): "No, you can't".

Valentin (Student/surprised): "Ha! No, seriously!!!

Gloria (annoyed) closed her iPad and put it in her bag

A practical course of enterprise simulation was held with the presence of 19 students who were equipped with computers. They carried out their iPads to the class but the professor provided them the data sheet of exercise and they needed only the system for their practical work so we couldn't observe any utilization of iPad. At the end, students tried to send their file to professor through Moodle but it didn't work.

Professor Ms. Karin (annoyed): "I was thinking that I know how Moodle works but still I don't know what the problem is".

One of the students (mocking/addressing professor): "these new tools are just wasting time; we can't even develop our digital competence".

3.1.1.3. During Project

In the most of observed cases, it was obvious that iPad became a game tool for forth year engineering students who were passing a very serious educational year; linking them to the job environment. Every group consists of two students that should do a final project (thesis).

By observing the environment, we could realize that each group has access to a private equipped room with two MacBooks. All groups were doing their project with PC (MacBooks), they needed software, space and high functionality for doing their project. During their project, we can see the presence of iPad not only as an entertainment tool but also as notebooks, document storage or e-books.

Sebastian (Group D/ just arrived to project room): "Ohh, I forgot to bring my iPad".

Leila (Group D/ joking/ replying back to Sebastian): "That's great, you won't play games today so you can finish your part".

Kevin (Group D/ saying to Sebastian): "Ah! Today we want to play group games with other groups, it is Ok, take Leila's iPad".

Sara (Group B/ asking Beatrice):"I don't have those documents, pdf given by the professor, what about you?".

Beatrice (Group B/ replying back to Sara): I have them always in my iPad and I don't need to carry papers anymore, hold my iPad and read them in this folder".

3.1.1.4. During break/lunch time

During six months of observation, we spent 286 hours with students in break and luck time. In fact, these moments allowed us to understand the point of views of students about the implemented mobile technology (iPad). The following conversations show the students' expressions about the given mobile technology:

Marc: "I don't see the use of iPad, I do everything that others do with my mini laptop, and I find it more efficient. Others say that it is easy to carry and my mini laptop is easy to carry too".

Chris:"I prefer coming to class with my laptop, I do everything with my laptop same as others but I think that iPad is just a business and doesn't have any pedagogical aspect".

Michael (laughing):" iPad is cool, what's wrong with you guys, we play games and we have fun".

Benoit (addressing Michael): "that's why some professors don't allow us to use iPad in the class".

Clement:" iPad is very good for the image of the university, attract new students".

Antoine (smiling/addressing clement): "It's good for our image too, when my friends know that my university lends us an iPad for free, they are jealous".

Raissa: "I never buy an iPad but as long as they gave it to us so it's good, I like to take notes with it and it's easy to carry but it doesn't change my learning habits".

Lili (foreign student): "I am not comfortable with iPad; I am not used to it. I did my two years in my country and I am in fourth year of this program, by the beginning I was thinking maybe it's new for me and I can't really use it but I saw that even it's worse for you guys. All of you just playing with iPad".

Rémi (laughing/ addressing lili): "joint us and play games, I am sure that you'll love it".

Lili: "I don't know how you can listen to the lecture at the same time".

Megan: "iPad is a replacement for pen and paper".

Hervé: "from the timetable you can recognize the courses in which we can't use iPad easily, check those courses in green and blue colors".

Morgan: "who take notes with iPad? Nobody, except Raissa and Rawia".

Thibaut: "maybe we learn the functionality of iPad if our professors use it better".

Max (addressing Thibaut): "the problem is that they don't know either".

During the informal conversations of students, we could discover the perception of students about the iPad itself or the iPad project of the university. Some of them believe that iPad can't change or develop their role as a student because this digital tool isn't fit to their needs and expectations. Some others perceive the iPad project as a strategy for promoting the image of the university and don't have any pedagogical aspects. Among students, iPad is just a cool and fun device which is good for their social image. Some students have confidence in iPad

project in condition that the university organize a specific training for students and faculty members. Other students assume that the new mobile technology can make their learning effective if it fits to the nature of their courses and vice versa.

3.1.2. Students' perceptions about the implemented mobile technology

The revealed themes in the definitions of mobile technology specifically Tablet. Firstly, it is presented in a table for the sake of clarity before being discussed. The following tables present different themes that are identified from the expressions given by the students. A selection of transcribed definitions is used to illustrate these themes.

Table 7 - Student's definitions about the implemented mobile technology (iPad)

Themes	Definitions
Social aspect	"It's good for our image among our friends" (Antoine). "Our university iPad project is good gives a good image to the companies that intend to hire us" (Théo). "iPad in our university give us value, it shows that we have experience of using latest technologies".
Administrative aspect	"I check e-mails only in iPad, regularly we receive courses materials so I check my e-mails and intranet a lot" (Michel). "iPad is a replacement for pen and paper" (Lucie). "iPad is a good tool for checking university schedule and timetables frequently" (Max).
Entertainment aspect	"iPad is cool, we play games and we have fun with it" (Michael). "iPad is a good device to play games easily" (Remis). "The first thing we do with iPad is going to social media, everybody does" (Morgan).

Mobile aspect	"I have all my documents in iPad and it's easy to	
	carry everywhere" (Raissa).	
	"I can study my course materials in the train when I	
	go to see my family in the weekend" (Nathalie).	
	"We can be easily mobile with iPad, like revising for	
	exams in the bus before arriving to the university"	
	(Max).	
	"iPad is helping me to study everywhere, I find it more	
	useful when I am not in school" (Rawia).	
	"iPad is a good tool for online courses that I wish to	
	have some" (Thibaut).	
	"It is bad that we must be in the class while we have	
	an iPad so then what's the sense of this tool?"	
	(Arthur).	
	(Armar).	
Personal	"iPad is good as a personal device and it does not	
benefit	mean that it suits to our educational space" (Jean	
	Christophe).	
	"Since I have an iPad, I am practicing how using	
	$mobile\ technology" (Jean).$	
	"iPad is a good tool for watching movies, better than	
	laptop and Smartphone" (Wilfred).	
	"As long as they gave us iPad, I do everything with	
	iPad like watching movies, taking picture, checking	
	social media apps etc" (Sarah).	
Fashion/	"Today is iPad and next year maybe another	
attraction	technology, it's fashion like in other industries"	
avii activii	(Marie).	
	"I know that technology evolves quickly but we must to	
	know that which technology fits more to our needs	
	30 /	
	otherwise it gets a fashion image which is our case" (Mohamad)	
	(Mohamed).	
	"iPad is in fashion that's why every student wants to	
	have" (Asma).	

Image promotion	"iPad is very good for the image of the university, attract new students" (clement). "I think that iPad is just a business and universities are involved in like other organizations" (Chris) "iPad is a good advertisement for the university, they can show that the university is equipped to the latest technology" (Lucie). "It is obvious that iPad is not for us, it's good for the image of university among those they are in competition with" (Alex).
Connectivity	"iPad let students be always connected anytime" (Morgan). "With iPad, we are connected in the class, in the campus and I can say everywhere" (Sophie).

Some of the students had the experience of using mobile technologies before but generally it is their first experience of using iPad. We didn't differentiate those few experienced students from others for two reasons: firstly there were few, secondly they had experience of using iPad few times and for a short period and mostly for personal uses which are considered in the following themes.

When we summarize all the collected definitions, we understand that the mobile technology implementation physically appears as a sign of fashion. It differentiates the students from their friends who study in another university where there is no trace of mobile technology implementation. Students talked about the value added by this new mobile technology to their social status (iPad allow us to show that we are the students who work with the latest mobile technologies). Actually, universities try to invest in implementation of mobile technologies because they know that it will attract new students and they will get a better image in high competitive market.

Many students indicate spontaneously the value of iPad project as an essential point. In brief, iPad gives value to the image of the university who adopted mobile technology and to its students and faculty members.

Other students take a position quite critical in ensuring that iPad is not fit to the needs and expectations of students and it's only adopted to promote the image of the university with its competitors. They believe that mobile technology adoption is only for the business purposes.

The other themes which are transcribed from the expressions of students are mobile aspect and connectivity. They find that iPad is useful because it's portable. They perceive that iPad allows them to study anywhere and anytime. If we take the term "Multi-contextuality" defined by Henfridsson and Lindgren (2005), it appears two fundamental dimensions of human experience: space and time "Anywhere, anytime". Enhancing the time and space, mobile technologies is in fact as catalysts for deeper changes (Kalika et al., 2013). Through the definitions of students, we see multi-contextuality which is defined by the author but the students argue that the mobile aspect of the implemented mobile technology is not compatible to the nature of their courses. To better illustrate this argument, here is some comments:

Marion (student): "I am a student of the fourth year but I have some subjects remained from my third year so then I have to pass them this year. I must attend all courses for being able to pass them. In fact, I have to attend various classes from current year and last year at the same time which create problem for me. Sometimes the professor takes short quiz in the class and I get zero because I am attending other class at the same time. The quizzes are normally multiple choice tests which are taken with Nearpod app but I can't take the quiz because I am not in the class, how is it possible? In this case what is the use of iPad? Mobile technology is given to us by the university while we still follow the traditional type of courses or exams. From the beginning I was so motivated for having iPad but in reality we can't be mobile and studying at the same time".

Silvan (student): "We are engineer students and our classes are mostly practical, before anything we need a PC to do the projects so in this situation, an iPad has no use for us. It is better that university invests in our damaged computers rather than an expensive mobile device".

In addition to the definitions, we realized some other themes which show the frequent use of students. The students consider iPad as an entertainment device that they play with it. Through the conversations of students, it is clear that there is a link between this definition and the previous one. It means that they don't find this device useful for their learning then it is just cool to be in a university which lends you an iPad for free. The other themes like administrative and personal benefits demonstrate those types of uses which aren't related to their education but somehow it helps them to learn how to work with a new mobile technology to answer their basic needs.

3.1.3. The utilization, experiences and perceptions of faculty members

In part (3.1.1.), we took a look at the faculty members in different situations and their way of dealing with the given mobile technology. In this part we describe our observations which have been held in the meetings and through e-mail exchanges as well, to better understand their experiences and perceptions about the implemented mobile technology (iPad). The students received iPad at the beginning of the year however; the faculty members had the choice. The university proposes them an iPad, which is optional if they desire to have one then they send a request to receive one.

3.1.3.1. Meetings

Meeting for professors of an informal meeting was organized monthly by one of the faculty member who was in charge of iPad project. The objective was the exchange of experience and question/ answers about their use of iPad. The duration of every meeting (called Café d'apps!) was an hour.

iPad project meeting:

- During 6 months, only 5 meetings were held.
- In the first meeting, only one faculty member participated.
- In the next two meetings, nobody participated; finally the meeting didn't take place.
- In the forth meeting, five faculty members participated.
- In the fifth meeting, four faculty members participated.

The iPad utilization of faculty members

Among average 25 faculty members in each program, we noticed that professors are engaged to iPad during their lectures. Normally majority of faculty members believes that iPad isn't a useful device for their subjects and they don't have enough time to find pedagogical aspects of iPad. They give their lectures with Macbooks even for presenting their ppts. Few professors use some iPad apps like Nearpod and e-clicker for getting short quiz (10 to 30 minutes quiz) for example:

Professor A (professor's meeting, addressing a professor): "as long as I am using e-clicker (iPad apps) I am aware of comprehension level of my students by measuring the percentage of their answers and having control on the knowledge of my students. Additionally I am able to collaborate with my colleagues easier"

Professor B (professor meeting): "I don't have enough time to practice this app and become expert and also I can't lose 30 min of my class for an optional quiz"

By considering the received comments, we realized that iPad makes a lecture more complicated and waste their teaching time. Few *professors* are satisfied of their digital class but at the same time, they don't use iPad more than 15 minutes in their lectures. The majority feels wasting their time for learning how to use iPad in their lectures.

During five iPad meetings of *professors* and responsible of the project, we understood that very few professors are interested to iPad project of this university and even these *professors* are not participating regularly for the meetings. In the first three meetings of the second semester, nobody came except responsible of the project and responsible of IT department. In last two meetings, we could observe some professor's perception concerning utilization of iPad:

Responsible of the project: "we have few professors who participate for iPad meetings!"

Professor A and B (his first time coming to meeting): "we don't have free time and we have sometimes many meetings, actually I prefer to come to the meetings and learn about an iPad application, use the experience of my colleagues who are expert for that app so we need less meetings but more formal and organized."

IT responsible: "we need to know that how many professors use their iPad and for which Apps because we should buy the license of those Apps for the next year and I just received few confirmations and also we will buy 300 new iPads for the new entry this year".

The director of iPad project said that only few professors are engaged with iPad project but still the university invests big budget to buy 300 iPads for students of new academic year. After two year running iPad projects, there is not enough output so the iPad project director is thinking to change to PC or other Tablets brand, still running iPad projects for one more year until making a decision regarding change of Tablet brand. As per my observation, the professors and the directors are not going in the same directions and professors did not seem satisfy with the strategies of the iPad project director.

Faculty member's experiences using iPad

The following table is a collection of faculty member's experiences and utilizations that are discussed during meetings, emails exchange and through the reports that made by the professor in charge of iPad project. The following table allows us to differentiate faculty member's situations towards the implemented mobile technology by considering their levels and types of uses or comments.

Table 8 - Presentation of faculty member's experiences using the implemented mobile technology (iPad)

Professor	Utilizations	Experiences	Remarks
Jacques Marie	"My first try this semester. I used Nearpod at every session and it works pretty well, we are limited to 30 students. You should not hesitate to launch Nearpod "in advance" to avoid the bottleneck when an entire class connects at the same time on their server to download the presentation. I used ECliker once, worked well and lively session but I lost everything right after. I used TeacherKit, but it's a bit heavy and not very practical. That said, I gave the students small positive / negative comments".	"Students are doing it very quickly and are even applicant once they are used to more interactive course sessions. From a point of view, it is a success, an interactive slide, all the 7-8 slides get the attention of everyone and creates (during comments, answers) a real exchange. Clearly if the iPad is out of the schoolbag, it must be used and solicit them with, otherwise they are tempted to do something else with this great gadget". Cell phone "forbidden" now but hard to enforce.	The use defined by the professor determines the extent to which the device should be used by the students
Paul	"Multiple choice Tests: Using eClicker (works fine on my side, I have not lost anything), Presentation: utilization "Explain Everything".	Feedback is very positive; it is a teaching tool really interesting from my point of view.	Appropriate to the use
Anne	"First attempt because of computer crash".		Technical failure, first try

Guillaum e	"I'm starting Tuesday 5/11"		First try
Jean	"Digital medium distributed to students since university owncloud. During the course some took a habit of taking notes 'all digital'".	"Training iBooks and complementary tools needed to conduct a course on this medium".	Dematerializat ion issue
Marie	E-Clicker was used for a 'continuous monitoring' evaluation. Two continuous controls of students unmarked after crashes".	"We have some maturity issues from last year.	Continuous technical issue
Clemence	"I have dematerialized all my course materials, which is comfortable. I would like to go a little further in the interactive (make students work on projects from resources available online) but I am still thinking about it".	"Do any applications exist for reverse class?".	Use hesitation due to lack of necessary knowledge
Karen	"e-Clicker is not appropriate for evaluation. Not stable enough. On the other hand, it is not bad for the evaluation of the concepts at the end of the course by some questions".		Limited use due to unsuitability to the needs
Rose	"Drawing etc".		Basic use
Karin	"Dematerialization of all course materials / tutorial classes".	"I noticed willingness of students to take notes directly on digital tools but sometimes they are still not fast and end up taking few notes. I would like to use an application eClicker type but a little worried for a class of 54 students. On the other hand, intranet is not practical for	Dematerializat ion leads to less efficient use Use hesitations due to numerous users Switching tool for performing the task

Jean- Christoph e	"I mainly use the Google Drive app to organize this course. The idea is to give them the course before and to organize the course to develop the concept. (They send me questions via GD), test their understanding (I found a script to do a multiple choice with GD, very nice) and go quickly on case studies. Objective: to make them the maximum actors and ensure that they arrive in class knowing a little bit of the course because we know that it changes everything! The link with the iPad is not direct, but digital access for all, greatly facilitates it".	uploading documents so I switched to Moodle". "Students were preparing the course a lot before. If the iPad is used to really rethink the pedagogy then it's a success".	Digital access to the documents facilitates thepreparation and transmission of limited knowledge iPad is considered as an incentive for new pedagogy rather than being just a tool
Caroline	"I assured the Jakarta videoconference in the first semester. The students followed the course thanks to their iPad.		Application response to the needs
Jacque	"Dematerialization of course materials; search for information during the tutorial class".	"Difficult to manage the use of the Tablet in class: many students play, surf on different sites, etc. no note taking!!	Difficulty in managing unrelated uses
Karin	"Dematerialization of orders and reports of virtual enterprises. The students make their cost calculation and their financial and accounting balance sheets on the Tablet and archive them (the game continues for ten periods".	"This course, based on the working group and spreadsheets, is well suited to Tablet use".	Course content suitability to the device

Ali	"Google Doc. for making a data dictionary and to agree on the vocabulary and it is used during the class".	"effective, Positive feedback. A little latency between the moment we start and the time they download".	Generally effective use but time consuming
Smith	"Full use of nearpod for multiple choice tests in reverse class frame: loading time is too long (15mn), reloading the page and data loss for some students, unable to load the MCT for some".	"Need a tool for multiple choice tests that works".	Data loss due to the technical issue
Hervé	"The same application allows to give the course materials, to have a discussion forum between students, and possibly to be able to give homework to the teacher".		New way of collaboration
Hervé	"Presentation with NearPod: works well in general (not always). Exercise collection in tutorial class + live or offline correction with Showbie app".		Barrier in use due to technical failures
Hervé	"Nearpod in progress for interactivity + course follow up + made some quizzes with ibooks author + also use the Tablet browser for Moodle activities (video viewing, responses to practical work/activities)".	"Happy students: "more fun", graphically showing things nicer than Moodle's quiz activities and happy to check that they understood some concepts after a class".	Data visualizations and features facilitating user comprehension
Anne	"For the presentation, I rather want to use nearpod but taking notes is possible? rstudio installation on a test server, it does not support simultaneous connections".	"Problem of dispersion of the students in course (surfing, e-mail). Little or no note-taking on the iPad. On the other hand, tool appreciated by the students for	Class dispersion due to unrelated use Lack of appropriate tool to control plagiarism

Céline	"Continuity compared to last	preparation of the course and quickly finds information in tutorial and practical classes. Answers for Multiple Choice Test (to be completed individually by the students before the class): not yet found the tool to customize sufficiently the multiple choice questions and avoid the "massive open online copying" "Problem with	iPad use appreciated particularly in tutorials and practical classes
	year. Students are very happy to interact. Evaluations are faster and more frequent; It is very good for continuous monitoring (continuous evaluation)".	nearpod because of the use of the free version (especially because of the limitation of the number of students who can connect) but the purchase of the license is planned for the next year. It would be much better".	of applicability due to high number of users
Julien	"I add annotations on the transparencies, or complete diagrams with GoodNotes and play videos with HD Player. I tried Office 365 to do directly Power Point but it's not good".	"A shared course with the FdS where students do not have an iPad".	Course preparation adapted to all the students particularly for those without mobile tools
Pierre	"I made a book on iTunesU that I share with students. I add and I share the content: chapter of lectures, tutorials and		Promoting digital discussion and

	students ask their questions directly inthe appI answer all of them and also those students who have the answers".		collaboration
Sophie	"Consultation of the course material and taking notes, Multiple choice test eClicker, progress score on a file shared with the other tutor of practical classes, board pictures at the end of practical session (group results)".	"Overall it's positive. Sometimes some problems related to the poor connection during the MCTs, solved with the return of wifi connection".	Barriers in use due to weakness of Wi-Fi networks
Smith		"They did the exam by cutting the Wi-Fi".	Monitoring students during the exam

The above table summarizes the comments of faculty members base on their uses and experience with the implemented mobile technology. They believe that their uses define the extent to which the device should be used by the students and this shows their learning aspects relating to the mobile device is shaping the uses of their students.

The professors find the functionality of iPad appropriate to their use particularly in tutorials and practical classes but at the same time there is some technical failure that distract the use. In fact what is taking our attention is that it is the first time that a number of faculty members try to use iPad after 3 years of iPad implementation, which brings a question "why are they engaging to this project this late? At the same time we have seen also those professors using iPad during one or two years but still it is very basic uses and it does not enough developed.

Dematerialization issue, continuous technical issue, poor network connection of university and data loss due to the technical issue are the elements that are mentioned by professors that considered as barriers in their uses due to technical failures and it is not related to their profile.

In addition, we have realized a lack of applicability as the result of the use hesitation, lack of necessary knowledge, numerous students in the classroom. At the end, there was limited use due to unsuitability to the needs. These elements show the misfit between use and needs of faculty members. The professors facing limitation in use lead them to switch tool for performing their task.

Despite the difficulty, they face in managing unrelated iPad uses of students (dispersion issue) in the class but they find that digital access to the documents facilitates the preparation and transmission of limited knowledge with their students and it considers as a new way of collaboration.

Some professors among others believe that they should prepare their course content in a suitable and adapted way to the mobile device and it will not be applicable when they have class within those students without mobile tools. They considered iPad generally effective but it is time consuming.

However there is a lack of appropriate tool to control plagiarism and they need still doing surveillance and monitoring students during the exam, which was held through iPad; thus it is paradoxical. Finally, we have noticed that the faculty members base on their experiences, considered iPad more as an incentive for forwarding them towards a new pedagogy rather than just a mobile tool.

The following section is a perspective of the motivations and opinions of faculty members in general about the digital classes or digital pedagogy. This part is a description of the observed situation.

Let's talk about digital pedagogy! Knowing more about the uses of digital tools for teaching:

A meeting arranged by the pedagogical engineers at the main campus of the University for the faculty members of different departments such as: Faculty of science, Faculty of education, Faculty of medicine, Faculty of dentistry, Institute of technology

The objective of this meeting is to engage the faculty members in digital pedagogy. The discussion was more around how to use Moodle and different platforms as the practices of professors.

18 faculty members participated in the meeting; they are as follows:

- 4 chemistry faculty members ("Quick Quiz on paper, it is better No?") ("our faculty is computerizing the information for marking exam papers")
- 6 information technology faculty members
- 1 medicine faculty member ("our faculty implemented iPad project in September 2016-2017 and recently we held the exams with Tablet and it was well worked")
- 1 management faculty member ("we suppose to use digital tools but I don't know why we still prefer pen and paper, Mocking")
- 1 law faculty member
- 2 language faculty members
- 3 math and physics faculty members

8 participants shared their experiences of using digital tools for their courses but 10 faculty members never used any digital tools. In general, 6 participants out of 18 used Moodle or QCM at least one time before but some of them stopped using it.

"I came only because my colleague is supporting me and without her, it is impossible"

"Moodle allows us to work together, I mean with my colleagues but we have the problem of computer system so we can't use digital tools"

"The implementation of the system is very complicated"

"It is quite strange and complicated for most of them when the instructor was explaining about e-learning and distance communication with their students with video conferencing"

"Instructor talks about Moodle which is an online platform at the same time a professor asked her to print the forms for them"

The instructor of the meeting asks everyone to play a game, which is called Photolangage. The Photolangage method used in the meeting to foster participants to express their thoughts about digital pedagogy (digital technology) in a spontaneous way. The symbolization activity results from the capacity to transform affect in feeling (feeling about digital pedagogy) by the word. Every member took a picture to express his feelings and the result of the game is as follow:

Table 9 - Express feelings of faculty members about digital pedagogy

Free fall	Share	Discharge of certain work
Freedom	Construction	Classic vs. Novelty
Race against time	Support	Lots of information
Discovery	Essential	Communication
Wonder	Incomprehension	Where to start
Exchange	Link/ Teachers, students	Lost
Multitask	Determination	No choice

CHAPTER 3 – Description of the realized observations

Multiple learning	Distance learning	Lots of tools
Serenity	Same destination	Bubble
Solitude	Lots of work	

Instructor concluded the game "the responses are generally positive about digital pedagogy"

- Most of the professors mock her conclusion and it doesn't seem they agree with her.
- Few participants seem interested in digital pedagogy

Raised questions:

- Why these faculty members came to this meeting? If it is for learning, why they are so negative about it?
- Which kind of interest do they have in knowing mobile tools?
- What are their conditions, relating to the technical system of the classroom?

Instructor made 3 groups of learning and asked participants to choose different groups relating to their needs. In fact, seven participants choose the work in distance, 6 of them preferred to learn about inverse class and 5 wanted to know more about collaborative work. Group of inverse class, the comments of participants are as follows:

"We can manage the timing more effectively (students studied the course before coming to the class, they have already studied the articles"

"In fact we are more in the classroom"

"Your teaching role starts in the classroom like answering the questions asked on the forum, professor respond to the questions during the sessions"

"We have to go through it all the time, it seems extra work"

"It's up to you to choose digital pedagogy"

"I don't see my teaching role in everything that you explained"

"It allows us to do our courses more dynamic but still it's wasting time"

"My course materials have high size and it's difficult to upload them on the platform"

"If all the professors want using this platform then our students get tired of too much homework and not having enough time to do them, then they will be less efficient"

CONCLUSION OF CHAPTER 3

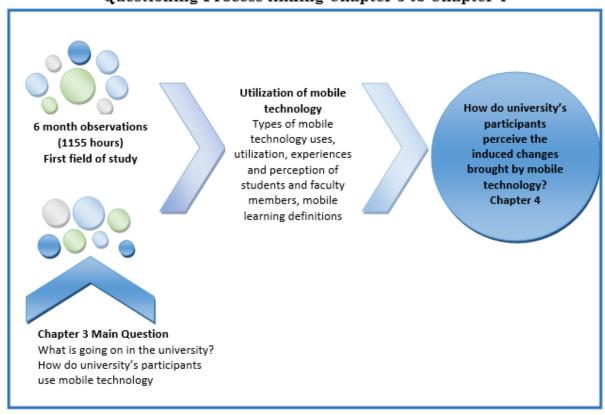
The purpose of this chapter was to show the place of the implemented mobile technology (Tablet) in daily environment of students and faculty members (university). At first, we have shown the interactions and utilizations of university's participant with Tablet in a natural way. We presented the different situations and stories of students who we met. In each class or situation after description of the class, subject and situations as well as the atmosphere of the class between students and the professors, also we described how Tablet had been used. Secondly, we described the meetings and e-mails of faculty members with the professor in charge of iPad project in order to better understand the established relationship of faculty members with this mobile technology.

Reading the stories of university's participants containing some details about the context, we highlight the difficulty of the exercise in order to understand the established relationship between the university's participants and mobile technology as the number of important factors involved in this relationship. Concerning students, their perceptions may have an effect on their relationship with the given mobile technology but it isn't the only factor, the experience of using Tablet may change the existing effect. The different actors may influence students' perceptions like peers (especially school friends/classmates) and the faculty members.

This chapter is the presentation of cases, individually, collectively and class by class which is a first step of our preliminary results. Chapter 3 opens the way for an associated analysis specifically concerning the perceptions of students and faculty members about the mobile technology implementation (chapter 4). The next step is trying to understand the adaptation behavior of university's participant towards the adoption of mobile technology (chapter 5).

Further chapter 6 aims to understand the strategy of university towards the adoption of mobile technology.

Questioning Process linking Chapter 3 to Chapter 4



PART 2

CHAPTER 3: Utilization of mobile technology

What is going on in the university? And how do university's participants use the given mobile technology?

Description of the realized 6-month observations (fields of study)

<u>Aim:</u> to describe two case studies without trying to analyze, play an introductory role in further result sections



CHAPTER 4: Participant's perceptions of the adopted mobile technology

How do university's participants perceive the induced changes brought by mobile technology?

Previous data (6-month observations- first field of study)
Discussion



CHAPTER 5: Mobile technology & Adaptation process

What are the actions taken by university's participants in the adaptation process of mobile technology?

Previous data + 4-month observations (second field of study)
Discussion



CHAPTER 6: University's strategy & mobile technology adoption How far does it support changes towards mobile technology appropriation?

Previous data + 15 interviews



Main Conclusion

Main results, Discussion, Theoretical and managerial implications Research limitations and perspectives

CHAPTER 4. FIELD RESULTS AND DISCUSSIONS

INTRODUCTION OF CHAPTER 4

This chapter is specifically dedicated to the result concerning the university participants' perceptions of the mobile technology implementation.

Through the description of the first case study (chapter 3), we achieved to the results of this chapter. The developed results are not still for the purpose of reaching the field conclusion but they rather constitute the avenues for reflections. These reflections are provided by the realized observations in university A (first case study) and they are lately confirmed by the data collected in the university B (second case study).

The presented results explain the way the university's participants including students, faculty members and directors evaluate the situation in which new mobile technology adopted by their university. We aim to answer to the question: how do university's participants perceive the adopted mobile technology? Answering to this question guide us to understand how they perceive the situation. This is the first step to understand the behavior of university's participants to mobile technology which would be discussed in further chapters.

This chapter is composed of three parts. At first, we discuss the perceptions of students and faculty members about the given mobile technology which is derived from their adoption logic at individual level and organizational level as well as their experiences of using the given mobile device (4.1.). The second part presents a comparison with the literature and a presentation of a conceptual framework concerning the link between the adoption and appropriation logic of the mobile technology which are made (4.2.). The third part explains the appropriation of mobile technology by university's participant base on the constructed conceptual framework (4.3.). At the end, emerging theory and discussion about the stream of research that provide significant insights into different aspects related to the user adaptation (4.4.).

4.1. The perceptions of university's participants

The individual behaviors differ from one individual to another according to their perception of the situation in which they are therefore this assessment is related to different acts (Folkman, 1992). In order to better understand of the behavior of students and faculty members to the implemented mobile technology, it is essential to understand their perception of the situation that differs from each other.

Based on our analysis we understand the perceptions of students and faculty members about the mobile technology which was adopted by the university. After the process of coding, we identified their perceptions into 4 categories: loss, threat, opportunity and challenge.

Some factors are similar between the students and faculty members whereas some of them are specific to students or faculty members. The following discussed categories evidently influence their interactions and utilizations with the given mobile technology which is the topic of next chapter (chapter 5).

4.1.1. Mobile technology perceived as a loss

This category of perceptions contains stress of students and professors, loss or harm denotes that the user has already sustained some damages. There is a distinct difference between the loss and harm. In our research context, loss tended to result from the feeling that an individual once had and it has been taken away.

Harm, on the other hand, was a direct negative consequence that was associated with the implementation of mobile technology. Since most of this appraisal is

represented by loss so then we focused on analyzing why university's participants perceived the given mobile technology as a loss.

4.1.1.1. Familiarity

Our initial codes show that how the professors and students do not feel familiar with Tablet and they hesitate to use it. They become exhausted of using Tablet because they are familiar with laptop. This feeling is important thing that we noticed during our observations. We coded this theme by the words like: not happy, exhausted and tired. Here are some examples who pointed out this feeling:

"It's been a long time, I can say 12 years of experience and I know very well how to do my job with laptop; laptop is like an old best friend. Why should we use Tablet? We don't know it" (Professor).

"I prefer coming to class with my laptop, it's been a long time; I do everything with my laptop" (Christ, student of university A).

4.1.1.2. Simplicity

This theme is another type of loss appraisal. The professors and students perceive iPad as a mobile device which is wasting their time and bring complexity in the way of teaching and learning. Refer to the previous chapter, the section of class work, students and professors felt using a complex mobile device. Some examples of the initial codes are as follows:

(after 10min trying to send her drawn answer in NearPod App): "I can't send my answer, I can't get connected, is it only my problem or anyone else?" (Mrina student, university A). "Same for us" (the rest of class). (professor try to get connected with MacBook): "sometimes we have this kind of problems" (professor, university A).

I can't draw in iPad, can you do it?" Kevin and Jonson (confused and nervous, saying to each other; students of university A)

"I'm tired of this (iPad)" Jonson (saying to Kevin while closing his iPad and connecting with PC of TP room, students of university A).

Megan, Pierre and Rémi drawn their answer on the paper and took a picture with their iPad then sent it through Nearpod Apps, actually they found it easier and faster answer rather than drawing with their iPad's apps (Students of university A).

Lucie and Alex drawn their answers on the PC of TP room and sent it to their iPad by using Gmail and Facebook then sent it to professor through Nearpod apps (students of university A).

4.1.1.3. Control over task

This appraisal is one of the important reason to perceive Tablet as a loss. Students were often upset that the university did not give the option for not using Tablet. In other words, they feel to be obliged in using Tablet and somehow they do not have any control over their vital situations such as exams. We noticed that students felt so much distraction during exams or quiz when they need having a comfortable situation. The following comments show that the students lost their control over exams because of the given mobile technology.

"I couldn't pass my exam because of Tablet. We had open book exam by using our Tablet but my Tablet did not block on one application so they took it and I didn't have any printed documents to use for the exam. Why shouldn't I have another option in such kind of situation?" (Lili, student of university A).

"I don't mind change...but I'd like the option to change it back if I don't like it...sometimes we don't know how handle things with iPad. Shouldn't university at least give us options instead of forcing it on us?" (Max, student of university A).

4.1.1.4. Satisfaction

Loss of satisfaction is the last theme that explains the perceptions of some students and professors who felt unhappy with the adopted mobile technology. Here are some comments specifically criticized Tablet while others expressed a general dislike.

"I know how to use it. I'm just not enjoying it" (Michelle, student of university A)

"This device is just wasting time and I don't appreciate to see that I lose the time of my class" (Professor, university A).

"Tablet is not productive for me, I learnt how to use it but at the end it made me sure that this mobile technology is not adapted to our pedagogical needs" (Professor, university A).

4.1.2. Mobile technology perceived as threat

This appraisal anticipated the stress and the loss that may occur in the future. Initially the students and faculty members negatively appraised the implemented mobile technology relating to the different factors which shape their perceptions.

4.1.2.1. Social influence

In our analysis we determined that the organizational decisions of mobile technology implementation are generally driven by imitation. The discourses show that universities adopt Tablet because other concurrent universities did, thus this puts an implicit pressure on them to do the same. Social influence plays an important role in the perceptions at the individual level (Venkatesh et al., 2003). This perception is considered as a threat. The following examples are presented to better understand this theme:

"Our university started using iPad because they noticed other universities adopt such mobile device and they copied them and they are waiting for the next revolution. The most important thing will be the image of university and not us" (Professor, university B).

"IPad is just a good thing for the image of university and we know that there is no other strategy behind" (Students of university A and similar comments noticed in the conversations of students in university B).

4.1.2.2. Task-technology misfit:

Many professors pointed out the fact that adoption of wrong mobile technology by university leads to a poor fit between mobile technology deployment and their needs. They believe that they are equipped with such a sophisticated mobile tool while they do not necessary needs this device for their work. The professors believe that they were received a mobile tool which does not satisfy their needs. Concerning the needs of professors and students in the engineering schools, they did not see any interest in the utility of mobile tool that is implemented by the university. The absence of consideration of users' needs would be categorized as

the second threat which is derived from our observations which were described in chapter 3. According to the discussed situations, some critical comments of professors are as follows:

"We don't see the point of using iPad in an engineering school. Base on the practical content of our classes we need mostly MacBook, laptop, PC" (Professor of university B).

"I asked university director to have a laptop several times which helps me most but they gave me an iPad instead!!!, what am I supposed to do with such a mobile tool? It is useless" (Professor of university A).

"They gave us an iPad which we didn't even asked for it and they never asked our technological needs and suddenly they came up with this iPad project. I didn't see how Tablet could improve our pedagogy" (Professor of university A).

4.1.2.3. Subjective norms:

This category refers to the perceived social pressure to engage or not to engage in a behavior. It is associated with the mobile technology use and acceptance as well as the culture of observed universities. The professors feel the fear of being seen as an ignorant person in front of their colleagues whereas the students did not have this kind of feeling. This perception is considered as a threat because the individuals felt pressure if they do not show their participations in the engaged behavior of their institution. The perceptions of faculty members present the occurred stress resulting from the acceptance of mobile technology by their colleagues. The implemented mobile technology perceived a threatening technology. We coded this theme through the conducted observations by analyzing the behaviors more than conversations. The fact that those professors who work together, they follow the behavior of each other or their presence in the

iPad meetings with an intention to show their participation and not an actual acceptance of the given technology. It seems explicit to discuss this category with the help of some examples as follow:

"I got hired this year, I was new here. I was afraid not engaging with Tablet project because my colleagues use it; I must do so if I don't use it then it won't look good in front of director of university or even my colleagues" (professor of university B).

"I was afraid to be judged irresponsible about the commitments (adopted mobile technology) of university" (professor of university B).

"My colleagues didn't like Tablet project, me neither" (professor of university B).

4.1.2.4. Prior experience

The experience of using mobile technology before the implementation of this technology had an impact on the perceptions of users. The perceived compatibility of the technology with users' experiences might influence user appraisal. All of the professors that we have observed, they did not have any experience of using Tablet. Some of them perceived mobile technology as a threat because they never used it and now they are going to bring this mobile technology into their teaching practices. However, many students who never had the experience of using Tablet, but they did not feel any stress for the lack of experience. This theme is appraised as a threat for faculty members.

"It was my first time using Tablet and I started to discover this device for the first time since 2013 that university brought us this technology. Only one session presentation of iPad didn't help me for knowing this device" (professor, university A).

"I didn't know this device. I need training. We need some people to be available all the times to help us in case of difficulties" (professors of universities A and B).

4.1.2.5. Privacy

To ensure the proper management of iPad and its spread, both observed universities have been equipped with a monitoring tool (MDM: Mobile Device Management). Some professors are worried to be controlled or to be dictated for the way of performing their tasks. The faculty members have the perception of being controlled or being directed by the university that raises stress for them. They have this perception that Tablet is threatened their privacy by monitoring their uses or time of usage so then this factor is categorized as a threat only for faculty members.

"I was afraid of losing my privacy after years of teaching experience; I don't want to do my job the way that they set for us" (professor of university A).

"I don't like to feel that someone controls me, it is about 15 years that I choose the most suitable teaching method for my students" (professor of university B).

4.1.3. Mobile technology perceived as a challenge

Challenges are appraisals that acknowledge the potential for future opportunities after certain difficulties that overcome. In this part, we explain how the expected

consequences of a mobile technology are appraised as an opportunity. In our conducted observations we noticed that initially some professors and students positively appraised the implemented mobile technology (Tablet) based on the different factors which shape this perception. This category is acquired from two types of factors. Some factors are perceived as an opportunity at the individual level (perceptions of faculty members and students) whereas other factors are perceived as an opportunity at the organizational level (perceptions of directors or persons in charge of iPad project of the university).

4.1.3.1. Perception as a challenge at the individual level

Subjective norms

As we know that the perceptions of individuals differ from one person to another. We better understand that subjective norms are already perceived as a threat by some professors but at the same time, it is considered as a challenge by others which show different perceptions relating to the same factor. The behavior of colleagues at work and also the culture of the organization has influence on the perceptions of others. In our analysis we found out that some professors of university A perceived mobile technology as an opportunity whereas the professors of university B considered it as a threat. When the professors saw the acceptance of mobile technology by their colleagues and they are willing to use Tablet so then they decide to use as well. This theme is mostly obtained from the observed behaviors of faculty members in the meetings that were the reason to accept and use Tablet.

"Since I saw my colleagues who I work with, they use Tablet and they seem to be satisfied, so it was a motivation for me" (professor of university A).

"My colleague 'Max' was very good at using Tablet, he was encouraging us to use Tablet also" (professor of university A).

Social influence

The individuals are also subject to social influence through a phenomenon of imitation, coming from the social group to which they belong. The positive perceptions of individuals linked to the obtained individual benefits in the professional sphere. Some faculty members appropriate mobile technology because they believe that it increases the prestige of their profession and it gives a new professional status. Sometimes mobile technology utilization brings new tasks and responsibilities for individuals. This factor is perceived as an opportunity.

"It is a good to say that our university equipped us with iPad like other organizations. My wife works in a firm that implemented mobile technology two years ago, I think it must start from the university but still lots of universities didn't invest in such a technology yet" (Professor of university A).

"As a professor of an engineering school, I am really proud that the school equipped us with new modern mobile technology (iPad) helping us to perform better" (Professor of university A).

In the same spirit, the professors feel appreciated as their university provides them the means to perform better. They appropriate mobile technology because it enables them to benefit from it in their private life.

Performance expectancy

In the same spirit, the professors feel valued as their university gives them the means to perform better. This would be a potential factor that is considered as an opportunity in the future. The professors perceive Tablet as an opportunity, which would help them to perform their tasks in a way that is more productive and to develop a new efficient pedagogy.

"As a professor of an engineering school, I am really proud that the school equipped us with new modern mobile technology (iPad) helping us to perform better" (Professor of university A).

"Mobile technology is not only a device; it would be a start for a better pedagogy in the early future" (Professor university A).

Learning curve

Learning curve is associated with introduced changes of Tablet and it is perceived as a challenge for the users. The professors as well as students are acknowledged the possible potential use of mobile technology if they learn its functionalities. To some extent, university's participants realized that learning how to use the iPad would help them being more efficient for example, they will not waste time using Tablet in the class or exam times. Learning is perceived as a challenge, which would bring benefits later. We observed this perception not only in the individual's conversations but also during our observations. We could observe the same class or same group of students and professors from 20 to 40 times, which gave us the possibility to notice their learning curve and performance during time.

(When the professors learn how to use the related application, they have the feeling to achieve a better performance or at least reducing the mistakes. Every session, they try the same application and it shows their improvement which motivates them to use again) observed in both universities A and B.

"Learning how to use Hive bench application helps to reduce extra work and I can receive and correct reports in the laboratory during the exercise (Professor of university B).

"Students think that by learning functionalities of iPad by themselves and their professors, then they can overcome on difficulties and experiencing an efficient pedagogy" (students of university A and B).

"Since I got iPad till now, I learnt a lot and I do much better. I expect using it more efficiently but it depends how much I learn about it" (Professor university A).

Adapt/change:

The willingness to change or accepting the changes creates a positive perception for users. This factor develops a positive perception for those faculty members who feel ready to change and intend to adapt to the situation. Mobile technology perceived as an opportunity by those professors who believe that universities must go forward in keeping with the society evolutions like other organizations. This factor is categorized as an opportunity.

"We should accept the change today otherwise we would stop here, the new generation will be equipped with the new version of technology and we as professors must get involved in this" (Professor of university A).

"Each year we have new entry students; they have a mindset a little bit different from the previous students. Over 5 years we have a huge difference and imagine in 10 years, it changes completely. They don't take the same type of teaching, so we should adapt" (Responsible of iPad project at university A).

"The laptop was a revolution at its age; mobile technology is at its starting age. We must at least try it" (Professor of university A).

"The world changes, we should get used to it at different dimensions" (Professor of university A).

4.1.3.2. Perception as a challenge at the organizational level

Social Influence

The first reason to adopt mobile technologies by universities is social influence at the organizational level. Social influence plays an important role not only at the individual level (Venkatesh et al., 2003), but also at the organizational level (Gallivan, 2001). In our analysis, we determined that the organizational decisions of mobile technology implementation are generally driven by imitation. The discourses show that universities adopt mobile technology (Tablet) because other concurrent universities did. It applies an implicit pressure on them to implement as well. This element is perceived as an opportunity at organizational level. This theme is extracted from the discourses of university's directors and the professor in charge of iPad project.

"We decided to adopt iPad because university A is using this device since 2013 and we were extremely confident that we would be satisfied as much as they are" (Department Director of university B).

"We didn't conduct any survey at our university before launching iPad. The other universities adopted this tool and why not us. It is good for improving our pedagogy" (the director in charge of iPad project of university A).

Effort expectancy

Universities adopt mobile technology and equip their individuals because they believe that the use of mobile technology is easy, effortless and individuals have a personal pre experience of using it. We understand that the elements of individual adoption can be found at the organizational level. In this part, we show that prior experience of mobile technology perceives as an opportunity at organizational level. The individuals generally have significant personal experience with the use of mobile devices before they enter the firm (Davis, 1989). The link of knowledge burden (Attewell, 1992) to the use of mobile

technologies is very light. Therefore, the mobile technologies favor the perceived ease of use. University's directors eventually are not considering that it is necessary to provide training programs in their technology deployment. They do not take into consideration that mobile uses of individuals are commonly private usages and they are different from their work nature. Effort expectancy is perceived as an incentive for adopting mobile technology only by the director of university B.

"I sometimes used my daughters' Tablet at home so I knew a little bit of it. There is almost everyone who has experience of using mobile application" (Department director in charge of iPad project at university B).

Innovative performance

In the same spirit, the university's directors have a positive perception about mobile technology implementation. They believe that mobile technology helps faculty members to perform their tasks in a way that is more productive. Improving the performance of students and professors in an innovative way is considered as an opportunity for adoption this new mobile technology.

"Our university equipped us with the latest mobile technology which is really motivating for us to perform our tasks in an innovative and modern pedagogy system" (Professor in charge of iPad meetings at university A)

"When our professor goes to a conference, presenting his work with iPad enhances image of his job" (IS director of university B).

"With the presence of such a technology, our professors challenge themselves to be more creative and increase the level of education of our university" (Department director in charge of iPad project of university B).

Top management commitments

Supports for mobile technology in the university have been found to positively influence some user's beliefs about engagement in the use of the adopted technology. This commitment appraised as an opportunity at organizational level. The following comments show that the university B understood that adoption of the mobile technology is not sufficient and they must to provide an organized training for the professors. The university's director commitment to iPad project influences simultaneously the perceptions of the faculty members about the implemented mobile technology at the individual level.

"Training is necessary for users to learn how to use mobile devices relating to the nature of their work" (Director of university B)

"For the year 2017, we'll organize a group of master professor in using iPad to help others and they will be paid for these extra working hours" (iPad project director university B)

"Maybe we change the mobile device later, it never stops, we need to change our pedagogy method and being more modern and innovative especially in our case as an engineering school" (Department director of university A.

As explained above, we understand that the elements of individual adoption can be found at the organizational level.

4.2. The theoretical analysis

In the last decade, the organizations have modified their structure and working process with ICT, mostly with usage of mobile phones, Tablets and laptops. Numbers of researches focused on organizational situations which have been transformed with mobile technologies. Most of the researchers in IS have been studied the adoption and appropriation of mobile technologies within the firms separately but in this study our objective is to understand the adoption and

appropriation process of mobile technologies diffusion within universities by analyzing the interaction between the individual, organization and mobile technology. This theoretical analysis represents the concepts of adoption and appropriation.

The analysis helps to understand adoption and use of the given technology. According to the existing IS literature review relating to the use of mobile technology, we realized that these technologies have specific characteristics which may largely influence the perceptions and behaviors of individuals. Nevertheless, mobile technologies may bring advantages for the organizations, but at the same time they may have unforeseen effects and consequences on individual usage, which may differs from their initials "spirit" (DeSanctis & Poole, 1994). The unforeseen effects of mobile technologies on individuals may finally discourage use and adoption.

One of the challenging issues facing the IS field is to understand how to implement IT successfully (Moore & Benbasat, 1991, p. 193). From a managerial aspect, the explanation of the factors of ICT adoption helps managers to improve ICT configuration of the organization in favor of the use by organizational actors. For this purpose, the researchers in IS focused on the analysis of the adoption of a technology by individuals within organizational contexts and very quickly many theoretical models developed in different disciplines such as psychology, marketing etc. As our concept is implementation of mobile technology in the context of university so it seems relevant to discuss the adoption and acceptance logic of mobile technology which is the framework of this chapter.

4.2.1. Review of individual adoption and acceptance models

Firstly, the adoption of innovations within individuals analyzed by the Theory of the Diffusion of Innovations (Rogers 1962). According to Rogers (1962), TDI identifies the factors of adoption at the individual level and analyze "the process through which an innovation is communicated through certain channels over time among the members of a social system" (p.5). This theory identifies the different elements which influence the individual adoption like the perception of the innovations' attributes, the communication channel, the social system and some others. He believes that the characteristics of an innovation such as complexity or compatibility define the adoption level.

The diffusion process brings up the adoption or rejection of the innovation by the individual. Moore and Benbasat (1991) applied TDI theory in information system to explain the factors of ICT adoption within organizations. TDI has some similarities with another theory called "Technology Acceptance Model" (TAM, Davis, 1989). TAM analyzed the elements to understand users' perceptions of adopting an IT innovation. Both theories have same spirit. Both models aim at understanding the individual use intention of an innovation but TDI focus on the whole process of adoption while TAM did narrow analysis to understand the predictors of ICT acceptance and use by individuals.

As the predictors of ICT use, the theory of TAM focus on the perceived characteristics of technology. The expected performance of ICT implementation depends on the acceptation of the user and is often limited to the reflection or doubts of users to use this technology. The benefits derived from the ICT integration are unquestionable by the organizations so however it is essential that the mobile technology is used and accepted by the organizational actors. According to Venkatesh and Davis (2000), the limited use of implemented ICT became one of the main issues of the "productivity paradox".

According to Ajzen (1985), TAM is considered as a fundamental model among IS researches on technology adoption. As stated by TAM, the intention to use ICT depends on the individual's acceptance of that technology which is measured by the use or intention of an individual to use ICT, presented by perceived usefulness and perceived ease of use.

Other studies have extended the TAM by adding other variables to it such as types of use or tasks, gender and culture (Karahanna et al., 1999; Straub et al., 1995). Venkatesh and Davis (2000) presents an extent version of the model TAM which takes into consideration some additional factors such as subjective norms and cognitive which determine the user intention. Taylor and Todd (1995) refer to the Theory of Planned Behavior (Ajzen, 1985) as the perceptions of internal and external constraints linked to the adoption of a behavior. Perceived behavior control speak about the perceived ease or difficulty to perform the behavior, in addition, the concept of behavior is influenced by behavior intention and perceived behavioral control. To unify these acceptance models, "Unified Theory of Acceptance and Use of Technology" (UTAUT), constitute three elements as determinants of use intention (Venkatesh et al., 2003): performance expected from use, expected efforts and social influence. The UTAUT model provides a rich analysis of acceptance behavior through identifying the determinants and adoption variables.

4.2.2. Limits of traditional models of adoption and acceptance

According to the result of this chapter, there are some factors that we are not able to understand by looking at the traditional models in adoption acceptance of ICT implementation. The concerned limits are as follows:

"Much of the inconclusiveness of prior research [TDI] can be attributed to a failure to recognize that innovation attributes can be perceived very differently according to the specific organizational context involved" (Zmud & Apple, 1992). According to Rogers (1962), every innovation has a positive value and the individual plays a passive role in the diffusion process. Therefore, the positive concern of TDI on innovation does not allow us to understand the rejection behavior and why sometimes individuals do not adopt an innovation.

In IS research, TAM models consider technology as univocal device and do not consider the effects of a technology, which may different considerably from one individual to another or from one organization to another. As mostly these models are applied to enterprises and less application to the adoption of technology in universities which is the context of our research as well as equivocal consequences of mobile technologies. It seems that these traditional models are unsuccessful to discuss the adoption logic of mobile technologies, which is currently considered as essential to education. Markus and Robey (1988) discussed that the existing theories such as TAM and TDI focus on adoption at individual level and fail to take into consideration the adoption phenomena within organizations.

Bhattacherjee (2001) finds that approaches from the TAM do not allow describe and evaluate individual behaviors beyond the first acceptance phase. He then proposes to explain the intention of the continuity of use of an IS in reference to three key variables: confirmation, perceived utility and satisfaction.

Certainly acceptance and adoption phase of IS are important and decisive in the process of implementation of an IS, but it is also necessary to take into account what happens after these two phases, that is, the post-adoption stage. Jasperson et al. (2005) defines "post-adoptive behavior" as an infinite number of technology

adoption and extension decisions made by an individual during the period of the introduction of the technology (Kim et al., 2007, Bhattacherjee, 2001).

We don't seek to use PAM model because firstly, the continuity of use is measured at the individual level as a stage in which the use of an IS becomes almost unconscious in the individual who makes it a routine activity (Bhattacherjee, 2001). Secondly, the stage of post-adoption is the last phase of the IS implementation process at the organizational level: (commit to using the IS acceptance - then infusion and routinizing of the system in the organization). Ideally, it would correspond to an "infusion" of IS in the organization. (Saga & Zmud, 1994). In addition, according to Jasperson, et al. (2005), the intent of the continuity of use in post-adoption considered as a part of a process that begins with IS acceptance and can only be investigated as a part of this process.

Therefore, the model PAM discuss adoption at the individual level like other classical existing models in IS and it fails to discuss the fact that individual perceptions have an influence upon the organization as well.

Chau and Tam (1997) question the validity of the TDI, in fact the TDI focus on the diffusion process among individuals as well generalizing the discoveries at the individual level to an organizational level, which seems a bias to emerge without any consideration of the differences and interactions between these two levels of analysis.

In the same spirit, TAM discusses the determinants of the acceptance at the individual level without taking into account the adoption logic of the group level. "There is often a complex social interaction process in which members of the group attempt to influence others so that a common orientation emerges" (Sarker et al., 2005, p. 39). Many authors explain that the adoption phenomena can be completely understood if taking into consideration the social dynamic of adoption.

To better understand the logic of adoption, some researchers consider factors related to the context of use or social influence, degree of training and organizational support, external factors (Venkatesh & Davis, 2000).

4.2.3. Adoption: not an individual binary decision

According to the classical models, adoption is considered as an individual binary decision for using or refusing an innovation. However, it seems more complex than this. In fact, these models consider that ICT adoption decisions are taken at the organizational level and individuals do not have the choice to accept or reject the technology. Whereas Gallivan (2001) underlines that, "These core frameworks were validated for many technological innovations where individual autonomy is permitted to adopt or reject an innovation. Evidences show that these traditional frameworks neglect the realities of implementing technology innovations within organizations, particularly when adoption decisions are made at the organizational, division or workgroup levels, rather than individual level" (Gallivan, 2001, p.51). The literature review shows that adoption has been analyzed at the individual level (acceptance or rejection of a new technology ICT) but Zaltlman underlines that adoption may appear at the organization level when the organization decides to adopt a new technology (Zaltman et al., 1973).

Adoption is a complex phenomenon, which appears with the interaction between individuals and organizations. Depending on this interaction, different kind of adoption may have seen. There is primary and secondary adoption. When the university decides to adopt a technology, this is called primary adoption. The implementation and adoption of this technology by the individuals would be the secondary adoption.

The external pressure may lead organizations to adopt a technological innovation or to act similarly (DiMaggio & Powell, 1983). The enterprises sometimes adopt ICT because of imitation phenomena, which are the case with adoption of mobile technology. For instance, in our second case study (university B), we realized that the university adopt mobile technology, because of imitation phenomena.

According to the study of Gallivan (2001), there are four different categories of adoption:

First case when an organization restricts the behavior of their actors by imposing them to use a technology innovation. It should be stressed that assumptions of mobile technology adoption and use by individuals are too strong in the traditional structure. The second case explains that technology is adopted at the organizational level where use is not instructed and in this way adoption may occur but technological use is not conducted. The third situation is related to the ICT adoption at the individual level, which depends on individual skills and experiences that is linked to ICT use. Furthermore, mobile technology implementation "become embodied in organizational routines, practices, and beliefs" (Attewell, 1992). The mobile technologies known as low knowledge barriers, they can be easily used outside of organizational contexts and then contribute to the practices in the organization. Other situation happens when the organizations and individuals do not adopt the technological innovations.

For example, the mobile technologies that adopted outside the organization, may influence the appropriation of it by the individual inside the organization. Therefore, it seems fundamental to relate both concepts of adoption and appropriation in order to better understand the full diffusion process of mobile technology within the universities.

Nevertheless, despite of these contextual elements that are a part of our result, we must acknowledge that the reciprocal interactions between organizations and individuals in adoption are not fully considered and the classical acceptance models fail to discuss the fact that individual perceptions have an influence upon the organization as well.

In order to better, understand the adoption and acceptance of mobile technology we need to go further of these models. Moreover, we wonder what are the impacts of different adoption processes on uses, individual behavior and particularly on appropriation of mobile technology by individuals. In the conceptual framework of this chapter, we aim to present the main reasons for mobile technology adoption with the help of reaction of individual facing mobile technology.

4.2.4. Structurationism and appropriation

To better understand the adoption and acceptance of mobile technology we need to study beyond of described models. These models fail to consider recursive logics of adoption, as an interaction between the individual and organizational adoption. According to the result of this chapter and the limits of the classical models, we rely on the appropriation concept, developed by structurationist frameworks.

Our objective in this theoretical part is to understand the adoption and appropriation processes of mobile technologies by taking into account the recursive interaction between the individual, the organization and the technology realized in structurationist models by Orlikowski (1992) and DeSanctis and Poole (1994).

However, individuals do not always have the choice to adopt, accept or reject a new technology but they have the possibility to develop different kind of usage of that technology. Therefore, the individuals may adapt to it through reinvention or appropriation process. This example shows the structurationist models which focus on appropriation inattention to the adoption logic. However, institutionalist theories show that external factors of adoption may influence internal appropriation by the individuals of the organization.

As the above situation is the case of our research, it seems necessary to develop our conceptual framework base on structurationist and institutionalist theories. Structurationism and appropriation structurationist and institutionalist theories enable us to understand new perspectives on the understanding of ICT adoption logic, equivocal nature of technologies and importance of appropriation process. The experience shows that the result of technology implementation differs greatly from one organization to another. This is because of wide dimensions of ICT.

Structuralism has been used extensively in IS research for thirty years to study the stabilities and changes in a social system following a change in IS. This approach has made it possible to emerge as much from a technological determinist as to focus on the strategic behaviors of the actors, and to highlight the structuring role of interactions around technology. It has given rise to various theoretical and methodological adaptations and variants (Jones & Karsten, 2008; Pozzebon & Pinsonneault, 2005).

The theory of structuration thus makes it possible to apprehend norms as sources of social structures emerging from practice, rather than as the incarnation of social structures having a proper and exogenous existence to the actors (Orlikowski, 1992). Adopting such an approach is a continuation of recent efforts within the project-as-practice research stream, aimed at better understanding what actors do in projects and why they do it (Cicmil et al. 2006, Blomquist et al., 2010, O'Leary & Williams, 2013).

However, in the SI domain, a new theoretical development "sociomateriality" has appeared in recent years to call into question structurationist approaches, to give more space to the material elements, and especially to avoid dissociating material and social (Orlikowski, 2007). Sociomateriality has given rise to lively theoretical debates, the content of which has been brilliantly staged by Kautz and Jensen (2013). As Leonardi (2013) clearly traced, sociomateriality is the result of successive adaptations of the theory of structuration to the study of the use of IS. At first, the structurationist versions proposed by Barley (1986) or Poole and DeSanctis (1990) led researchers to identify the emergence of a new organization or new group norms as a result of interactions between actors, modified by their use of the technical tool. Secondly, Orlikowski (1992) identified the technology as the central organizing element: the organizational structure corresponds to the aggregation of uses of the tool by the actors, who are engaged in power games during which the use of the tool allows certain actors to legitimize dominant positions. The author thus spoke of the "duality of technology".

This latest version of structurationism has been criticized because technology, although placed at the center, is obscured by the focus on the interactions between actors, their interpretations and the resulting norms of use. Empirical studies based on theoretical framework of Orlikowski (1992) have focused on describing social processes, leaving aside the technology itself. Faced with this over-occupation of the social, several researchers have sought to restore a structuring place to technology. Orlikowski (2007) reintroduces the non-human actors but by inextricably linking what is social and material: first, tools are the product of social processes of design; second, actors and social organizations are marked by the introduction of tools; finally, the actors and the tools evolve in a co-construction during the use. The term sociomateriality, which qualifies this new approach, wants to overcome the gap between technological artifacts and use of these artifacts.

The approaches of sociomateriality strive to escape determinism too social and to "reintroduce" the material in organizational thinking, without falling back into a technological determinism.

One of the roles of the Information Systems discipline is to explain that there is no technological determinism. For open training, this means that today we must disassemble both the illusion of a communication without mediation (Transparency, immediacy, interactivity, suppression of intermediaries), the illusion of technological liberation (Alternative to politics to a society without laws and no state) and technological fatalism (the Internet will change everything in our lives, but we have nothing to say about these changes) (Fallery, 2004).

The interest of a theoretical framework based on the theory of the structuration is the Structural perspective (adopted by neo-institutionalist work). Thus, it makes it possible to account for the institutional mechanisms that govern the behaviors in the projects while examining precisely the different modalities according to which the reflexive and transformative capacity of the actors expresses themselves. Secondly, research has so far considered standards essentially as an objective reality, which exists independently of the actors and their practice. However, norms only have reality if they are enacted and mobilized in practice.

Finally, the theory of structuring makes it possible to analyze the recursive relationship that exists between norms and practices, that is to say, how practices are structured by enacted norms, but also how, in return, norms are reproduced and updated by practice.

Regarding our research, we chose to take advantage of the structurationnist model in describing how the constitutive practices of a given social system are accomplished and ordered in space and time. The theory of structuring (Giddens, 1984, 2012) provides a relevant reading grid for those who wish to analyze professional practices in a standardized environment. In this theoretical perspective, the practices observed in a given project are not understood either as the only product of the deliberate action of the actors or as the only product of institutional forces exerted on them (structural perspective).

Weick (1989) explains that equivocal nature of ICT can be conceived and used in various ways. ICT do not only include a material dimension but also they are subject to a 'sense' making, an interpretation, an understanding and a perception by organizational actors. As Orlikowski (1992) introduced the concepts of 'duality of technology' and 'interpretative flexibility' which represent the equivocal characteristic of technology. "Technology is constructed physically and socially by different actors, those who are working with it in a given social context and those actors attach to it through different meanings" (p.406). Therefore, we found out that the equivocal nature of technology invokes unpredictability of the effects that is related to the implementation of technology.

Appropriation is the process by which people incorporate advanced technologies into their work practices (DeSanctis & Poole, 1994) in this process, individuals give sense to ICT and uses may be faithful or not to the spirit of technology (DeSanctis & Poole, 1994). DeSanctis & Poole (1994) underlines implementation of a technology in an organization above other dimensions of the technology, all depends on the individuals 'appropriation of it' and the meaning which is given by the actors. The structurationist model seems appropriate to analyze the question of ICT use especially in the case of non-voluntary adoption process. This model shows the link between organization and individuals in the appropriation logic of the technology and this logic goes beyond the micro-macro levels which have been raised by the TDI and the TAM.

The adaptive structuration theory (AST) points out two key concepts of appropriation including the general intention of technology and the appropriation of technology by individuals. These concepts developed from two sources "social structures in technology" (characteristics of technology) and "social structures in action" which influence the actors' appropriation to the ICT (DeSanctis & Poole, 1994). "Social structures in action" corresponds to the different elements in a social framework such as environment, norms of the group and tasks. Both social structures, organizational and technological innovation interacts each other unpredictably. In the same spirit, Orlikowski (1992) develop the idea that ICT is a social construct that connect the individual, the technology and the organization together through its institutional properties. In the appropriation logic of the technology, structurationist models take into account particularly the interaction between organization and individual.

4.2.5. The influence of external factors on the internal perception

Structurationist models develop the fact that external factors influence the internal vision of ICT. The social construct of ICT highlights that institutional pressures including social group and media contribute to the construction of perception and use around ICT.

As we are aware of the fact that structurationist models do not take into consideration the external forces and more particularly the mimetic phenomena. In addition, they focus on appropriation with paying no attention to the adoption logic behind appropriation. In fact, adoption logic of mobile technology may influence appropriation of it by individuals for example, the individuals who do not always have the choice to use or reject a technology may influence on their usage behavior and on their appropriation of it. Moreover, institutionalist

theories explain that external factors of adoption can have consequences on internal appropriation and use of ICT by the individual.

Thus institutionalist theories focus on the influence of environment which allows understanding the mobile technology appropriation process. More particularly, the "organizing vision", created in an extra organizational context which shows how organizations are under the influence of institutional pressures connected to their environment (Swanson & Ramiller, 1997). The model of "Organizing Vision" highlights the interrelationships between organizational and inter organizational levels respecting the decision for implementation of ICT by the organizations. (Carton et al., 2003, p. 5). Therefore, the organizational actors getting influenced by the "authorized discourses" about the implementation of ICT.

4.2.6. Conceptual frameworks

To bring a clear understanding of the discovered elements from the behavior and perceptions of our participants, we created a framework summarizing the adoption, use and appropriation of mobile technology by individuals in the university context. In addition, the theoretical analysis explained earlier has enabled to clarify the definitions of some notions such as adoption, use and appropriation. In addition, it identifies the main components and develops a potential link between the adoption and appropriation.

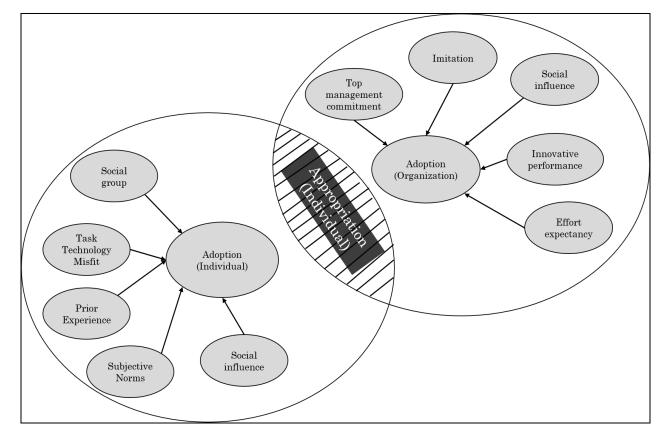


Figure 6 - The process of adoption and appropriation of mobile technology

This framework presents the different kinds of above identified adoption that influence on appropriation. Regarding to the received empirical results and the literature review, we could find some evidences, which show a significant link between the context (organization), use and appropriation of technological innovations by individuals.

4.2.7. Focus on adoption

We will first focus on the initial step of adoption. Thanks to the data analysis, we have discovered different origins for the first step of adoption. For passing the individual logic of adoption, we first identified the reasons for mobile technologies adoption at the organizational level including social influence, effort expectancy,

towards innovative performance and top management commitment. We also discussed that this step of adoption can appear at the individual level, due to the specificity of mobile technologies. In the second step we identified the reasons for adoption at the individual level: subjective norms, performance expectancy, social influence, learning curve and adapt behavior. We have shown that organizational and individual levels of adoption both exert an influence on each other. On the other hand, our analysis demonstrates that adoption process of mobile technology is more complex than what is seen in traditional models. Concerning the analysis of adoption, the organizational logics enable us to show that the elements of individual adoption can be found at the organizational level. For example, the adoption of mobile technologies generally in private life of actors reinforces the role of social influence in decision making at the organizational level.

4.3. Appropriation of mobile technology (university's participants)

According to our analysis we identify different appropriation behaviors of actors which driven by discussed the distinct adoption processes earlier. In the previous section, we have examined the different adoption logic (4.2) leading to the distribution of mobile technology to two kinds of users: faculty members and students. In this part, we aim to see how professors and students, appropriate mobile technology (Tablet) and how they analyze if the identified adoption process lead to different use and appropriation behavior.

4.3.1. Absence consideration of user's needs

Many professors pointed out their fact that adoption of wrong mobile tool (Tablet) by university leads to a poor fit between mobile technology deployment and user's needs. They believe that they are equipped with such a sophisticated mobile tool, whereas they do not necessarily need such a device for their work. Most

professors told us that they are given a mobile tool (iPad) which doesn't satisfy our needs. Concerning the needs of professors and students in the engineering schools, they did not see any interest in the utility of mobile tool which they are given. *

"We don't see the point to use iPad in an engineering school. Base on the practical content of our classes we need mostly MacBook, laptop, PC" (Professor of physic at engineering school B).

"I asked university director for having a laptop several times which helps me most but they gave me an iPad instead!!!, what am I supposed to do with such a mobile tool" (Professor of communication at engineering school A).

"They gave us an iPad which we didn't even asked for it and they never asked our technological needs and suddenly they came up with this iPad project" (Professor of IS program at engineering school A).

"Maybe we change the mobile device later, it never stops, we need to change our pedagogy method and being more modern and innovative especially in our case as an engineering school" (Department director of engineering school B).

"It took us many years to get to use laptop which satisfy our needs and now they expect us to work with iPad which is the mobile tool of new generation. If we hardly get used to it then they will change it some years later. It never stops" (chemistry professor of engineering school B).

"Since 2013 we involved with iPad, our plan for 2017 is to stay in our iPad project but at the same time we think to change our adopted mobile tool and choose a mobile tool which will be more adapted to our needs and convenient for our professors and students" (Responsible of iPad project of engineering school A).

"We stopped our iPad project after one year because it was not a productive and sufficient mobile tool at our business school so we decided to replace it with laptop" (IS director at Business School A).

The fact that sophisticated mobile technology is given to the professors furthermore has consequences on the usages made of such device.

4.3.2. Low use of mobile technology

As we explained that adopted mobile technology (Tablet) is just a sophisticated tool and not adapted to the needs of professors and students therefore they don't really use such mobile device. As we have shown in the adoption decision process, the mobile technology is adopted because of mimetic phenomena. At the same time, there is a lack of regular training program for university's participants who need to know the functionalities and purposes of the adopted mobile technology. As long as there is lack of mobile technology training, the users underuse the main functionalities of this device. Concerning the previous logic of appropriation, professors told us that they do not have time to learn to use it, get used to it and finally appropriate the technology.

"We have so much work to get done and we don't have time to learn how to do the same task with different applications of iPad" (Professor A at engineering school B).

"Unfortunately, so many of our professors don't use their iPad. They didn't even open their device since they got it" (Responsible of iPad project at engineering university B).

"iPad has lots of applications that I am sure I don't need them and I will never use them" (Professor A at engineering university A).

"Apple Company offer us two days (each time 2 hours) training for our large quantity purchase every year. The purpose is a presentation about the functionalities of iPad" (Director of engineering school B).

"I don't have time to attend iPad training sessions which is just wasting time and we do not learn useful things. I am obliged to attend these sessions because we are personally called by a letter from director of school; you know what I mean..." (Language professor at engineering school B).

"We still do not know the possible functionalities of this mobile device. I tried so many times but it takes long time to learn. Me and my colleagues sometimes share our knowledge about useful applications of iPad" (Professor of IS at engineering school A).

It appears that adoption processes of mobile tools influence on uses of such devices. In our studied universities, users could not exploit potential of such mobile device (Tablet) and their usage is largely limited to communication only.

"I mostly use iPad to check our class planning and checking my e-mails" (most of professors at university A, B and C/ students do as well).

"iPad is a portable device, we have access to information easier and faster. It enables us to stay connected anywhere and anytime" (responsible of iPad project and IS professor at engineering school A)

As shown above, the adoption logic has consequences on mobile technology usage.

4.3.3. Paradoxical appropriation process

We interviewed many professors and we notice that they are worry about mobile technologies breaking the boundaries between professional and private life then they question the value of such technologies. They are aware of inconvenience of mobile technology (Tablet) but still they appropriate it because they consider it as an integral part of their functions and responsibilities, which are a paradoxical appropriation behavior that sometimes appears in the case of under study.

"I am busier than before, iPad is with me everywhere, I am always connected and I receive e-mails every minute. Answering bunch of e-mail on the way or at home is an increase in work time" (Professor A at engineering school B).

"More reachability and overload of information make us less efficient" (Professor at engineering school A).

"Using such a mobile tool is very time consuming and it can really waste our time and being less efficient" (Professor at Business School A).

"In my private life I am more interrupted with iPad than using laptop" (Professor C at engineering school A).

Regardless of all the potential impacts of such mobile technology on their professional and private life, they appropriate mobile technology because they consider it as an essential part of their functions and responsibilities.

"Despite the difficulties we face by using this device (iPad) we accept it because we are professor of this school and we have responsibilities" (Professor at engineering school A).

4.3.4. Obtaining individual benefits in the private sphere

The individuals do not have a choice to reject it so they appropriate mobile technology (Tablet) by making different kind of uses, which is mostly useful in their private life. They benefit from this mobile tool in their private life; finally, it makes them able to appropriate it in the professional sphere. According to the analysis of data which has been collected through our observation; mobile technology mixed up the notion of work and availability. A student who has Tablet can exercise his exam inside the class of another subject or watching a film, chatting, playing games, reading stories and searching on different

websites. It enables them to use professional time (learning) for achieving their private goals. Sometimes students practice their exam while they have another class with different subject and they read the courses of other subjects because they carry all their subjects' documents in their Tablet, which allow them to work anywhere at anytime.

"I use iPad anywhere because it is not heavy to carry and keeps battery longer. I have all my courses in there and I can do my exercises even in the train when I go home for weekends" (3rd year student at engineering school B).

"iPad is given to make us more efficient. It helps me to have a technological progress for my personal purposes" (Professor at engineering school B).

In this part, we should specify that personal uses of individuals mostly students are classified into useful and improper usages in fact, they take the advantage of mobile technology. They use this mobile tool for private and personal uses, which increase their personal autonomy. According to our analysis, mainly students appropriate the mobile tool (Tablet) for entertainment and personal purposes inside and outside of the university as described in chapter 3 (figure 5 & 6).

These examples show that the benefits of mobile technology (Tablet) to students in their private life enable them to appropriate the technology in the professional sphere.

4.4. Assessment of mobile technology implementation: primary appraisal

The above discussion summarizes the factors relating to the adoption and appropriation of mobile technologies by the individuals but these factors are generalized for all the individuals. As we said, the interaction with ICT differs from one individual to another. Therefore, we discovered that individual's

behavior is not only limited to the adoption factors but also there is a link with the way that they adapt or do not adapt to the new IT environment. According to our data analysis, we understood that base on the different adoption factors; the individuals perceive the mobile technology implementation differently and it may impact their adaptation behavior further (chapter 5).

Prior models, (e.g., TAM, IDT, TTF) help in predicting adoption and use of a given technology as we explained earlier. Base on the predictions in the users' appraisals of the mobile technology, variations occurs among individuals facing a given mobile technology, and the variations within users over time, providing a dynamism that is unavailable in factor models. It gives predictive power, a view of IT-related behaviors, which allow explaining many different responses to IT-induced changes.

Empirical research indicates that coping activities differ from one individual to another according to their perception of the situation. The introduction of a new IT is undoubtedly a special event for many individuals since it does not happen everyday. This event disrupts the daily lives of users in that it disturbs the routine, habits and ways of doing things.

During the analysis of the collected data, we discovered that the university's participants evaluate the given mobile technology differently, they consider how the expressed situation affects them, it considers as a challenge. Some individuals perceive the situation positively, only beneficial results are expected. We noticed that faculty members and students consider their new situation as an opportunity, a challenge, a threat or loss. Some of them perceived the implemented mobile technology, as threatening, refers to a potential loss they may have in the future. A challenge refers to the potential growth, control, gain whereas some factors present loss, which presents the caused damages (Folkman

and Lazarus, 1985). Lazarus and Folkman (1984) argue that acts of coping by individuals vary according to whether individuals perceive the situation as a loss, a threat, a challenge or a benefit.

4.4.1. Emerging theory & discussion

4.4.1.1. Theory of adaptation: coping theory

We have noticed some studies in psychology researches which appear to be relevant to the identified appraisals. Psychology researchers have also been interested in the subject of adaptation. In psychology, they are summarized as follows. The "evolutionary" approach that borrows from biology considers adaptation as an unconscious mechanism of any living system interacts with its environment. This regard (White, 1974) argues that all living creatures constantly seek to reduce tension and restore their balance in order to preserve and grow (p.54). In psychology, this approach is based on the concept of defense and is normally studied and evaluated clinically (Folkman, 1992).

Considering the common point to the presented empirical results of this chapter, it is appropriate to refer to the theory of adaptation in order to better understand the behavior of university's participants facing induced changes by the implementation of mobile technology. Adaptation has been the subject of many studies in various fields, including biology, sociology and education, Beaudry and Pinsonneault (2005) applied it into the field of management through the theory of coping to study the individual adaptation behaviors due to the implementation of a new information technology.

Indeed, the theory of coping (Lazarus, 1966) explains the conscious adaptation behavior of individuals when they face a particular event that disrupts their daily lives. The basic premise of this theory is that coping acts are influenced by this relationship. Lazarus (1966) argues that among other factors, the assessment of the situation allows the individual to determine the coping options available to him. Dewe et al. (1993) add that coping activities are triggered in response to the assessment of the situation. In this perspective, coping begins with an individual's assessment of a particular situation or event that concerns them. This evaluation starts when the individual estimates the importance of the situation as far as he / she is concerned.

Table 10 - Participant's primary appraisals & the link with adoption factors

	Primary appraisal elements		
Primary appraisals	Concerns	Adoption factors	Conceptual frameworks
Loss	Loss of familiarity Loss of simplicity Loss of control over task Loss of satisfaction		
Threat	Privacy	Social influence Task technology misfit Subjective norms Prior experience	Karahanna et al. (1999), Moore and Benbasat (1991), Agarwal and Prasad (1999), Agarwal et al. (2000), Taylor and Todd (1995a), Venkatesh (2000),
Challenge/ opportunity	Learning curve Willing to change/ adapt	Subjective norms Social influence Performance expectancy Innovative performance Effort expectancy Top management- commitment	Venkatesh et al. (2003), , Lewis et al. 2003, , Taylor and Todd (1995b), Ajzen (1985), Davis et al. (1989), , Thompson et al. (1991), Venkatesh and Davis, (2000),

The above table summarizes the full set of primary appraisals within our data set and the reasoning behind each. It is clear from the analysis that the university participants' assessments of the given mobile technology varied drastically and, they were contradictory of one another. This highlights how primary appraisals were based on individual's perceptions of the mobile technology implementation, not necessarily based on the actual changes that were made. The adoption logic at organizational level has influence on the individuals' perceptions and they have not been discussed in coping theory.

As the coping theory is mute in discussing the elements of disruption used in shaping the primary appraisal of users whereas the explained IS literature focus on this issue. Therefore, we have found the elements, which explain every category of primary appraisals. In addition, we have found the adoption factors in primary appraisal of individuals who facing IT-induced changes. Primary appraisal of university's participants is classified into three categories: loss, threat and challenges. Challenges represents user's perception positively as an opportunity in the future that is why we do not explain benefits and challenges categories separately. In our empirical results, we have received four elements concern loss appraisal which has not been found in the factors of adoption but we realized the opposite in threat and challenge appraisals.

Many authors have proposed that users' beliefs are mainly developed based on their understanding of certain key aspects of a technology (Davis 1989; Griffith 1999; Moore and Benbasat 1991; Rogers 1983; Venkatesh et al. 2003).

Griffith (1999) discussed that a new feature of a technology that is considered as visible or tangible, it can be directly and specifically observed and described. On the other way, opposite to the tangible feature and referring to a dimension that is relating to the functionality, or the objectivity of a technology, the feature of a technology is expected to be experienced as visible or inconsistent and generates

more individual sense making. For example, the perceived or expected fit between a technology and a task (Dishaw & Strong, 1999; Zigurs & Buckland, 1998), the perceived compatibility of the technology with the values, needs, and past experiences of users (Karahanna et al. 1999; Moore and Benbasat, 1991) influence user primary appraisal. For instance, the perceived inability of mobile technology to support the user's task (task-technology misfit) leads faculty members and students to assess the implementation of mobile technology as threatening. Effort expectancy is perceived as an opportunity for adopting mobile technology at the organizational level, which has an opposite impact on the perceptions of individuals. Furthermore, performance expectancy has been discovered to influence users' behavior (Venkatesh et al. 2003) and eventually affect faculty members in order to consider the implemented mobile technology as an opportunity (i.e., a technology associated with high performance expectancy is probably perceived positively). Similarly, faculty members with higher personal innovativeness have been noticed to reveal more positive beliefs about the mobile technology (Tablet) (Agarwal & Prasad, 1999; Lewis et al. 2003).

Users' prior experience with a technology has also been found to shape how they perceive a new technology, therefore we have found that professors perceive Tablet as threatening because of not having prior experience of using this technology (Agarwal and Prasad 1999; Agarwal et al. 2000; Taylor and Todd 1995a; Venkatesh 2000). Primary appraisal may occur in a specific context, social and institutional factors such as peers and superiors' perceptions may influence the primary appraisal of university's participants (Lewis et al. 2003; Taylor and Todd 1995; Venkatesh et al. 2003).

For instance, top management's commitment and support for mobile technology implementation influence positively on beliefs of faculty members regarding the usefulness and mobile technology ease of use. This commitment appraised as an opportunity at organizational and individual level, (Lewis et al. 2003). At the

organizational and group level, the subjective norms associated with the acceptance and use of the given mobile technology are likely shaped the appraisal of faculty members positively and negatively (Ajzen 1985; Davis et al. 1989; Taylor and Todd 1995; Thompson et al. 1991; Venkatesh et al. 2003).

In addition, when faculty members follow their peer's behavior or accept Tablet with an intention to show their engagement and not an actual acceptance of the given mobile technology thus, this behavior is considered as threatening. Whereas acceptance of mobile technology by colleagues motivate other faculty members to engage in this behavior and accept to use the implemented technology which is appraised positively challenging. The organizational decisions of mobile technology implementation are generally driven by imitation, which plays a threatening role in primary appraisals at the individual level (Venkatesh et al., 2003). In the other way, the individuals are also subject to social influence through a phenomenon of imitation, which is derived from the social group to that they belong. The positive perceptions of individuals linked to the individual obtained benefits in the professional sphere. Faculty members perceive mobile technology as an opportunity because they feel that such mobile tool increases their prestige and they achieve new responsibilities as well.

CONCLUSION OF CHAPTER 4

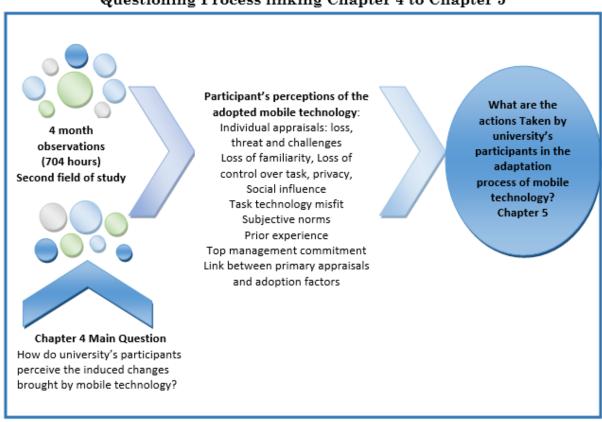
This exploratory research on mobile technology shows that adoption and appropriation of mobile technology by universities cannot be any longer separated as they traditionally have been. Our analysis shows that different appropriation behaviors appear according to the different adoption logics. Our conceptual framework presents that there is a link between process of adoption and appropriation. Generally, in IS research, there has been a difference between the adoption and appropriation but this framework aims at better understanding the logics of adoption and appropriation as well as the link between them. The collected data from two case studies represents that the mobile technology appropriation by universities' participants are highly depended by the way which is adopted.

Indeed, the large distribution and adoption of mobile technologies in the private life of people has a strong influence on the adoption process by universities. At the organizational level, the universities often follow a mimetic behavior rather than a rational adoption process. As consequence, the appropriation process is mostly dictated by organizational characteristics such as symbolic logics. This logic of adoption generates different type of uses among students and faculty members. They use a very limited number of possibilities of mobile technologies, consequently limiting the benefits for the institutions. Learners and trainers use mobile technologies differently as they are obliged to use them to show that they are integrated into the projects of the institution and they are responsible for it. Moreover, it should be considered that the appropriation process of mobile technologies is the result of strong interactions between the individual and the organizational level.

Our results were compared to theory. Two main comparisons emerged. One with the literature that mentions the adoption logic at individual and organizational level as well as its' influence on the appropriation logic of mobile technology by individuals. The other comparison with the Coping theory about the four categories of primary appraisal (Loss, threat, challenge and opportunity) is done and its' link with the identified adoption factors have been found which hasn't been discussed in this theory.

By highlighting the perceptions and the primary assessments of individuals about the adoption of mobile technology in university context, our next step is to understand their coping acts in order to respond to the induced changes that is caused by the implemented mobile technology (chapter 5).

Questioning Process linking Chapter 4 to Chapter 5



PART 2

CHAPTER 3: Utilization of mobile technology

What is going on in the university? And how do university's participants use the given mobile technology?

Description of the realized 6-month observations (fields of study)

<u>Aim:</u> to describe two case studies without trying to analyze, play an introductory role in further result sections



CHAPTER 4: Participant's perceptions of the adopted mobile technology

How do university's participants perceive the induced changes brought by mobile technology?

Previous data (6-month observations- first field of study)
Discussion



CHAPTER 5: Mobile technology & Adaptation process

What are the actions taken by university's participants in the adaptation process of mobile technology?

Previous data + 4-month observations (second field of study)

Discussion



CHAPTER 6: University's strategy & mobile technology adoption How far does it support changes towards mobile technology appropriation?

Previous data + 15 interviews



Main Conclusion

Main results, Discussion, Theoretical and managerial implications Research limitations and perspectives

CHAPTER 5. RESULTS AND DISCUSSION

"It is argued that individuals form beliefs about their use of information technologies within a broad milieu of influences emanating from the individual, institutional, and social contexts in which they interact with IT" (Lewis et al., 2003, p. 657)

INTRODUCTION OF CHAPTER 5

In the previous chapter, we explained the adoption and appropriation logics at the individual and organizational level to better understand the individuals' perceptions and their assessment of the situation in which mobile technology is implemented. This chapter is going to discuss the behavior and precisely the actions of individuals in order to integrate the implemented mobile technology.

As we are conducting an inductive research, our purpose aims to discover "what is going on" and why (Idrees et al., 2011, p. 193). For this purpose, we conducted 4-month observations as our second case study in university B as well as 15 semi guided interviews to understand what are the modifications made by students, faculty members and the university's directors in order to adapt to the induced changes that is brought by the implementation of mobile technology.

This chapter will summarize and analyze the different types of actions taken by university's participants in the process of adapting to the mobile technology. The chapter presents the results base on the coded data which has been presented in the methodology (chapter 2). This chapter attempts to answer two research questions that we have raised:

RQ1: How do university's participants respond to induced changes of mobile technology implementation?

RQ 2: What kind of modifications are needed in the process of adaptation of mobile technology in university context?

The behaviors and answers of our participants are compared to the theory and a conceptual framework has emerged from our empirical results and empirical, theoretical researches towards understanding the adaptation process.

This chapter is divided into four parts. First part is devoted to the individual behaviors in order to adapt to the mobile technology implementation (5.1.). The second part presents the adaptation activities at the organizational level (5.2.). The third part dedicated to the adaptation behaviors at the group level (5.3.), the last part represents the emerging theory and discussion, then proposing our proper modeling for the specific adaptation process that university's participants engage in order to respond to the implemented mobile technology (5.4.).

5.1. Individual behaviors

We start this chapter by presenting a review of the main study which has examined the behavior of individuals due to the implementation of mobile technology. The following results explain the actions of students and faculty members in order to integrate the adopted mobile technology into their teaching and learning environment.

Regardless the primary appraisal of individuals that is emerged in chapter 4, we are going to understand the coping actions that university's participants take in their new environment. Our data gave insights into two types of responses to mobile technology implementation. We generally classified their responses as follows: emotional acts and active behaviors.

Emotional acts refer to those uses that prefer to escape the situation or avoid acting on the situation because of emotional instability. They are engage in an emotional form of coping and they cannot minimize their stress and control the situation. On the other hand, the active behaviors explain when users prefer to change the stressful situation by making changes in their feelings, work environment and the implemented mobile technology itself. Active users focus their coping efforts on aspects that they are able to change or control. They attempt to reduce their negative feeling and change the situation by engaging into problem focused acts. The difference between these two forms of responses is derived from the adaptive efforts made by users of the implemented mobile technology.

5.1.1. Emotional coping acts

Based on our data, we are categorized the emotional acts of students and faculty members into five types of responses to the implementation of iPad: Complain, quit, workarounds, switch and cool down. Some examples of the data coding are presented for each type.

Table 11 - Coping efforts of participants in response to the implementation of mobile technology (Emotional acts)

Emotional acts	Examples (coding)
Complain	"Finally I stopped to complain and use it like others even though it is not a big use" (Professor university B). "I don't use iPad in my class, it is not an appropriate tool for my classes which are mostly technical and it needs Mac computer" (Professor university A).
Quit	"I tried to convince my colleagues to use Tablet but after months they reject it" (Professor in charge of iPad project in university A) "Honestly I must say I did try iPad but I didn't do that much with it so I don't want it anymore" (Professor university A).
Workarounds	"My colleagues don't really use it as they should do; they prefer to use other platforms rather than applications (iPad) which does the same" (Professor in charge of iPad project in university B).
Switch	"After years of working with laptop, of course using Tablet would be a big change and it is not easy to apply it into our pedagogy, I did try but I come back to my laptop and using some learning platforms which I find more useful for my classes" (Professor university A).

Cool down

"In the beginning, I didn't want to use this but I was telling to myself; the more you use, the better you become at using it" (Professor university B).

"After all, it is better to accept that it is our responsibility to learn new tools and help our students to learn how to work with the latest technology as well" (Professor university B).

"university director really insisted by sending us the official letters to attend the iPad presentation meeting so after while the only thing we can do is to accept it" (Professor of university B)

The first type of coping action is categorized as complain. After the implementation of iPad and its uses by faculty members and students, we noticed that some users are not satisfied. Therefore, they do not find another way of coping except complaining whereas some other users can control their emotions and minimize their stress, which lead them to stop complaining, and trying to use the given mobile technology. We noticed that the second type of coping is quitting or rejecting the mobile technology, this action shows the complete emotional instability of users.

The users prefer to leave mobile technology project because of different reasons such as technology misfit to their task and work overload however, some users do not make any efforts for using iPad, which is related to their negative primary appraisal. Other coping acts like switching and workaround refer to those professors and students who feel not having control on the induced changes and cannot control their stress that is why they accept iPad but they do whatever they can to escape using the implemented technology. Despite of all emotional coping efforts of participants, over time, some users minimize their stress or emotional instability and stop complaining or rejecting the given mobile technology. These coping efforts lead them to accept and use the mobile

technology. This passive act (emotional act) can be converted to an active adapting act over time.

5.1.2. Active behaviors

The active efforts identified and classified into 5 types: Accept, request, try to engage, willing to learn and highly use. Our participants prefer to change the stressful situation by changing their feelings and minimizing their emotional instabilities, which is the next step of the defined emotional act that is called cool down. When our university's participants accept to try or to use the given mobile technology in order to adapt to the new environment and this act is considered as an active effort. Another active adaptive behavior is the efforts of users to engage into the new environment by participating in iPad meetings and generally relating to make changes in themselves. Some faculty members focus on their coping efforts related to the aspects that they are able to change or control. The changing habits or the way of doing tasks and more precisely, adapting the implemented mobile technology into work practices are problem focus efforts which are the best way to cope with the induced changes.

In this regard, for learning and using, it is better that they get help from the colleagues and search solutions for revealed problems and also they ask for training which presents the adaptive responses of our participants towards adapting to the implemented mobile technology. The last type is called highly use represents users who are positively perceived iPad and having control over the situation. They make adaptive efforts by making necessary changes in the work system, the mobile technology and their habits as well.

Table 12 - Coping efforts of participants in response to the implementation of mobile technology (active behavior)

Active	Examples (coding)
behaviors	
Accept	"It is not easy to change our habits and using this tool for what we were doing for a long time but I must try new technology" (professor of university B).
	"I got Tablet, I didn't use it till now but I try too" (professor of university A).
Try to engage	"Finally, I decided to go for iPad meetings few times to discuss my problems which were better than nothing" (professor of university A).
	"I try to go to our iPad meeting when I have time, maybe I can see what others do and I do the same" (professor of university A).
	"After years of working with laptop, of course using Tablet would be a big change and it is not easy to learn it quickly but I did try" (professor of university B).
Request (get help)	"I decided to get help from one of my laboratory colleague and learn the useful applications related to our subject" (Professor of university B).
	"We get help sometimes from each other to learn how to use this" (Professor of university B).
	"I decided to try learning how to use it, one of my colleague is very good in this, he helps me but we need training sessions" (Professor of university A).
	"It could be faster if we could have a help desk, I ask my colleagues when I have a problem rather than wasting time and look for the solution" (Professor of university B).
Willing to	"I changed the way of my work a little bit and I spend more

learn	time learning the functionalities of Tablet" (Professor of university B). "I use it at home, my son has Tablet, he helps me to learn" (Professor of university B).
Highly use	"I spend hours trying to discover creative uses of Tablet and I quickly learned how to use it. I would like to share my knowledge with my colleagues in our monthly iPad meetings" (professor in charge of iPad meetings in university A). "I can make a quick excel of my student's quiz and share this with my laboratory colleague which was useful" (professor of university B). "Now I can eliminate extra works by using (Inverse class) which pass some works to students before coming to the class" (professor of university A). "The iPad allowed me to change the way I was used to teach and interact with my students" (professor of university B).

Active and Passive adaptive response to the mobile technology implementation

Our data gave understanding into two types of responses to disruptive mobile technology. They are as follows: 'active' or 'passive' types.

The difference between two types of responses is based on the adaptive efforts made by students and faculty members. Active participants try to change the situation by taking problem-focused strategies. Regardless of whether participants assess the situation as being a threat or an opportunity, they focus their efforts on those aspects that they are able to change or control. In order to change or control the induced changes, the participants act in a way to change or control their feelings, perceptions, work environment and mobile technology itself. This kind of actions defined an 'active adaptation strategy'. On the other

hand, In order to avoid acting on the situation, the participants engage in 'passive adaptation strategies'. When participants feel low control over the stressful induced changes then they take an emotion-focused act in order to search for an emotional stability to reduce their negative feelings or to increase the positive.

According to our analysis in Table 11, our participants act emotionally, engage a passive adaptive effort, which leads to complaint, workaround, cool down, switch, and quit. Refer to Table 12, our participants claimed to engage an active adaptive effort regarding mobile technology, technical difficulties, their feelings and work system. We identified these active coping efforts: learn, accept, get help, willing to learn, highly use and adapt to task.

Orlikowski and Robey (1991, p. 154) argue that studying how IT influences users without understanding how users are appropriating to it. It results a partial understanding of how IT interacts within organizations. Consequently, it seems unrealistic to expect different individuals or groups to appropriate a given technology in the same way and especially, in a predetermined way. That is the reason why it is necessary to understand the adaptation behaviors of individuals in connection with the mobile technology.

5.1.3. Adaptation behaviors

The above analysis presented a general view of student's actions and faculty members in order to cope with the changes induced by implementation of the mobile technology in their university. To better understand the fact that individuals sometimes refuse to use mobile technology and thus fail to appropriate it, they can react in many ways. In the following table, we identified six different individual's behaviors in the face of mobile technology which

highlights that mobile technology adaptation is not limited to technical changes but also involves environmental, behavioral and procedural alterations. The following table presents the individual's behaviors differ from rejecting the mobile technology to adapt the work environment and the line of actions.

Table 13 - Adaptation behaviors of individuals (participants) in connection with the mobile technology

Behaviors	Examples (coding)
Reject the mobile technology	"Unfortunately, some of our professors don't use their iPad. They didn't even open their device since they got it" (The person in charge of iPad project at university B). "I don't let my students open their iPad in the class, I am not interested wasting time of my class" (Professor of university A). "At the beginning he resisted to use iPad, he was acting as there is no Tablet" (department director of university B). "I didn't use it at first, I didn't want to" (Professor of university A).
Criticize the	university A). "I know that some say that Tablet is good but I disagree,
mobile technology	it is just reduced paper work" (Professor of university A).
or the technical staff and support	"Technically is not well established here and I don't want to waste the time of my class only for 5 min quiz" (Professor university A).
	"The IT department is in charge of iPad project, but when we have technical problems for blocking the internet connection during the exams, the technical support isn't really helpful" (Professor of university B).
	"How the university expect us to use iPad while we don't know how to use it, at least they must give some technical sessions training, we don't have time to learn all alone"

	(Professor university A).
Develop contingency plan	"We bring our printed documents for open book exams in case the professor cannot block the internet or unrelated applications. It's happened already and we faced the problem" (students of university B). "I share documents with students through the iPad application and also on intranet in case that they can't connect all on the same application" (Professor of university B).
Modify the configuration of the technology or the equipment associated to their use	"I downloaded a free application which help me to share videos and pictures with students easily and give comments on their pictures as well, I found this app fit to my laboratory works because we must take videos of our chemical compositions" (Professor of university B). "I bought a small keyboard for my iPad, it's much easier to type with a separate keyboard rather than its virtual one" (student of university B).
Create the buffer or change the immediate environment	Despite the limited time of professor but he set time to edit the answers (pdfs) of all students (through iPad application) and reply them back in order to use Tablet apps for creating work collaboration with students (Professor of university A). "I must spend more time to answer e-mails because of iPad, which is with me everywhere so I take time out of school to do so" (Professor university B).
Change the expectations of others by considering that they will judge the technology based	Professor take small quiz through the Nearpod app(iPad) which promote a positive attitude from the students (Professor of university A).

on their experience of use

From the above result, it appears that the adaptation of individuals facing mobile technology involves changes in mobile technology by modifying the configuration of mobile device and adapting it to their use. On the other hand, they make changes on the process of performing their task in order to change and adapt their environment immediately. Some of our participants (faculty members) use the implemented mobile technology however; they find it difficult due to the lack of good support and technical system. In order to control the likely issues caused by mobile technology, thus they develop the contingency plan. In addition, the faculty members change their way of work to show their use experience in order to respond to the expectation of their students and promote a positive attitude towards mobile technology among them. According to the study of Sokol (1994), IT adaptation is not limited to technical changes but also involves environmental, behavioral and procedural alterations.

For this purpose, we point out that these changes stem from the efforts of our university's participants alone, sometimes from the joint efforts of participants and developers. These changes involve more user involvement than just the use of the adopted mobile technology and they are an integral part of the mobile technology appropriation process. However, it is questionable when and how this appropriation process is required or realized and what factors favor it. These questions will be discussed later through this chapter.

5.1.4. A review of the phenomenon of adaptation

The review of studies examining the behavior of individuals following the implementation of a new IT that reveals some terminological confusion. Indeed, different terms (appropriation, adaptation, adjustment and reinvention) are used to refer to the phenomenon of adaptation. These terms are used indiscriminately in the literature. Some authors discuss the changes that made by users to technology. In this perspective, Rice and Rogers (1980) define "reinvention" as the degree to which an innovation is changed by the user when it is adopted and implemented. Other authors provide the same definition of the adaptation process, while Poole and DeSanctis (1989) argue that appropriation is about changes to IT by users. Indeed, we take a look at the different definitions for the same concept.

Some authors go further and include a concept of adequacy in their definition. Ives and Olson (1984) emphasize that adaptation involves the alteration of technology to meet the needs of users. In the same way, Clark (1987) argues that there is appropriation when the individual, recognizing the offered possibilities by a given IT that develops the capacity to use it and uses creativity to refine it. Poole and DeSanctis (1989) define appropriation as the way a group uses replicates and adapts a technology to their needs. Some authors argue that adaptation is more than a notion of balance between user and IT. For example, Leonard argues that adaptation is a mutual process, which occurs between technology and user environment. However, developers and users reinvent technology and the organization adapts to it simultaneously. The objective according to the authors is to increase productivity arising from the use of innovation. She added that this process of mutual adaptation can occur at different levels in the organization (individual, group, organizational). Tyre and Orlikowski (1994) note that adaptation refers to adjustments and changes of any order following the implementation of a new technology. The authors add that the adaptations concern both the physical aspects of the technology, the

operating procedures, the beliefs and the knowledge of the individuals that their relations between them. Finally, Majchrzak et al. (2000) combined the models of Leonard-Barton (1988), DeSanctis and Poole (1994) and Tyre and Orlikowski (1994) to simultaneously study adaptations at the levels of IT, the working group and the organizational environment of a virtual team. Their results indicate that adaptation activities did occur at all three levels during the ten months of their study. However, looking closely, it appears that the authors all define a phenomenon of adaptation between IT and individuals (Clark, 1987; Majchrzak & Cotton, 1988) or between IT and tasks (Ives and Olson, 1984; Leonard-Barton, 1988; Nelson, 1990; Poole and DeSanctis, 1988, 1990; Rice and Rogers, 1980).

Thus, regardless of whether they use different words, the authors discuss the same concepts. Indeed, although the terms used by the authors differ, it appears that they all speak of a phenomenon of IT adaptation, individuals and tasks. Several of these definitions have in common to emphasize that the implementation of IT is often followed by modifications to one, two or each of these three levels: the individual, technology and the work environment. Indeed, the study of a very rigid IT (unmodifiable) probably cannot reveal IT adaptation activities but can certainly make it possible to observe the adaptation of the individual to IT. Conversely, the study of a very flexible IT should provide the opportunity to examine both the individual's adaptation to IT and the IT adaptation activities to the user's habits and preferences.

5.2. Adaptation at the organizational level

According to the previous results (chapter 4) and our analysis (chapter 5) derived from the collected data, we understood that the integration of mobile technology into the work system, the skills and preferences of the user does not only depend to the coping efforts of individuals but also it gets influence by the actions of the

organization. Adaptation is a recursive and essential process between the organizational environment and technology. This mutual process is required since the characteristics of IT never match those of the organizational environment (Tyre & Orlikowski 1994: 1996; Leonard-Barton, 1988; Orlikowski, 1996). In our context (university), the adopted mobile technology is not practically correspondent to the existing pedagogy system of the university. The empirical studies have stated the phenomenon of the IT adaptation at the organizational level (Orlikowski, 1996).

5.2.1. The organizational adaptation activities

According to the discussion and conceptual framework of previous chapter (chapter 4), the implementation of mobile technology is immediately followed by activities initiated by the university to encourage its adoption, use and "appropriation" by individuals. We discussed that the organizational adoption logic influences the individuals' adoption. Therefore, it is related to consider the role of organization in the individual's adaptation process of mobile technology.

However, it seems that at the organizational level, the process involves much more. In the following table, we classified the activities of organization (university) into four concepts in order to understand the institutionalization of mobile technology appropriation. Thus, the first activity, the implementation of a new technology, is followed by enhancement, adjustment and alteration activities related to periodic changes in both the technical characteristics of the mobile technology and the level of task involvement. Subsequently, new features and procedures are typically added. We have found that first three sets of activities, implementation, enhancement and adjustments, are usually followed by irregular intervals changes at the technical and behavioral levels, as well as at the operational procedures. These periodical changes occur in order to facilitate

the situation for adaptation of technology by the individuals. The following table summarizes these activities and illustrates them with some examples.

Table 14 - The organizational activities encouraging the adaptation of mobile technology

Concept	Activity	Example (coding)
Implementation	To modify the institutional property of the university to facilitate the assimilation of mobile technology. Fit together the cognitive and behavioral routines through which the technology can be appropriated by the users.	"We organized some sessions learning programs for presenting ipad to our professors. We payed for to Apple company for sending us trainer" (Department director of university B). "We have the plan to develop the IT department by hiring some specialist in the domain of mobile technology that provides a good support" (Vice principal of university B).
Enhancement	Promoting and assisting faculty members in adopting mobile technology and using appropriate cognitive and behavioral routines in the use of technology. Maintaining the operational reliability of	"I spend hours trying to discover creative uses of Tablet and I quickly learned how to use it. I would like to share my knowledge with my colleagues in our monthly iPad meetings" (professor in charge of ipad meetings in university A). "Our first year experience in implementing iPad, we have found that our professors need a help desk so

	the technology.	that's why we are going to set a group of faculty members who are expert in using this device and helping others to learn. We are going to pay for their services, for extra hours (professor in charge of ipad project of university B).
Adjustment	To adjust the technical characteristics of the technology to promote its use	"According to the needs of our programs which are different in the concept, we pay to buy related applications to favor the practices of our professors and I should say that sometimes it is costly for us" (Vice principal of university B). "In case of any demand on behave of professors for applications; we make a purchase for them (professor in charge of iPad meetings of university A).
Intermittent	Improving the characteristics and adding features to the technology. Modify the institutional property of the university to facilitate the changes in the use of mobile technology. Redefine the cognitive and behavioral routines to facilitate the changes in the appropriation of	"Our university is equipped with a monitoring tool (MDM: Mobile Device Management) which helps our faculty members to be able to lock the iPad of tehir students on a single application and other pre-settings" (IT staff in charge of iPad project in university A). "This year is the second year of adoption of iPad and we spent so much to install MDM which provides Lock devices or reset their password, remotely delete accounts or managed data, or completely erase a device and other services for the facility of use of faculty members" (professor in charge

faculty members with the mobile technology.

of iPad project of university B).

"It seems that few learning sessions that we organized by the beginning wasn't sufficient and we are going to ask for another group (from Apple Co.) to train our faculty members this year" (Department director charge of iPad project of university B).

"We need more personnel for our IT department that we didn't predict earlier but it is in the process" (professor in charge of iPad project of university B).

This part of analysis generates the results explaining that each stage focuses on activities aimed at fostering "appropriation" through both technical improvements and the promotion of adaptation to mobile technology. According to Orlikowski et al. (1995), research tends to focus on changes made by users to technology. However, at the organizational level, these modifications or actions involved more in the adaptation process. In this regard, studies in IT adaptation have mainly explained the phenomenon by extrinsic factors to users.

During our study in the first field of study, we noticed that the implementation of mobile technology and establishment of new system by the university is the first step to present the mobile technology to the students and faculty members, which is the case in our second field of study as well. During our presence in the second field of study, we realized that the university organizes more structured meetings and help desk to promote and assist faculty members in order to adapt the mobile

technology and enhancing appropriate cognitive and behavioral routines in the use of mobile technology by its participants. However, the organizational activities are not limited to the modification of the institutional property of the university or fitting the behavioral routines to the needs of the faculty members. In addition, the university takes into consideration the adjustment of the technical characteristics of the mobile technology to promote its use by providing the needed or essential suitable applications to the content of each course. Our data collected from the second field of study represents one of the important activities of the university in the process of adaptation of mobile technology. This activity relates to a periodic adjustment and changes in technical, operational, procedural and behavioral routines according to the needs of the participants in order to favor university's participants in the adaptation of the mobile technology.

The more individuals gain experience with new technologies and as they face new challenges and discover new opportunities. The more they feel the need to change IT and their work processes. These changes considered both in terms of technology and work procedures and have important implications at the organizational level (Tyre and Orlikowski, 1996, p.791).

5.2.2. The recursion in the adaptation process: forms of inadequacies

The adaptation process is required since a technology almost never corresponds to the user environment (Leonard-Barton, 1988). In case, the implemented mobile technology does not seem practically compatible to the existing system or pedagogy method of the university. The following categories identify three types of mismatches between mobile technology and the environment of university's participants. Identifying these types of insufficiencies help in understanding

which forms of modifications (technical, environmental, human or other) are required in the adaptation process.

First type of inadequacy is between mobile technology and lack of technical requirements of the university, which has to be modified at the organizational level. Its alteration has different effects on the adaptation process of faculty members and students. For example, when the university aims to change the mobile technology and provides another device rather than focusing on the adopted one, therefore this action is not favoring the user adaptation. In addition, it develops the negative perception, which leads to the rejection of the new technology. Nevertheless, at the same time, there is other technical inadequacies that can be modified and encourage the individuals' adaptation. The second type presents inadequacies between the mobile technology and the system through which is delivered. We found out the irrelevance of pedagogy of the university with the implemented mobile technology that requires to be modified by organizing the training for faculty member.

Identifying these inadequacies and make their required changes and alterations accelerate the adaptation process at all levels (Leonard-Barton, 1988).

Table 15 - Types of inadequacies between the mobile technology and participant's environment

Category	Situation	Example (coding)
Lack of	Changing the device rather	"The university decided to
technical	than improving the existing	change the mobile device this
requirements	one.	year; we are going to bring another technology which
of the	Low speed of internet	seems more adapted than
university	connection doesn't respond	<i>iPad"</i> (professor in charge of <i>iPad project of university A</i>).

the needs.

Laboratories are not equipped with video projector.

The problem of connecting on the same application which is referring to the low speed of internet which doesn't help connection of 25 students or 45 students at the same time (observed situation in theory and practical courses)

"How we can share and follow the same formula that we created with the application (iPad apps.) while we don't have video projector in the laboratory" (Professor of university B).

Insufficient system of the university

Asking innovative pedagogy while all courses are taught in a traditional way.

No training for adapting the pedagogy to the new environment.

Some administrative activities are not still adapted to the mobile environment.

"We don't have time to discover what to do which is more adapted with mobile technology while still we follow the traditional classes like the content of our courses or the way we used to present them or the way we expect to evaluate students; they are all not adapted" (professor of university A).

"Still in our pedagogy methods meeting, we don't talk about technology how come!!!" (Professor of university A).

"If we really want to use mobile devices, at least we must provide a mobile situation into our education system for example let students to follow

		the course in distance or show their presence online even if they are out of the class" (Professor of university B).
Mismatch with	The mobile technology	The professors believe that the
the	mismatches with the pre-	performance criteria defined by their education system doesn't
expectations	defined evaluation criteria	allow them to involve mobile
	which are link to the	technology and they only can
	performance.	use ipad as a tool for some limited uses.

According to DeSanctis and Poole (1994), IT "appropriation" can be studied at the individual, group and institutional levels. The authors argue that the analysis of appropriation at the individual level is to identify the occurrence of appropriation in their different aspects. Thereafter, by compiling these individual acts. We believe that it is possible to identify one or some dominant styles at group level which, structure use at the institutional level over time. DeSanctis and Poole add that, eventually, institutionalized practices will influence usage behavior at the individual level. We have found in our presented analysis that organizational adaptation activities influence the adaptation behaviors of its participants. Appropriation is considered as a recursive process of structuring related behaviors to the adaptation and integration of technologies to the environment and users. Poole and DeSanctis (1989) argue that any effect attributed to a technology is depended on the appropriation of the latter.

According to our findings and comparing to existing literature review, we are aware of the group and organizational impacts on the individuals' adaptation behaviors that is the reason to discuss firstly the organizational activities and in further understanding the adaptation at the group level.

5.3. Adaptation at the group level

Based on our finding, we realized that the conversation and interaction between the colleagues or peers and the group-working environment influence the individual's adaptation behaviors. Therefore, it seems essential to discuss the adaptation at the group level. As we identified in previous chapter (chapter 4), social and group factors influence positively or negatively the perceptions of the individuals. In fact, faculty members build their perception base on the attitudes or behaviors of their colleagues. They focus attention on how their peers or colleagues behave in dealing with the implemented mobile technology and which kind of adapting activities are taken by them in order to cope with the induced changes.

5.3.1. Influence of group working environment & peers' attitude

They experience situations where they feel obliged to comply with the attitudes of their colleagues to show having control over the situation and present a positive, flexible image of themselves in competing with their colleagues. In this situation, the participants perceive the mobile technology as threatening but they take adaptive actions to race over their colleagues to prove their position in the organization. In fact, they get negatively impact from the group that they belong to which may not favoring their adaptation process.

We found out in the discourse and activities of faculty members that they feel free from obligations and they have more mutual understandings with their peers or colleagues therefore in a situation they don't feel fear or stress asking others (colleagues) to help in case of difficulties when they use the implemented mobile technology. Regarding the use of mobile technologies, this group working environment positively impacts the behavior of university's participants (faculty members). Here is the example of some of their discourses:

"I decided to get help from one of my laboratory colleague and learn the useful applications related to our subject" (Professor of university B).

"We get help sometimes from each other to learn how to use this" (Professor of university B).

"I spend hours trying to discover creative uses of Tablet and I quickly learned how to use it. I would like to share my knowledge with my colleagues in our monthly iPad meetings" (professor in charge of iPad meetings at university A).

"I work with three colleagues in laboratory and we learn from each other what is good to do with iPad for our courses" (Professor of university B).

5.3.2. Peers' attitudes towards the utilization of mobile technology

The extent of use of mobile technology by peers or co-workers influences on coping activities of others. We have noticed from our data analysis that faculty members set their strategies in order to adapt to the implemented mobile technology somehow base on the behaviors and activities of their peers or colleagues. They attempt to not only show that they take responsibilities in their institution like others but also their surplus potentials comparing to others. For example, displaying the capacity to learn the adopted mobile technology faster and better than other peers or the ability of being initiatives in this regard will encourage other faculty members to learn and engage mobile technology in a competitive context within group of professors. Therefore, we understand that

the coping strategies of peers and colleagues influence the adaptation strategy of an individual within a group.

Our data show that the conversation between co-workers or colleagues reflects the appropriation activities including the level of comfort in their use of mobile technology, the added value that they receive in their work by using the mobile technology, the level of satisfaction, their willingness to learn the implemented mobile technology and promoting their use. These appropriation activities encourage use among members of the group and enhance the process of individual's adaptation of mobile technology as well.

According to DeSanctis and Poole (1994), IT adaptation at the individual level may involve some studied aspects at the group level. However, some of these appear to be less relevant at the individual level while others may be considered as dimensions of use. Indeed, the first two activities identified by DeSanctis and Poole (the behaviors of direct or partial use of the functionalities or the outputs of IT) can be considered as an evidence of the use and not of the appropriation of IT as defined previously. On the other hand, the other two activities (the interpretation and expression of IT judgments) defined by DeSanctis and Poole although certainly useful at group level, they are difficult to analyze at the individual level. Furthermore, it is questionable whether the expression of positive or negative judgments about a given IT reflects the depth or intensity of its appropriation by the user.

The configuration of the mobile technology or the system directly influences the quality of "appropriation". In addition, they consider user training as one of the most important antecedents. The training has the potential to bias users toward the appropriation activities by providing the ability to guide actions and restrict user choices (Wheeler & Valacich, 1996). As we explained earlier, we identified some activities like training at the organizational level that influence the

individual's adaptation and in this part, we add its impact at the group level as well.

The above discussion summarizes the factors favoring or distracting adaptation in relation to the mobile technology at the individual, organizational and group level at the same time we did some comparison with the IT adaptation in the literature. The following pages are devoted on these questions. We discovered that the adaptation efforts at organizational and group level influence the individuals' behavior then we cannot disregard the fact that the adaptation is a continuous process.

Thus, a gap resides to understand individual adaptation to mobile technology. While the existing concepts are not totally fit to the behaviors of our participants in the university context therefore more emergent approach is needed to better understand the adaptation process and how individuals cope with disruptive situation induced by mobile technology implementation.

Further, we design on the various conceptual developments and models of coping theory to propose our view for adaptation to the given mobile technology. We focus on the influence of individual, group and organizational factors on shaping the beliefs and actions of individuals towards mobile technology adaptation.

5.4. Emerging theory and discussion

5.4.1. Mobile technology and individual's adaptation: a coping model

An area of study that has recently received interest in the literature is that of understanding how organizational actors cope with the negative effects that are related to IT in general and mobile technology in particular. In this regard this section is divided into two main parts. The first is devoted to the theory of coping (Lazarus, 1966) that has emerged through our previous chapter. Following the presentation of this theory, examples of its application in the field of management are presented in order to shows its application in the context of our research. Subsequently, reconciliations and application of coping theory for the study of individual adaptation behaviors due to the implementation of a new information technology are proposed (5.4.1.). The second part then propose our proper modeling of the specific adaptation process that university's participants engage in their responses to implemented mobile technology (5.4.2.).

5.4.1.1. The Coping

Considering the common point to all the discussed studies in various fields, including biology, sociology and education, it is appropriate to refer to the adaptation theories to answer the developed questions. Indeed, the theory of coping (Lazarus, 1966) explains the conscious adaptation behavior of individuals when they face a particular event that disrupts their daily lives. The introduction of a new IT is undoubtedly a special event for many individuals since it does not happen every day. This event disrupts the daily lives of workers in that it disturbs the routine, habits and ways of doing things.

The "personality" approach considers adaptation as a personality trait that influences the behavior. Adaptation is defined as an ability to deal effectively with environmental challenges (Grasha & Kirschenbaum, 1986, p. 7). Folkman (1992) emphasizes that as a personality trait; adaptation is typically evaluated by questionnaires and the performance of different behaviors. She adds that so far the results of this work have not been very satisfactory since the adaptation measures are related rarely and poorly to the future behaviors. However, some tracks seem promising. Among others, the most important work derived from this

current study is on the innovative character (Kirton, 1976), internality (Rotter, 1966) and Type A (Friedman & Rosenman, 1974).

The approach that has generated the most significant developments recently is the perspective that can be described as "contextual". The "contextual" model studies coping as adaptation activities in relation to specific situations. This is the current dominant model of research in psychology (Folkman, 1992). In this model, Coping is defined as the set of actions performed by an individual in order to manage (reduce, minimize, control, tolerate) the external and / or internal demands of a specific relationship between the individual and the environment (Lazarus, 1966).

The basic premise of this theory is that coping acts are influenced by this relationship. In this perspective, coping begins with an individual's assessment of a particular situation or event that concerns them. This evaluation is done in two stages. The first step is for the individual to estimate the importance of the situation as far as he / she is concerned. In the second step, the individual evaluates the coping options available to him. In other words, the individual asks himself first "What is the issue for me in this situation? and then, "What can I do?". These two assessments determine the content and extent of the acts of coping that the individual will perform (Folkman, 1992). The author adds that coping strategies continually are changing according to the evaluations and reassessments of the evaluated situation. Indeed, Folkman explains that the relationship between the individual and the environment constantly evolves according to the acts of coping, the meaning or the understanding of the individual's situation and the changes in the environment.

Thus, evaluation and acts of coping influence each other continuously. These can alter the situation which leads the individual to reassess (Stone et al., 1992). In addition, an individual who judges that a problem is insurmountable or that he

does not have or he does not have access to the necessary resources to cope with it may decide to withdraw or abdicate.

The coping theory states that the content and extent of coping activities depend to a large extent on the assessment that individuals make in the situation that they are confronted by them (Lazarus & Folkman, 1984). As we discussed in our analysis (chapter 4), we identified the factors relating to the assessment of the situation which allows the individual to determine the coping options available to him (Lazarus, 1966). Dewe et al. (1993) indicate that coping activities are triggered in response to the assessment of the situation. Empirical research indicates that coping activities differ from one individual to another according to their perception of the situation and therefore this assessment is related to different acts of coping (Folkman, 1992).

Empirical studies suggest that coping is more important, in terms of the number and diversity of activities that compose it, and more problem-oriented when the latter is perceived as a challenge rather than when they perceived as a threat or loss (Oakland & Ostell, 1996). Conversely, the authors point out that when the situation is perceived as a threat or a loss, coping is not only less important but also the activities that compose it, are aimed more at the individual aspect than the problem itself. However, (Folkman et al., 1986) conducted a longitudinal study aimed at comparing the evaluation and coping processes of the same individuals in different situations. Their results indicate that coping strategies vary according to the perceived issue. For example, respondents used more emotion-focused activities when they perceive that their self-esteem is involved. Conversely, when their work was the issue, respondents realized more direct focused actions on the management of problem. It should be noted that the associated categories with the events are not mutually exclusive. Indeed, as a challenge may be associated with a loss or threat. Loss or threat may be

associated with a challenge. Moreover, the perceived challenge in a given situation also varies in terms of intensity.

The model that currently dominates research using coping theory classifies them into two broad classes: the management of the situation (problem-focused coping) and the regulation of emotions (emotion-or self-focused copying) (Folkman, 1992; Lazarus & Folkman, 1984; Stone et al., 1992). Indeed, these two large classes of activities continually compose coping in empirical studies. Thus, in front of any event, the individual would realize two main types of coping activities. The results of studies suggest that individuals use both forms of coping in virtually all types of problems (Folkman et al., 1986a; Folkman & Lazarus, 1980:1985). Research suggests that individuals vary their coping acts from context to context depending on whether they perceive the situation as a loss, a threat, a challenge or a benefit. In addition, the social role of the involved individual, environmental factors, the challenge and coping options are available to individuals to influence their actions (Folkman, 1992). In addition, evaluation and coping depend on a particular judged situation by a particular individual (Folkman et al., 1986).

An individual does not remain passive in the face of a stressful event; he adapts himself to difficult situations: he evaluates the links between the situation and his personal capacities, and then develops a strategy Coping, or adjustment strategy (which may be more or less effective). When he considers the situation controllable, he will instead use "active" strategies focused on the problem (vigilance, involvement, seeking social support, etc.). Stress is associated here with a challenge; if he perceives the situation as uncontrollable, he will instead use "passive" strategies centered on his own emotions (avoidance, denial, flight etc.). Stress is associated here with an obstacle (Lazarus and Folkman, 1984). We can therefore see coping as a moderator of the relationship between a stressful event and emotional distress. In information systems, Beaudry and Pinsonneault

(2005) used this coping model to analyze the different strategies of user adjustment to technology-related threats.

5.4.1.2. Coping activities between the mobile technology and individuals

Thus, according to the theory of coping and our findings, it is clear that individuals react differently, depending on their assessment of the situation (adopted mobile technology). Their coping activities are classified into two types: problem focused act and self-focused act. Referring to the analysis of individual's behavior (5.1.), in the case of the implementation of mobile technology, we represent that the coping activities take place between the mobile technology and the work systems/task (which can be associated with problem-focused) and between mobile technology and individuals (similar to emotion-focused). These two aspects will be the subject of the following pages.

These activities include modifications to technical and human aspects. Table 16 presents various adaptation activities between university's participants and the implemented mobile technology in the university context. We gave few examples of participant's discourses in order to explain each activity clearly.

Table 16 - Coping activities between the mobile technology and university's participants

Personal aspects Examples (coding)	
Modify relationships	"Since we use iPad" I learn to use iPad and achieve a significant progress and surpass my colleagues" "iPad is forced from the superior level and we are obliged to change our way of works, I don't feel control over my working situation anymore" "I am new in this position and I need to create a

	good image of myself so I try to engage with iPad project of university which shows the level of my commitments and responsibility"
Modify your work habits	"I changed the way of my work a little bit and I spend more time learning the functionalities of Tablet"
	"I correct exam papers with the help of iPad while it was on paper before, its time consuming but I do"
	"I take 10 minutes of class for an online optional quiz each time through app Nearpod"
	"One of my colleague is very good in this, he helps me but we need training sessions"
	"We have a plan to start a help desk with the help of some colleagues and paying extra hours to them" (iPad project director)
Ask colleagues for help, ask for help desk	"Finally I decided to go for iPad meetings few times to discuss my problems which were better than nothing"
	"I decided to get help from one of my laboratory colleague and learn the useful applications related to our subject"
Improve their knowledge	"Mobile technology improved some new techniques
and skills through training	in the way of my communication, discussion, evaluation and sharing knowledge with my
and specialized lectures	students"
	"If we have specific trainings , I believe that we can improve our skills in using Tablet"
Develop and try new usage	"the students do all of their reports from the
and / or communication	laboratory observations through the apps Hivebench

protocols	and its edit, update and correction is very helpful"
Technical aspects	Examples (coding)
Add or modify equipment	"I downloaded a free application which help me to
associated with technology	share videos and pictures with students easily and
based on user's preferences	give comments on their pictures as well, I found this app fit to my laboratory works because we must take
or habits	videos of our chemical compositions" (Professor of university B).
	"I bought a small keyboard for my iPad, it's much easier to type with a separate keyboard rather than its virtual one" (student of university B).

As we discussed earlier, the adaptation process of university's participants began when they started to recognize the potential of the given mobile technology (Tablet). As a first step, it reduces the gap between the requirements of the device use and their own ability to use it. We see in the above table that in the second step, participants take adaptive activities by modifying and refining the mobile technology in order to improve their use. Consequently, the failure occurs as soon as the individual tries to adopt the technology but is unable to use it (Clark, 1987).

Clark (1987) believes that the adaptation of an innovation involves a continuous, cumulative and incremental process of changes to the innovation in all its details. According to the proposed scale by Clark (1987) that measures the quality of adaptation by individuals, we clearly understand the integration level and adaptation of our participants. Thus, between failure and complete adaptation, different degrees are possible ranging from simple use to what is called adaptation. Thus, between failure and complete adaptation, different degrees are possible ranging from simple use to what the author calls the limited adaptation

where the technology is slightly adapted to individual needs but where the knowledge base of the individual remains unchanged. This scale explains exactly the degree of adaptation among our university's participants, particularly the faculty members.

The results seem to indicate that the need for training, the feeling of control or being overwhelmed and the attitude towards iPad and its use vary greatly from one faculty member to another. We emphasize that these factors are related to many variations in the use and adaptation of the implemented mobile technology. Among faculty members, the differences appear in habits such as using e-books for their lectures, taking frequent optional quiz, correcting exam copies, size and numbers of courses materials. These different usage habits point to differences in adaptation between mobile technology and faculty members. Referring to the study of Mackay (1988), user profiles vary greatly from user to user. The author concludes that this diversity implies that the experience of an individual with the system is clearly insufficient to understand the experience of other individuals that use the same system.

The adaptation of faculty members to mobile technology is in terms of the changes brought by iPad implementation, the required qualifications, level of changes in power relations and influence of colleagues and superiors. We understood that the implemented mobile technology required the acquisition of new skills for faculty members. Although users have lost the influence that their previous skills gave them (Patrickson, 1986).

These results remind the findings of Zuboff (1988) who explained that the introduction of new technologies had led to deep changes in the interpersonal relationships of the workers of three studied organizations. It is not only compelling individuals to change their work habits and to adapt to IT but to acquire new skills as well.

Faculty members start learning, adjusting and modifying the mobile technology in the adapted way to their habits and preferences. The participants' adaptation in order to cope with the changes and adjust to the implemented mobile technology begins as soon as they accept the device. In further, the adaptation process at the individual and organizational level continues until the use of mobile technology is well integrated into the work system and user routines. Lopata (1993) shows 27 categories of adaptation activities at the organization, user, or IT level. The author concludes that the pre-implementation period is characterized by organizational and individual adaptation activities in preparation for the implementation of IT and the adjustments to the technology began as soon as the system was selected.

From the above discussion, it appears that adaptation activities between individuals and mobile technology are reciprocal and recursive. It results in increasing the degree of integration of mobile technology into the users' abilities and preferences. Adaptation is achieved through various modifications to the habits, behaviors and knowledge of individuals. It also impacts users' changes to technology in order to make them more consistent with their skills and preferences. Also, we can assume that these activities may result in different degree of integration between mobile technology and individuals.

5.4.1.3. Coping activities between mobile technology and work systems

The coping activities between mobile technology and work systems encompass both changes to the technology itself and the user's operational procedures. In the same way, the studies on coping in organizational context showed how individuals try to adjust, or to adapt to new working conditions (Dewe, 1992; Erera-Weatherley, 1996). The findings of this study have explained behaviors in relation to mobile technology. Table 17 presents different adaptation activities between mobile technology and the tasks of faculty members and students. We

study them separately because the faculty members make changes in their working system while students make changes in their learning environment.

Table 17 - Coping activities between the mobile technology and work system of faculty members $\,$

Change work system	Examples (coding)	Aspects
Add, share or edit tasks and responsibilities	"I can make a quick excel of our students' evaluations taken through optional quiz (Nearpod app) and share it with my laboratory colleague, we share the responsibilities in this way" "I can eliminate extra works now with using (classe Inversée) which pass some works burden to students before coming to the class, it allows them to acquire a temporary knowledge and preparation" Add extra work and add tutorial task to our work: "Managing the work flow of content from students to us in app Showbie for the purpose of giving feedback by using some tools including PDF annotation and voice notes"	Operational
Develop new ways to	"The iPad allowed me to change the way I was used to teach and interact with my students" "It's been a year that correct exam copies online, edit the laboratory reports of students through Hivebench where I kept the previous versions of their chemical compositions"	Operational

Develop new work	This change is done by those professors	Operational
standards	who work in a group of two or three	
	mostly for laboratory classes, each of	
(frequency of tasks)	them follow a part of chemical	
	composition of students but in general	
	it's for the same project of the same	
	group of students. Because of the	
	frequency of their task which are	
	related to each other and must not	
	been repeated so they developed a new	
	standard such as editing the report of	
	students' project and the level of	
	progress and the degree of progress in	
	the composition must be shared	
	through some applications (Hivebench,	
	Showbie, iTunes), in this way the other	
	peers and students are aware of the	
	progress in the project and they	
	continue instead of repeating the same	
	work.	

 $\begin{tabular}{l} Table~18-Coping~activities~between~the~mobile~technology~and~learning~environment~of~students \end{tabular}$

Change learning environment	Examples (coding)	Aspects
Add, delete or edit	Taking notes on the related application instead of writing on papers. Participate in the class debates and making interactive presentation through the Nearpod app. Using speech note for reducing the time and facility for typing notes.	Operational

Develop new ways to do exercises	For projects or reports, students have possibility for collaborative work in real time when they don't stay in the class or campus; they connect to the app Google Docs and can work on the same document at the same time from everywhere and seeing all the modifications in real time. Also they have automatic backup of the currently edited document.	Operational
Develop new standards (submissions, communication)	Using the different apps and platforms for submitting their reports or exercises. Create the new way of communication with their colleagues and professors like sharing their questions or documents in Showbie and getting the feedback before the submission of last version of the report.	Operational
Modify the configuration of mobile technology (settings)	Foreign students active the settings of iPad to give them the option of translation while they read a document online or in pdf.	Technical
Change access or modify the procedures of data collection	"Through apps, students have access to e-books or online documents, for collecting the required information; they take a screen shot and convert it to text with another application. The pertinent data for their projects	Technical

Our analysis suggests that some facilitated changes by mobile technology and have not been caused by participants. It seems that changes that are more appropriate have occurred gradually through reciprocal adaptations to mobile technology and user work procedures. Among other changes, we highlight that the development of new standards among faculty members is related to the frequency of tasks. In this regard, the faculty members who work together and having frequent tasks, the functions of mobile technology supports considerable customization and thus enables them to build specific versions for their tasks and make local adaptations of mobile technology and operational procedures of their work.

The table 18 and 19 show that the faculty members and students do not only make changes in their work or learning practices but also modify the given mobile technology. They add the required applications, which are more adapted to their needs and preferences. These changes in mobile technology and operational procedures have helped to increase integration level between the mobile technology and the task as well as between mobile technology and participants. Students have found innovative ways to have access to their needed data and modify the procedures of data collection. Students modify the configuration of the mobile technology as well. For example, foreign students activate the settings of iPad to give them the option of translation while they read a document online or in PDF. In this way, they modify the functionality of the mobile technology and adapt it to their needs.

These changes in technology and operational procedures have helped to increase levels of integration between IT and the task and also between IT and users. The effects of IT are not unidirectional: designers and users altered the configuration of the technology and the work procedures. The study clearly shows that in offices where the context was favorable, users modified their work procedures following the introduction of the new IT and adapted IT to their preferences and work habits. (Kraut et al., 1989).

The mobile technology can have varied consequences, or even divergences, depending on the context in which it is introduced, even within a university. On the other hand, we show that in the same context, the faculty members develop innovative use procedures to enable effective sharing and delegation of certain tasks to their colleagues or peers and also to their students. At the same time, students add tutorial task to the responsibilities of their professors by modifying their use procedures with using the functionalities of iPad.

In the light of the above, it appears that the implementation of mobile technology is a disruptive event for university's participants. In fact, whether situation is perceived as positive or negative, it does not mean that it less disturbs the habits, the routine, the ways of working and learning of students and faculty members. According to the theory of coping, acts of coping are always conducive to an individual's assessment of a disruptive event. Empirical studies have identified two major dimensions of coping: problem-focused coping and self-focused coping. Individuals perform coping activities in order to restore the equilibrium that has been disrupted or to reach a new one between them and their environment. In order to understand the coping activities in a disruptive mobile technology event, we indicate two broad categories of adaptation activities: between the work system (teaching and learning environment) and mobile technology and also between mobile technology and users (university's participants).

Likewise, the basic premise of the present study is that the coping acts performed by individuals will promote the adjustment and integration of mobile technology in their work system and habits. More specifically, the study suggests that different levels of adaptation may result from coping activities between mobile technology and the work system and between mobile technology and the individual as well. In addition, the study presents the impact of organizational activities on the level of integration of mobile technology in the work system and habits of participants (users). On the other hand, our study focuses on the influence of group level of adaptation on individual's adaptation strategies.

Individual's coping activities does not depend only on the level of individuals' integration of in the process of adaptations but also depend on the coping activities of other individuals (group members). Taking more adaptive responses (self-focused or problem focused acts) by peers and colleagues in a group context influence the individuals' coping activities and promote the individual's adaptation to the disruptive mobile technology event.

Thus, the analysis of this chapter presents that the organizational activities must not be limited to the introduction and implementation of mobile technology. However, there are other activities like the enhancement of cognitive and behavioral use, the characteristics adjustment of the adopted technology to the users' needs and the discontinuous modification of institutional property promote the individual's coping activities in order to adapt the implemented mobile technology.

5.4.2. The proposed framework

The following framework inspired from the literature review and discussed field results to understand the full adaptation process of mobile technology within the universities.

We presented coping model studied by Lazarus and Folkman, (1984). Their model has been created to states that the content and extent of coping activities depend on a large extent of individual's assessment of the situation in which they are confronted with (Lazarus and Folkman, 1984). In particular, Beaudry and Pinsonneault (2005) proposed an interesting application of the coping theory in

the IS field, that is called the Coping Model of User Adaptation (CMUA). They did not only propose a definition of the adaptation as "the cognitive and behavioral efforts performed by users to cope with significant information technology events that occur in their work environment" (Beaudry and Pinsonnault, 2005). However, they went in depth in the concept of 'adaptation' by examining the adaptive actions that users engage towards a new or a disruptive technology "events". They distinguished four adaptation strategies based on a combination of the perceived consequences of the situation, opportunity or threat, and the level of control of people over the situation. The four proposed different strategies are: 'Self-preservation Strategy', 'Disturbance Handling', 'Maximizing Benefits' and 'Benefits Satisfying'.

However, we propose a different approach from that of Beaudry and Pinsonnault (2005) by investigating the *continuous* process of adaptation to mobile technology rather than the punctual adaptation to stressful IT *events*.

We adapted the model to create new framework. With this framework (figure 7), we summarize the ongoing suggested changes from theory and from our field results in the process of integration and adaptation of mobile technology in education.

Introduction of Continuous process of adaptation Primary appraisal of Coping Outcomes Mobile Technology Mobile Technology event activities through three phases Emergence of Organizational $G_{\bf roup}\,L_{\bf evel}$ Mobile Individual Opportunity new knowledge Technology Level Level and skills Mobile Adoption at Technology -Individual self oriented Level Modification of efforts existing Threat knowledge and skills Mobile Mobile Technology -Technology work system Restoring the Adoption at task oriented emotional Organizational efforts balance Loss Level Exit No change

Figure 7 - Main research framework

Our framework asserts that university's participants experience a constituted dynamic process of a 3 episodes sequence following a certain pattern:

1) University's participants facing the induced changes in their environment resulting from the adoption of mobile technology at the organizational level. 2) The imbalanced academic context resulting from mobile technology and working/learning environment lead to a continuous challenging adaptation process. 3) Which implies that university's participants engage adaptation strategies that are shaped through different coping activities between them and their environment. These transactions are held at the individual, group and organizational level.

Indeed, the processual view of this established process implies that the three steps constitute rounds of interaction patterns between perceived states of the implemented mobile technology and responsive adaptive actions. Accordingly, we decided to design a framework to investigate the dynamic process of how university's participant's adaptive responses to mobile technology implementation emerge.

5.4.3. Discussion

The adaptation process is highly iterative and continually evolves as a function of the ongoing changes that occur in the relationship of university's participants and their academic environment. Appraisal and adaptation constantly influence each other. Adaptation may be due to the adaptation efforts related to the mobile technology, the working/learning system and the participants in order to change the environment. Changes might have occurred independently of the person or by the organization; or in a subjective understanding that one has of the situation (Folkman & Lazarus, 1985). In other words, appraisal influences, further, the

outcomes of the adaptation process (i.e., modifying the knowledge and skills, acquiring new knowledge and skills or restoring emotional stability). These are likely to change the university participants' perception of the mobile technology "event", which can lead to a reappraisal of the situation and can trigger a new adaptation efforts sequence. As we demonstrated in our framework, in the process of adaptation, the adaptation efforts of peers and colleagues as well as the university (organizational level) play an important role in the continuous process of adaptation.

In addition, the results highlight the effect of taken coping activities by the peers and co-workers on the participant's behavior as well as the effect of adaptive activities of the institution. In this regard, a new framework emerged from our empirical results and the theory of coping. The results present adaptation as a process which involves continuous interactions and adjustments between the individual and the environment. The proposed framework shows the link between the result of chapter 4 and chapter 5. It discusses that the individual's assessment of the implemented mobile technology influences the individual's coping actions.

A continuous challenging adaptation process implies that participants engage adaptation strategies that are shaped through different adjustment and modifications between them and their environment. These modifications will be held within individual, group and organizational phases.

CONCLUSION OF CHAPTER 5

Despite many studies, our understanding of the relationship between mobile technology implementation and individual's responses in a new situation are inadequate. Institutions invest heavily in the acquisition and development of new mobile technologies without being able to accurately assess the impact use on their participants. Moreover, the results of studies on the subject are contradictory and often mixed. In addition, it is becoming increasingly clear from our back and forth to the literature review that the participant's adaptive behaviors towards mobile technology as well as the adaptive behaviors at the group and institutional level play the prominent role in this relationship. These behaviors and their effects, however, are poorly understood and their antecedents remain obscure (Majchrzak et al., 2000).

Also, the main objective of this chapter was to improve our understanding of the relationship between the defined participants' appraisals of mobile technology (chapter 4) and the selected coping activities by individuals, group and institution in the process of adaptation. In addition, our study directed us to consider the effect of taken coping activities by the peers and co-workers on the participant's behavior as well as the effect of adaptive activities of the institution. In this regard, a new framework emerged from our empirical results and the theory of coping (Lazarus, 1966). More specifically, the chapter aimed to answer the following questions: How do university's participants respond to induced brought changes by the implementation of mobile technology? What did kind of modifications need in the process of adaptation of mobile technology in university context? in order to answer the first question, we have classified their responses into two dimensions: coping activities between the mobile technology and individuals (self-oriented) and also between mobile technology and work system (task oriented). The answer of second questions completes the first answer by

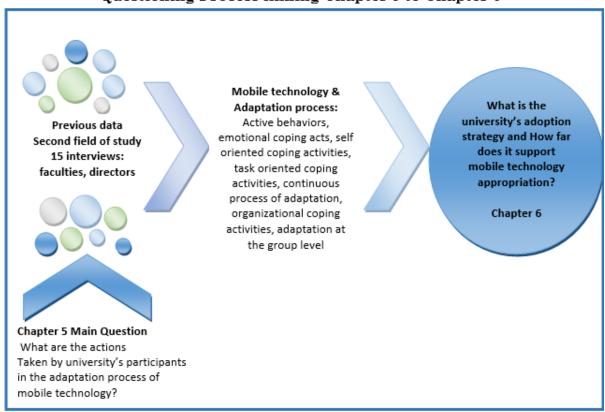
discussing the impact of coping activities of the group and institution on individuals in the process of adaptation.

The adaptation activities have been defined as the point at which mobile technology is assimilated to the participant's preferences and skills. The adaptation is incorporated into the activities, underlying the roles that the participants must play in the framework of its function.

Finally, this chapter proposes a framework showing the link between the result of chapter 4 and chapter 5 which discuss the individual's assessment of the implemented mobile technology influences the individual's coping actions with mobile technology.

Chapter 6 will help us to better understand the university's main strategy and the various factors that can potentially affect the adoption and appropriation of mobile technology by university's participants, either positively or negatively.

Questioning Process linking Chapter 5 to Chapter 6



PART 2

CHAPTER 3: Utilization of mobile technology

What is going on in the university? And how do university's participants use the given mobile technology?

Description of the realized 6-month observations (first field of study)

<u>Aim:</u> to describe two case studies without trying to analyze, play an introductory role in further result sections



CHAPTER 4: Participant's perceptions of the adopted mobile technology

How do university's participants perceive the induced changes brought by mobile technology?

Previous data (6 month observations- first field of study)
Discussion



CHAPTER 5: Mobile technology & Adaptation process

What are the actions taken by university's participants in the adaptation process of mobile technology?

Previous data + 4-month observations (second field of study)
Discussion



CHAPTER 6: University's strategy & mobile technology adoption How far does it support changes towards mobile technology appropriation?

Previous data + 15 interviews



Main Conclusion

Main results, Discussion, Theoretical and managerial implications Research limitations and perspectives

CHAPTER 6.

STRATEGY OF UNIVERSITY

INTRODUCTION OF CHAPTER 6

Who's on board? In the previous chapters, we studied the logic of adoption at the individual and organizational level according to university's participants and as well it's influence on the appropriation logic of mobile technology by individuals. Therefore, chapter 5 discusses the individual's assessment of the implemented mobile technology and its influence on the individuals' coping actions. In the process of adaptation, we found the impact of coping activities of the group and institution on individuals' behaviors.

As we saw in our literature review, the adoption and appropriation of mobile technology by universities cannot be any longer separated as they traditionally have been. Throughout our studies, it rapidly appeared that at the organizational level, the universities often follow a mimetic behavior rather than a rational adoption process. As consequence, the appropriation process is mostly dictated by organizational characteristics such as symbolic logics. This logic of adoption generates different type of uses among students and faculty members. They use a very limited number of possibilities of mobile technologies; consequently, the benefits for the institutions are limited. Learners and trainers use mobile technologies differently as they are obliged to use them to show that they are integrated into the projects of the institution and they are responsible for it. Moreover, it should be considered that the appropriation process of mobile technologies is the result of strong interactions between the individual and the organizational level.

As mobile technology in education is a cutting hedge topic then it can be perceived either as threatening or as a needed change that should be encouraged. Some university's participants are very driven on mobile technology implementation and others do struggle with it.

As a direct consequence, the faculty members may face different tensions towards the given mobile technology. These tensions are due to various factors that are analyzed and presented in chapter 3 and chapter 4. In the previous chapter we were presented some of the encountered tensions by university's participants towards the force for adoption and uses of mobile technology, we compare these tensions described by them to the main strategy of the university in adoption of mobile technology.

In this chapter, we present the university's main strategy and we will explain the strategic responses that developed by the various participants and educational team to the implementation and adoption of mobile technology. We mix these two parts to discuss the result and compare it with existing literature review and summarize the theory emerged from the field, base on the grounded theory methodology. As we discussed in chapter 2, the analysis and results of this chapter are based on primary data (previous observation in 2 fields of study) and 15 conducted interviews.

In fact, 14 semi-directed interviews are conducted on our primary fields of research and one additional interview on another university (university C) and the observations were analyzed as well. The interviews took between 35 to 60 minutes; they were conducted from 20th January 2016 to 28th May 2016 with regular professors, professors in charge of iPad project on the campus, principle and vice principle of the university. Interviews were held with IT and administration staff.

The used methodology to decode the data is content analysis. We built up a coding grid in order to analyze the tensions faced by university's participants in the implementation of iPad project.

An existing discrepancy rapidly appeared from our interviews: the university's main strategies do not always support changes towards mobile technology appropriation. In light of those observations we conducted further studies to better understand the university's main strategy.

This was done through data observations and as well through additional interviews to better understand how directors and professors respond to the institutional pressures and expectations. As the interviews and the observation often express difficulties or faced challenges inside the university, we decided to unidentified the names of the individuals who were interviewed and the name of the universities as well.

6.1. Institutionalized Practices

The central themes of institutional theory are legitimacy and isomorphism. In the institutional perspective, the actions and decisions of the actors are motivated by their quest for legitimacy. At the organizational level, in an uncertain context, certain types of pressure influence them. Organizations will tend to adopt structures that will be considered legitimate by other organizations to ensure their sustainability (Meyer & Rowan, 1977). Thus, in the same environment, organizations will tend to present the same organizational forms as isomorphic (DiMaggio & Powell, 1983). At the individual level, institutional actors are "over socialized individuals who assumed to accept and follow social norms unquestioningly without any behavioral resistance based on their own personal interest" (Tolbert & Zucker, 1999, p.179).

A practice becomes a social norm then institutionalized when it is taken for granted by members of a given group (Tolbert & Zucker, 1999). Institutionalized practices are practices that are regarded as appropriate and legitimate in a given context. The "institutional entrepreneurs" (an individual, a collective or an organization) may have sufficient capacity to challenge institutionalized practices in a particular field, depending on their interests: they create practices or standards then they seek to legitimize as explicit norms. It speaks the strategies of legitimating and institutional work (Slimane & Leca 2010). Stakeholders can thus be audiences to which organizations must demonstrate legitimacy.

While most institutionalists assume that actors in an institutional field will immediately adhere to institutionalized practices, some authors suggest that actors have a wider range of strategic responses to institutionalized practices, including compromise, manipulation, defiance and avoidance (Oliver, 1991). Oliver proposes a typology of possible strategic responses and associated tactics. Under institutional pressure, an organization may decide: 1) to agree 2) to

compromise, 3) to avoid a situation where it would have to comply, 4) to challenge the institution or 5) to manipulate the institution. For Oliver, adopting an institutionalized practice is a strategy of acquiescence, which may be more or less conscious. Oliver also identifies tactics of acquiescence where the actor makes a conscious effort to comply with pressures: imitation and compliance. The actor who adopts a compromise strategy, will promote his own interests through tactics such as compensation, pacifying and bargaining. The strategy of avoidance involves the following tactics: concealment, buffer and escape. The fourth strategy proposed is defiance and can be categorized in rejection tactics, challenge or attack. Finally, the last strategy, manipulation, involves three opportunistic tactics: co-optation, influence and control.

Some information systems (IS) project management practices are now considered as institutionalized practices. While traditional institutional theory holds that actors unconsciously agree to such practices, some authors argue that they have a range of strategies, including compromise, avoidance, provocation, and manipulation. The study of Mignerat and Rivard indicate that IS project managers actually use a range of strategic responses to institutionalized practices that including acquiescence, provocation and manipulation (Mignerat & Rivard, 2007).

6.2. Strategic responses to institutional processes

In this part, various strategic responses acted by the individuals who involved in mobile technology adoption or appropriation. These individuals form a small organization inside the main university. The university or institutional environment puts pressure on them to create some changes.

In the study of "strategic responses to institutional processes" (Oliver, 1991, p.152), Oliver wrote the typology of organizational strategic responses to

institutional processes that vary in active organizational resistance from passive conformity to proactive manipulation. Our analysis is not exactly about the same stakeholders, however it is about board of directors in charge of the main decisions in the university who adopt the mobile technology and aiming at developing mobile technology adoption strategy, we can say that the university as an organization respond to the institutional environment.

Our second part of analysis in some types of strategic responses considers another type of stakeholders in the same concept. These stakeholders are about a number of individuals (faculty members) inside the university, in fact, they form a small organization responding to the university's institutional processes.

Oliver identifies five types of strategic responses:

- · Acquiesce,
- Compromise,
- Avoid,
- Defy,
- Manipulate

Table 19 - Five Types of Strategic Response (Source: Oliver, 1991, p.152)

Strategies	Tactics	Examples
Acquiesce	Habit Imitate Comply	Following invisible, taken for granted norms Mimicking institutional models Obeying rules and accepting norms

Compromise	Balance	Balancing the expectations of multiple		
	Pacify	constituents		
	Bargain	Placating and accommodating institutional		
		elements		
		Negotiating with institutional stakeholders		
Avoid	Conceal	Disguising nonconformity		
	Buffer	Loosening institutional attachments		
	Escape	Changing goals activities or domains		
Defy	Dismiss	Ignoring explicit norms and values		
	Challenge	Contesting rules and requirements		
	Attack	Assaulting the sources of institutional pressure		
Manipulate	Co-opt	Importing influential constituents		
	Influence	Shaping values and criteria		
	Control	Dominating institutional constituents and		
		processes		

Acquiescence

The organizations commonly acquiesce in institutional pressures; acquiescence may take alternative forms including habit, imitation, and compliance. Habit refers to taken-for-granted rules or values. Particularly when institutional norms have insisted status of a social fact, an organization may respond to them strategically while it is unaware of institutional influences.

Under these conditions, organizations repeat actions and practices of the institutional environment that have been historically taken-for granted (Scott, 1987). For example, universities adopt the mobile technology for their

university's participants because they see it as a familiar part of the lives of teachers and students today. They distribute widely institutionalized tools such as the latest mobile technology (iPad) for having access to information anytime, anywhere or share data with friends, colleagues or the wider world. Therefore, they take it for granted on the basis of conventional definitions of its uses. Here are some examples of taking mobile technology for granted:

"I have smartphone, I already saw Tablet, I work with laptop every day. There is almost everyone who has experience of using mobile application. Nowadays, most of the students and teachers are familiar with mobile technologies." (Department director in charge of iPad project at university B)

"Today in academic environment, every student and professor use mobile technology, it is something which is everywhere so why not our students and professors" (Professor in charge of iPad project at university A)"

Imitation is consistent with the concept of mimetic, refers to either conscious or unconscious mimicry of institutional models (DiMaggio & Powell, 1983). The external institutional pressure may lead organizations to adopt a technological innovation or to act similarly (DiMaggio & Powell, 1983). The study of Galaskiewicz and Wasserman's (1989) focus on the mimetic processes; whereby organizational decision makers imitated the behavior of other organizations in their environment, particularly those actors whom they knew.

"The main failing reason of our project (adoption of iPad) was getting influenced by the environment (fashionable mobile device) and other universities' adoption, more than focusing on what would be more productive for our learners and professors" (IS department Director of Business School A)

We also realized that the universities adopt the mobile technology (iPad) to show to people and the environment that they are modern and innovative:

"Our university started using iPad because they noticed other universities adopt such mobile device and they copied them and they are waiting for the next revolution. The most important thing will be the image of university, not us" (Permanent Professor of engineering school B)

The enterprises sometimes adopt ICT, because of the imitation phenomena which are the case with adoption of mobile technology among universities and academic environment. For instance, in our second case study (university B), we realized that the university adopt mobile technology, because of the imitation phenomena.

"We decided to adopt iPad because university A is using this device since 2013 and we were extremely confident that we would be satisfied as much as they are" (Department Director of university B).

"We didn't conduct any survey at our university before launching iPad. The other universities adopted this tool and why not us. It is good to improve our pedagogy" (the director in charge of iPad project of university A).

"Our university started using iPad because they noticed that other universities adopt such mobile device and they copied them and they are waiting for the next revolution. The most important thing will be the image of university and not us" (Professor, university B).

Compliance is when an organization consciously and strategically chooses to comply with institutional pressures in anticipation of self-benefits like social support or resources. It is more active than habit and imitation (DiMaggio, 1988; Meyer & Rowan, 2008; Pfeffer & Salancik, 1978).

For example, the university may comply with external pressures because the approval of external constituents or society confirms the logic of necessary confidence to conduct organizational activities in good faith (Meyer & Rowan, 2008). Compliance may also create the adequacy of "the organization as theory" by reducing the organization's susceptibility to negative evaluation of its conduct (Meyer & Scott, 2008). For example, a university's compliance with the variety of specified procedures by the ministry of education and the academies, under the guidance of the Digital Academic Delegates (DAN) elevates its legitimacy and protects it from public criticism.

For example, the university A integrates in iPad project in order to comply with the external pressures for engagement in sustainable development. The Sustainable development has imposed itself on the world of education. UNESCO has been mandated by the United Nations to promote sustainable development in all education systems of the world. In France, EESD courses (Environmental Education for Sustainable Development) have been set up (Rodhain, 2007).

The principal of the university A pointed that the iPad as well as operations in the context of sustainable development are conducted in parallel without real connections. Initially, this project aimed to provide the school with new educational tools. The goal is to modernize teaching and learning techniques. He emphasized that the iPad was to facilitate interactions between students and teachers especially for the transfer of data and connectivity to all the documents at the same tool. Therefore, the iPad has allowed the school to decrease paper consumption significantly and also decrease in costs related to printers and paper. The Director remains convinced that this operation is a success but that it will take time to be perfect. Indeed, the appearance of the iPad in the school being recent, teachers and students still need time to adapt and make the most of this new educational tool during their training.

Organizational consent depends on the awareness degree of organization about the institutional processes and its conscious intention to conform in order to serve to organizational interests.

Compromise

Organizations often meet conflicting institutional demands or challenges with inconsistencies between institutional expectations and internal organizational objectives related to autonomy or efficiency. Under such circumstances, organizations may try to balance, pacify, or bargain with external constituents. These compromise tactics show the organizational resistance to institutional pressures. Rowan (1982) highlighted the role of balance in explaining the diffusion of structural innovation. Strategically, balance can be defined as a tactical response to institutional processes. For example, we have found in the studied universities how the university was able to balance multiple activities by cutting one activity off against another.

The Balance tactics refer to the arrangement of multiple constituent demands in response to institutional pressures and expectations. In particular, balance is the organizational attempt to achieve parity among or between multiple internal interests. For example, the university's board of directors in charge of iPad project, finding the balance by cutting off the budget to repair the laboratory personal computers up to 40% and in instead invests in iPad for all students and faculty members.

More specifically when expectations conflict; e.g., IT staff support the iPad project of the university while they did not even receive an iPad. Staff demands for an iPad in order to be able to give technical supports to the faculty members and students. The university provides iPads for them if they provide a help desk to

the iPad users. The organizations' interests may be served most effectively by obtaining an acceptable compromise on competing objectives and expectations.

Pacifying is another tactic which constitute partial conformity with the expectations of one or more constituents (Scott, 1983a). In our analysis of universities, we observed that the boards of directors tend to conform at least the minimum requirements for learning how to use and engage mobile technology into the practices of the faculty members. They introduced one session training for iPad while being sure that faculty members will not come to this session because they know that one session is not even enough. The university provides few training sessions in order to calm down the faculty members.

"Unfortunately, so many of our professors don't use their iPad. They didn't even open their device since they got it" (Head of the Department of iPad project at engineering university B).

"Apple Company offer us two days (each time 2 hours) training for our large quantity purchase every year. The purpose is a presentation about the functionalities of iPad" (Director of engineering school B).

"I don't know how to use iPad, training sessions are just wasting time and what we learn in two presenting sessions" (Professor at engineering university A)

A university that employs pacifying tactics typically ascends a minor level of resistance to institutional pressures, but allocates most of its energies to placate institutional source that it has resisted.

Bargaining is a more active form of compromise than pacifying. The tactics of bargaining involve the effort of the organization to obtain some concessions from an external constituent in its demands or expectations. For example, faculty members in the form of an organization may negotiate with the university's

directors to get paid for the extra hours that they work for learning how to use iPad and training other colleagues.

In particular, resource dependence theorists have developed in detail the "negotiated environment" of organizations (Pfeffer & Salancik, 1978, p. 143-187). That assumes that organizational relations with the environment are open to negotiation and the exchange of something in response to demands.

All three compromise tactics: balancing, pacifying, and bargaining are used in the spirit of conforming to institutional norms, or values.

Avoidance

Avoidance is recognized as an important response to institutional pressures as per several institutional and resource dependence theorists (Meyer & Rowan, 1977, 2008; Pfeffer & Salancik, 1978; Powell, 1988; Thompson, 1967). The organizations try to conceal their nonconformity or buffering from institutional pressures, or escaping from institutional norms or expectations in order to prevent the necessity of conformity.

The tactic of **Concealment** disguises nonconformity behind a facade of acquiescence. For example, the studied university may establish rational plans in response to institutional requirements in order to cover the fact that it does not intend to implement them. The university displays a variety expected activities in their report such as:

- Digitalization of all documents with the purpose of facilitating course preparation with iPad
- Setting up a separate technical support for having a better maintenance and help desk relating to the implemented mobile technology,
- Digitalizing all exams (through iPad)

However, these activities may not be a part of their normal activities and it creates a question: is the conformity apparent or real? Answering this question has become possible through our observation. Mostly the university established rational plans and procedures, which have been presented in their report (report submitted for the Tender process), in response to the requirements but in reality the university did not implement them.

Buffering tactic:

The example has not been found for the buffering tactic. It is when an organization tries to reduce the extent to which it is externally assessed. Buffering tactic is about decoupling internal work activities from formal structures as a means of maintaining the faith and legitimacy of the organization which is highly institutionalized (Pfeffer & Salancik, 1978; Thompson, 1967; Meyer & Rowan, 1977, 2008). Therefore, we could not see any example matching it.

Escape is the dramatic tactic of avoidance in response to institutional pressures toward conformity, an organization may exit the domain within which pressure is applied (Hirschman, 1970) or significantly alter its own goals, activities to avoid the requisite of conformity altogether.

For example, we have found the tactic of escape through our interview with the university C. The studied university stopped the iPad project after one-year implementation because their activities (low level of support of the academies such as support, training and resources) and goals (non-voluntarism of the relevant teaching teams or not the tendency of actors, community, educational team, and academy) did not respect the main requirements of the state (institutional requirements). Furthermore, if the university does not exit then it is not eligible for seeking the support of the investments for the future program.

Therefore, in our case the university exited from the project to avoid the necessity of conformity.

"How we can continue when our teaching and educational team don't have willingness despite all the efforts we make for our iPad project. In fact, the problem isn't just them but also we need to provide more resources in order to support the iPad project which wasn't enough successful that's the main reason why we stopped the iPad project" (Department director in charge of iPad project at university C).

There is another example of our studied university (university A) which explains the escape tactic. The university decides to change from one device (iPad) to another device to avoid the necessity of conformity or in other words, the circumventing conditions make conforming behavior necessary.

"It should be noted the very low participation (almost non-participation) of faculty members in the training days. Moreover, we did what was necessary: organize a return experience, proposal of time schedule for individual training, IT staff mobilized for sessions on tools installed at university for iPad control and iPad configuration). A dozen people had registered but 2 came.

Did all faculty members use the iPad in class? Are they autonomous on? Do you keep track of educational apps that are constantly coming out? If so, we stop the training, indeed it is useless. If not, it is not nice that they do not come to talk to their colleagues for a few minutes of their successful or failed experiences! But honestly, I think the problem is something else here: our teachers do not care about the iPad for the most part.

So what do we do next? We return the iPad? we stop giving iPads to students? It is the public money that is spent here, it hurts me a bit to provide gadgets to students, since not used pedagogically that's what they are in the end. Some play ping pong with the outdoor tables, which is to say the value that they give to this "tool", but is it surprising if we are the first to don not give it, "value"?

Once the question is resolved, it would also be necessary to stop a date for the discussion about iPad, PC and equipment of the new classrooms" (Professor in charge of iPad project meetings).

The above comments show that the actors mostly faculty members do not have tendency to engage to the iPad project of the university and the board of directors are looking for alter their goals or activities in order to employ conformity to institutional expectations.

Our data analysis shows that the university knows that the iPad activities are not towards pedagogy and the iPad project did not bring autonomous to students neither to the faculty members but it still uses the public money for this project and it makes attempt to alter the situation by changing the device.

"I propose that we fix a meeting in order to discuss "change of Tablet or no change in 2015" so that things and the process are clear for everyone, and also everyone can express themselves. Without necessarily making a final decision. There are recent new elements (transition to Casper MDM) that bind us more specifically than before with Apple. We will talk about it". (Department director in university A)

The acquiescence and compromise establish strategic responses to employ partial or total conformity to institutional processes however in opposite, the avoidance deploys strategic responses in order to turn around the conditions that make conforming behavior necessary.

Defiance

In this tactic, we see the strategic responses of a group of faculty members and educational team of the university in a form of an organization to the institutional pressures (using the implemented iPad into their teaching activities and practices) applied by the university (board of directors).

Defiance is defined as a more active form of resistance to institutional processes. Tactics for increasing active resistance are dismissal, challenge, and attack. **Dismissing** is about ignoring institutional expectations and it is a strategic

option when an organization sees the internal objectives conflict very dramatically with institutional requirements.

In the studied universities, we have noticed the temptation of faculty members or even the students to ignore the force of cultural expectations of the university which is exacerbated by deficient organizational comprehension of the rationale behind the institutional pressures and noncompliance as the result. For example, the faculty members ignore the implemented iPad explicitly and not accepting to use or engage the device into their exams or teaching practices because of seeing this mobile technology as wasting time for their classes. More importantly, they ignore the university's force of iPad project due to the lack consideration of university to their demands and needs. Therefore, dismissal is a strategic option for them in resistance to the institutional pressures of the university.

"We have the bad habit of working for notes, the pace is even slow, there are a lot of extra school curriculum activities, there is iPad in progress, internet in the school, ... kind of taking me away from work. So, I must admit that I do the minimum." (Student of 4th year of engineering university A)

"We have so much work to get done and we do not have time to learn how to do the same task with different applications of iPad" (Professor at engineering school B).

"I asked university director for having a laptop several times which helps me most but they gave me an iPad instead!!!, what am I supposed to do with such a mobile tool? It is useless" (Professor of university A). "They gave us an iPad which we didn't even ask for it and they never asked our technological needs and suddenly they came up with this iPad project. I didn't see how Tablet could improve our pedagogy" (Professor of university A).

"Among the disadvantages, the majority of students emphasize distraction: more than 99% of students pointed out that this is a tool that can distract in class. They also report writing difficulties for producing long texts using the Tablet. The management of the work is complicated and some textbooks are unsuitable according to some student testimonials. Finally, others have even said that iPad had, for them, a negative impact about their academic success. Teachers generally make identical observations" (Group of professors at university A).

Challenge is a more active departure from norms, or expectations than dismissal. The faculty members that challenge institutional pressures (applied by university through the adoption of iPad) go on the offensive in disobedience of these pressures and may make a virtue of their resistance. For example, conformity of the faculty members to highly institutionalized set of iPad project activities defines the university's pressures for a common understanding of digital educational requirements and the process of digital education.

Faculty members will be more prone to challenge the norms and rules of the university related to the mobile technology implementation when the challenge reinforced by demonstration of their rationality.

The faculty members and educational team (support) will be more likely to challenge institutional rules of university. In fact, they attach considerably less to widely shared beliefs of directors than to their own vision of should be appropriate to the students. For example, several professors and IT staff have attempted to challenge rule of getting exams digitally through iPad to conform to mobile technology appropriation because they feel this rule is not "rational".

Therefore, they have a plan B (hard copies) because the mobile technology bugs are above reproach. According to our direct observation in university B, we have noticed bug of the iPad at the time of the annual exams of the university. The university decided to shift the exam in a month.

"We have no alternative but to postpone because the subjects were revealed". (Vice president of engineering university B)

This decision, however, aroused the anger of students, "overworked". In fact, the university would have had to provide a backup solution: prepare hard copies or at worst postpone the test to next day. In opinion of the Economic, Social and Environmental Council (EESC) rightly considered that France still had "great efforts to be made" to develop digital pedagogy in higher education institutions.

Despite the board's pressures for using iPad in their lectures, the faculty members provide a lecture, which requires high technical skills to acquire knowledge, and it is more adapted to the non-iPad classes because of existing bugs and technical issues of iPad.

"Despite the restart of the app, impossible to start on my iPad this morning, as well as other students in my group (well, I had the computer, but not the students! Advice: not set everything on iPad and provide a plan B" (Professor of university A)

"Data lost again due to the technical issue of iPad apps, take your multiple test questions with hard copies or digital file rather than using this tool" (Professor of university B)

"I don't use iPad in my class; it is not an appropriate tool for my classes which are mostly technical and it needs Mac computer" (Professor university A).

Attack

We have not found an example for the tactic 'Attack' as it is quite an aggressive strategy, striving on assault, disparage or strongly denouncing institutionalized values, we could not see any example matching it.

Manipulation

The strategies of acquiescence, compromise, avoidance, and defiance show increasingly active levels of resistance of an organization to the given institutional demands and expectations. Manipulation is defined as the most active response to institutional pressures because it is intended to actively change power over the content of the expectations themselves. Manipulation is an opportunistic attempt to co-opt, influence or control the institutional evaluations.

An organization may attempt to co-opt the source of the pressure in response to the institutional pressures (Burt, 1983; Pennings, 1980; Pfeffer & Salancik, 1978). For example, the board of directors of the university may attempt to co-opt with some faculty members in the iPad project (support for training their colleagues or sharing their experiences in using iPad) in order to obtain support and willingness of other faculty members for iPad project as well. As mentioned in the week conference of mobile learning in UNESCO: "Teachers are the pillars of education systems and their involvement is crucial for the viability of Information and Communication Technologies in educational initiatives". Here are the comments of the director or vice-president of the studied universities:

"Our first year experience in implementing iPad, we have realized that our professors didn't participate for one training session of Apple Co. and they must need a help desk. That's why we are going to set an equip of some faculty members who are expert in using iPad, they will be a good example for other faculty members, at the same time they help others to learn and we pay for their services, for extra hours (Director in charge of ipad project of university B).

"When firstly the university brought iPad, I was so interested in the project, when the director asked for a faculty member to get the responsibility of iPad project such as demands and meetings of faculty members so I was volunteer for that. We are colleagues and we can share our interests or conflicts about the iPad project. At least I could influence my close colleagues who we have common lectures" (Professor in charge of iPad project, meetings...)

Influence is defined as a tactic, which may be more generally directed toward institutionalized values and beliefs. Organizations may strategically influence the standards by which they are evaluated (Scott, 1983). The manipulation of belief systems is reflected by this tactic. For example, the university's board of directors shows the success and a good return of the iPad project of the university in order to enhance beliefs to influence the potential funding and obtainable support from the public sources (regional or governmental).

"This week is the deadline for submission of our application for a regional tender for the purpose of digital education, can you give me a report about your observation in our school, and a report with two parts: the strong points and improvement areas" (Vice president in charge of iPad project in university B)

In the following table, we show the examples for each tactic in order to illustrate how the strategic responses take place inside the studied context. In addition to the five strategic responses, we have found one more strategic response from the studied context and we created **an additional strategy with** three additional tactics:

Strategy: Disguise

- Acting
- Intrusion

This additional strategy "disguise" illustrates the hiding, changing, modifying appearances in order to modify the institutional perceptions.

Acting is a tactic to modify the appearance of the organization by going on the stage and talking about the organization's actions in order to create a new identity that will be accepted by the institution. The organization aims to talk the walk while the institution will eventually react by walking the talk. The director of university in charge of iPad project presents actively in the UNESCO conference of mobile learning, other mobile learning conferences organized by General Direction of School Education (Dgesco), the General Inspection of National Education (IGEN), digital education seminars, Apple Co training sessions. Therefore, the university will be perceived as a dynamic university regarding mobile learning and digital education. The university is acting as if it is true. Eventually the university will receive better offers from the high-tech companies and more importantly enhance their potential for receiving more funding among other universities. The university ends up adopting the created identity on a public stage.

According to the analysis, this is the best way that they have found to persuade faculty members to change their perceptions, to accept and appropriate to the implemented mobile technology because it is externally accepted.

"Generally we want to make lots of noise out there, in academic environment, through different sources, research or media so that we can get more funding and support for our university. That's a much more persuasive way of doing it" (Vice president of university B)

At the same time, this strategy is a good publicity for the universities, as noticed during our observation, so many of students and faculty members believe that the implementation of iPad is a project to enhance the image of the university and attracting new students as well.

"When our professor goes to a conference, presenting his work with iPad enhances image of his job" (IS director of university B).

The most important thing will be the image of the university and not us" (Professor, university B).

"It is obvious that iPad is not for us, it's good for the image of university among those who are in competition with" (Students of 4^{th} year in university A).

Some students see the iPad project presentation in public as an opportunity for their future career and job profile.

"iPad in our university give us value, it shows that we have experience of using latest technologies" (Students of 5th year in university A)

"Our university iPad project is good and gives a good image to the companies that are intended to hire us" (Students of 4^{th} year in university A)

Therefore, if the university manages to talk and get other stakeholders (students, faculty members) to communicate about iPad project, then their fellow colleague

will start to adapt to this new identity and modify their perceptions and start to appropriate to the implemented mobile technology.

Intrusion is a tactic of disguise strategic responses of the university that we have identified in our studied context. The university's board of directors intends to intervene into the teaching practices of the faculty members through the adoption of mobile technology and the university covers this intention with the objective of the iPad project as an educational innovation at the service of the development of digital education. Intervention into the practices of the educational team specifically the faculty members is not defined and accepted by the institutional (academic) environment, then the university apply their interference internally and cover it with an innovative strategy. The conversation between some professors in the university B:

- F. Holland announced in November a new big Digital Plan 2016: all the students of colleges will be equipped with digital Tablets from the 5th year
- Ah, you see ... in our university, we will have been pioneers in new pedagogies!
- Yeah, yeah ... pedagogies "news", with Tablets it is mostly audio-visual and Multiple Choice Test... Moreover, noting mentioned about the ecological problems, isn't it sad! (Manufacture of Tablets, necessary data centers, electronic waste, planned obsolescence.)
- There is also the problem of the surveillance society, as Michel Foucault said when speaking about "technologies of government"
- Monitoring company?
- Here, look at this testimony of a teacher on Pronote software, you think we have to talk about the introduction of ICT at school or intrusion of ICT at school?

To ensure the management of iPad and its proper spread, both observed universities have been equipped with a monitoring tool (MDM: Mobile Device Management). Some professors are worry about to be controlled or to be dictated the manner of doing their jobs. The faculty members have the perception of being controlled or directed by the university, which raises stress for them. They have this perception that Tablet is threatened their privacy by monitoring their uses or time of usage then this factor is categorized as a threat only for faculty members.

"I was afraid of losing my privacy after years of teaching experience; I don't want to do my job in the way that they set for us" (professor of university A). "I don't like to feel that someone controls me, it is about 15 years that I choose the most suitable teaching method for my students" (professor of university B).

"From this year, we will be equipped by the monitoring system. We paid to install the MDM, this tool would be very useful to check the uses of our students and also faculty members, any of them who received iPad. For example, I can see when the last time that my colleagues used iPad is, for instance, one teacher did not open iPad since he received it. We can see what application they have on their iPad or do they use the application that we paid for" (Department Director in charge of iPad meeting in the university B).

Table 20 - Strategic responses to adoption of mobile technology at universities

Strategies	Tactics	Illustration encountered during our research
Acquiesce	Habit Imitate	Take mobile technology for granted Mimicking other universities
	Comply	Anticipation of institutional requirements (Ministry of education, Digital Academic Delegates)
Compromise	Balance	Cutting off the budget for repairing laboratory PC and in instead investing in iPad
Pacify	Introducing one training session while being sure that professors don't will to come	

Bargain	Negotiating	with	the	university's	directors	about
	extra hours payment and resources					

Avoid	Conceal	University established rational plans and procedures for Tender purpose (acquire funding)	
	Buffer	No change	
	Escape	Change from one device (iPad) to another device to alter their goals and activities	
Defy	Dismiss	Ignore the implemented iPad explicitly	
	Challenge	Create classes without iPad despite the director's pressure	
	Attack	No change	
Manipulate	Co-opt	Getting some professors involve in iPad project to influence their colleagues	
	Influence	Enhance beliefs in future legal requirements or in potential governmental Funding	
	Control	No change	
Disguise	Acting ,	Go to seminars, conferences and create an active profile in digital education	
	Intrusion	Intervene into the professor's practices with a cover of an innovative strategy	

According to the definition of Acquiescence, we can see from our results that the board of directors imitate from other institutions (universities) which already adopted mobile technology. For example, they will try to encourage the university's participants like faculty members to adopt the implemented mobile technology and try to appropriate it into their practices. Furthermore, as we explained, they will attempt to reach some compromises through bargaining with

faculty members about the extra time that they spend for learning iPad. Further, pacifying the faculty members by introducing some training sessions and supports. At the same time, the faculty members defy the institutional rules and take some risks such as ignoring the mobile technology event explicitly that have been accepted by the university's directors and create the lectures that are not adapted to iPad and push the limits. Lastly, directors and participants in charge of the iPad project indicated some strategies that refer to manipulation while presenting a good report and showing the progress in their iPad project in order to enhance beliefs in potential regional and governmental funding offers. More importantly, we identified a significant strategic response of the university towards the adoption of iPad project, which consists of the tactics of acting and intrusion.

Our results highlight the importance of all university's stakeholders on the implementation of a strategy. As we presented it in this chapter, according to the strategic management, various tensions can appear that will negatively impact the development of a strategy.

From a traditional institutional perspective, it is assumed that organizations influenced by the institutional pressures of their environment, actors passively and mechanically adopt institutionalized practices in order to ensure their legitimacy (DiMaggio & Powell 1983). However, this passive submission is not the only possible response of actors to institutional pressures; instead, they have a range of strategic responses, such as compromise, manipulation, provocation and avoidance (Oliver, 1991).

Our results conduct us to suggest that the respect of the existing norms (conformity and acquiescence) is not necessarily the fact of a passive adopted behavior for reasons of legitimacy. However, it can be the utility of a reflection and a conscious approach to manage all aspects of risk that can be identified in order to ultimately ensure the success of the project. According to the study of

Mignerat and Rivard (2007), the manager may seek to use a variety of strategies. It is important for a senior manager to understand the institutional context in which the project manager works if he wants to be able to control the strategies that he will implement to ultimately avoid the most extreme strategies (such as defiance and manipulation) which can potentially go against organizational objectives. Finally, it suggests that compliance with existing standards (compliance and acquiescence) is not necessarily the result of passive behavior.

6.3. The process of institutionalization

At first, the current theoretical of institutionalism considered that initially "mechanistic" organizations (created to achieve technical objectives) have a tendency to gradually transform themselves into "institutions" (whose objective is to become perpetuate through the infusion of values and social norms). However, for the neo-institutionalism, it is actors who, in practice, play with the institutional rules and can thus legitimize changes in an institutional field.

In a cognitive approach, the decision is apprehended as the result of process in which routines of institutional origin play a major role. The emphasis on cognitive dimensions also distinguishes neo-institutionalism from original institutionalism. It is in the current sociological approach that DiMaggio and Powell (1997) are connected. It becomes classics of the theory of organizations and revolves around a theoretical construction whose concept of institutional isomorphism is the founding foundation. The neo-institutionalism approach is more oriented towards the analysis of inter-organizational systems, beyond the focus on only the forces within an organization (Powell & DiMaggio, 1997).

Moreover, in the utilitarian perspective of neo-institutional economic thinking, the sociological approach emphasizes that formal structures have both symbolic and functional properties and the adoption of a structure can occur independently of the problems of control and coordination that an organization faces (Meyer & Rowan, 1977).

The process of institutionalization of the organizational field is then well characterized by DiMaggio and Powell (1997). It is articulated around four phases: a) a growth of organizational interactions in the field; (b) the emergence of dominant inter-organizational structures and coalitions; c) an increase in the level of information to be processed; d) the participants' awareness of their common membership in a field of activity. While significant institutional pressures are exerted and lead to the homogenization modes of action, a form of collective rationality peculiar to the field is gradually developing. Even if the organizations wish, in a more or less recurring way, to introduce changes, the consequence is, under the effect of the institutional forces and the interest of the actors (DiMaggio, 1988), a decrease of the diversity. The permanence and similarity of complex social systems is thus explained through the interaction of actors whose actions are conscious and sometimes finalized but which incidentally tend to reproduce at the aggregate level the institutions that constrain these actions. While directing action, institutions act as a filter through which individuals discover their preferences (DiMaggio & Powell, 1991: 11).

DiMaggio and Powell (1997) argue that the most appropriate concept for describing homogenization dynamics is isomorphism. It makes it possible to identify the process that leads the unit of a population to resemble units facing the same environmental conditions. Such an approach suggests that organizational characteristics change to become progressively compatible with the dominant features of the environment.

Beyond the competitive isomorphism, DiMaggio and Powell (1997) affirm the predominance of the institutional isomorphism. Organizations not only compete

for resources but also search for power and legitimacy. To gain this legitimacy, organizations engage in symbolic activities and create stories which contributes to their survival and their own institutionalization. Organizations do not necessarily adopt the most appropriate practices but those that appear to be the most socially acceptable. Then, the question that arises is about the change, institutionalization of organizational practices and forms. Explanations of institutional isomorphism are articulated simultaneously around the emergence of a normative discourse and the pressures that organizations and actors exert on each other.

6.4. Institutional isomorphism: a homogenization of practices in an organizational field

We can describe convergence within an institutional field according to several types of isomorphism (DiMaggio & Powell, 2012).

Coercive isomorphism is the result of formal as well as informal pressures from organizations belonging to a field. It is also derived from the cultural expectations of a society. In this perspective, new political and legislative rules are likely to encourage organizational change. For example, the announcement of digital education and modern pedagogy requires innovation. Moreover, organizational structures and modes of action come to reflect the dominant rules which are enacted by a society or state (Meyer & Hannan, 1979). However, coercion can be more subtle and involve the informal adoption to gain legitimacy.

Normative isomorphism differs analytically from the previous one. Normative isomorphism gives importance to the phenomenon of professionalization. Professionalization is understood here as the collective efforts of the members of an organization to define their working conditions and methods and to establish a legitimate basis for their activities which guarantee them a sufficient degree of

autonomy. Two aspects of professionalization are considered as important sources of isomorphism: one concerns formal education systems, the other is related to the growth of professional networks through which organizational diffused. Such mechanisms produce quasi-interchangeable individuals who react almost identically, regardless of the contexts and situations. Professionalization maintains uniformity and also socialization through common practices. Thus, the members of the profession decide to act especially by the demonstration of the conformity of their decisions with the norms which are produced by the social structure. Thus, these standards produced and generated in a constantly renewed process and a growing homogenization of structures. In this spirit, decision makers are led to give the illusion that they behave rationally by adopting standards of behavior and techniques which perceived as the most appropriate way to achieve the goals set by the market. For example, The University's directors intends to intervene into the teaching practices of the faculty members through the adoption of mobile technology and the university covers this intention with the objective of the iPad project as an educational innovation at the service of the development of digital education. Intervention into the practices of the educational team specifically the faculty members is not defined and accepted by the institutional (academic) environment, then the university apply their interference internally and cover it with an innovative strategy.

In addition, although homogenization within organizational fields is very largely sustained by the exercise of normative and coercive institutional pressures, it is also the result of the frequent inability to imagine new solutions. In a state of uncertainty, individuals are often inclined to search for "their own solutions" (Cohen et al., 1972).

DiMaggio and Powell speak of a mimetic isomorphism, however we can consider that mimicry is rather a type of rationality than an isomorphism. This dynamic takes the form of the imitation of the behaviors which are easily identifiable or used by most organizations in order to appear legitimate in a field. In this sense, the innovation selection process is driven more by mimetic isomorphism tendencies than improved performance.

More than other forms of isomorphism, the concept of mimetic isomorphism has often been taken, used and disseminated in social science and management studies (Mizruchi & Fein, 1999). Mimicry represents not only a powerful means of coordination as the conventionalists insist, but also it becomes a real modality of routine coordination and a mechanism of normalization of the behaviors. Mimicry is supposed to generate effective solutions at lower cost. Mimicry also appears as a producer of social structure as well t favors fashion phenomena and its management is a well-known case. This form of isomorphism leads to compliance, imitation and more importantly the attraction of managers for new tools and management methods.

6.5. Institutional work

However, the arguments and representations that appealed for digital education refer first to conceptions of what is considered constitutive (and legitimate) of a modern university in the twenty-first century. These representations did not impose themselves, however they were led by a particular group of actors at the initiative of this evolution: the presidents of the studied two universities. The latter have indeed played a determining role and called up the members of their university. The idea of the mobile technology implementation did not come "from the ground" but those who were at the head of the concerned institutions first carried it. The actors most engaged in the restructuring of the university are the school heads. It is they who "impose" their vision, their understanding of the transformation of the world of higher education to all the components of the institution.

It is very largely the presidents who develop the arguments and stories that we have identified in chapter 4 and first section of chapter 6. If they have found allies in the person of their secretaries and their vice presidents, they are obviously "entrepreneurs" of the mobile technology adoption.

Mobile technology adoption, an innovation that is taken by surprise and not a revolution

However, the mobile technology implementation of universities (A and B) takes the French university world by surprise when it is announced. Therefore, the justifications that surround it and the representations that it carries, they are not in contradiction with those circulating in France at the same time. The studied universities directors said that they did not occupy neither a position of opponents nor a position of leaders in the French university system.

It means that neither "challengers" nor incumbents, rather they are well-integrated members within the organization who will push a new organizational solution without upsetting or questioning the whole.

The diagnosis focused on the French university. The need for digital and new modern pedagogy is largely taken by policy makers, ministry of education, many academics and various initiatives pushing in the direction of digital education or new pedagogy. Therefore, the initiative of two studied universities will not encounter major obstacles.

However, initially the mobile technology adoption of university A occurred without being explicitly encouraged or even considered as an example to follow. The university B announced that they were starting to implement mobile technology or had begun a reflection in this direction, develop arguments very comparable to that of the actors of university A. This diffusion phenomenon remains to be analyzed. The institutional position of the university A directors, is not without impact on this diffusion of digital university and new pedagogy, as

the new organizational form to adopt. The precise reasons why the other university's directors look at the mobile technology implementation of engineering university A, with interest is the approach deserve to be empirically studied.

Our analysis therefore reinforces the neo-institutionalist approaches that show how representations considered legitimate, provide place to scripts that are imposed on organizations, but also those that value actors and are interested in institutional entrepreneurs (DiMaggio, 1988).

The notion of institutional work makes it possible to take into account the plurality of activities undertaken by different actors vis-à-vis institutions. Where the notion of institutional entrepreneur focuses attention on activities and aims at modifying existing institutions, or creating new ones. The notion of institutional work broadens to a broader set of actions that target institutions.

The notion of institutional work allows one to develop from the figure of the hero institutional entrepreneur and to account for the multiplicity of actors who involved in institutional processes. The necessary institutional work is not led by one but by multiple actors, in a collaborative effort and some supporting the initiative of others. For example, adoption and implementation of mobile technologies in French education system is the multitude actions of the State and the Ministry of Education. It shows that the introduction of digital education in France was the result of a multiplicity of interactions between several actors among which, those who supported digital education project are those who tried to shape it.

In addition, Bartley (2007) demonstrates that the constitution of institutions is an emerging process that results from the institutional work done by all parties and not pre-determined by the action of a few institutional entrepreneurs which followed by only mimetic pressures. This approach makes it possible to understand the establishment of institutions as political processes.

CONCLUSION OF CHAPTER 6

The results of this chapter helped us to understand the university's main strategy in adoption and implementation of mobile technology and how far it supports the mobile technology appropriation.

The results are based on 15 semi-directed interviews conducted with university's participants who are involved in the implemented mobile technology and our previous data.

They are the faculty members, the principle, vice principle and department director, in fact some of them they do not have a formal title but they are the professors in charge of iPad project and strategically work towards the mobile technology implementation. Our interviews and data analysis show that these individuals do face various tensions inside the university. Looking at the main strategy of the universities, our attention focused on the imitation and intrusion phenomenon. At the same time, we presented the impact of the university's image on its strategy.

We compared our work to the study of Olivier (1991) about the university's strategy and described convergence within an institutional field according to several types of isomorphism (DiMaggio & Powell, 2012). Our analysis therefore reinforces the neo-institutionalist approaches that show how representations considered legitimate, provide place to scripts that are imposed on organizations, but also those that value actors and are interested in institutional entrepreneurs (DiMaggio, 1988). The developed strategic responses of university or its' participants are very similar to the different strategic responses presented by Oliver. In addition to his findings, we created an additional strategic response "disguise", this new category fits some strategic modes like Acting and Intrusion which are described by our respondents.

CONCLUSION OF PART 2

The purpose of this Part was to understand from empirical research why and how mobile technology is used in higher education.

What is going on in the university? And how do university's participants use the given mobile technology?

To serve this purpose Chapter 3 presented the results answering the subquestion what are the uses of mobile technology. At first, we have shown the interactions and utilizations of university's participant with Tablet in a natural way. We presented the different situations and stories of students.

Firstly, different types of iPad uses among students are described. Secondly, we described the perceptions and experiences of faculty members which influence their established relationship with the mobile technology. Concerning students, their perceptions may have an effect on their relationship with the given mobile technology but it isn't the only factor, the experience of using Tablet may change the existing effect. Different actors may influence students' perceptions like peers (especially school friends/classmates) and the faculty members. Results are further used as preliminary result for analysis of chapter 4.

How do university's participants perceive the induced changes brought by mobile technology?

Chapter 4 introduced the results explaining the adoption and appropriation of mobile technology by universities cannot be any longer separated as they traditionally have been. The result shows that different appropriation behaviors appear according to the different adoption logics. Our conceptual framework presents that there is a link between process of adoption and appropriation.

The presented framework aims at better understanding the logics of adoption and appropriation as well as the link between them. In addition, it represents that the mobile technology appropriation by universities' participants are highly depended by the way which is adopted.

Indeed, the large distribution and adoption of mobile technologies in the private life of people has a strong influence on the adoption process by universities. At the organizational level, the universities often follow a mimetic behavior rather than a rational adoption process. As consequence, the appropriation process is mostly dictated by organizational characteristics such as symbolic logics. This logic of adoption generates different type of uses among students and faculty members. They use a very limited number of possibilities of mobile technologies, consequently limiting the benefits for the institutions. The results present that learners and trainers use mobile technologies differently as they are obliged to use them to show that they are integrated into the projects of the institution and they are responsible for it. Moreover, it should be considered that the appropriation process of mobile technologies is the result of strong interactions between the individual and the organizational level.

Our results were compared to theory. Two main comparisons emerged. One with the literature that mentions the adoption logic at individual and organizational level as well as its' influence on the individual's appropriation logic of mobile technology. The other comparison with the Coping theory about the four categories of primary appraisal (Loss, threat, challenge and opportunity) is done and its' link with the identified adoption factors have been found which hasn't been discussed in this theory.

By highlighting the perceptions and the primary assessments of individuals about the adoption of mobile technology in university context, our next step is to understand their coping acts in order to respond to the induced changes that is caused by the implemented mobile technology (chapter 5).

What are the actions taken by university's participants in the adaptation process of mobile technology?

Chapter 5 analyzed different adaptation behaviors at the individual level. The coping efforts of students and faculty members are classified into two categories: Active and passive responses. The results of chapter 5 highlight the coping activities between individuals (self-oriented efforts) and mobile technology as well as the coping activities between mobile technology and learning/working environment (task-oriented efforts).

In addition, the results highlight the effect of taken coping activities by the peers and co-workers on the participant's behavior as well as the effect of adaptive activities of the institution. In this regard, a new framework emerged from our empirical results and the theory of coping. The results present adaptation as a process which involves continuous interactions and adjustments between the individual and the environment. The proposed framework shows the link between the result of chapter 4 and chapter 5. It discusses that the individual's assessment of the implemented mobile technology influences the individual's coping actions.

A continuous challenging adaptation process implies that participants engage adaptation strategies that are shaped through different adjustment and modifications between them and their environment. These modifications will be held within individual, group and organizational phases.

What is the university's adoption strategy? How far does it support changes towards mobile technology appropriation?

The results of this chapter show that the main strategy of the universities focused on the imitation and intrusion phenomenon. At the same time, it presented the impact of the university's image on its strategy.

Chapter 6 presents the factors that can potentially affect the participant's adoption and appropriation of mobile technology, either positively or negatively.

The result compared to the study of Olivier (1991) about the university's strategy. Moreover, the developed strategic responses of university or its' participants are very similar to the different strategic responses presented by Oliver. In addition to his findings, the result of this chapter created an additional strategic response "disguise", this new category fits some strategic modes like Acting and Intrusion that are described by our respondents.

PART 2

CHAPTER 3: Utilization of mobile technology

What is going on in the university? And how do university's participants use the given mobile technology?

Description of the realized 6-month observations (first field of study)

<u>Aim:</u> to describe two case studies without trying to analyze, play an introductory role in further result sections



CHAPTER 4: Participant's perceptions of the adopted mobile technology

How do university's participants perceive the induced changes brought by mobile technology?

Previous data (6-month observations- first field of study)
Discussion



CHAPTER 5: Mobile technology & Adaptation process

What are the actions taken by university's participants in the adaptation process of mobile technology?

Previous data + 4 month observations (second field of study)
Discussion



CHAPTER 6: University's strategy & mobile technology adoption How far does it support changes towards mobile technology appropriation?

Previous data + 15 interviews



Main Conclusion

Main results, Discussion, Theoretical and managerial implications Research limitations and perspectives

MAIN CONCLUSION

« You're not here anymore. You've got to leave in order to return to the present. » PAULO COELHO Aleph (2011, p.9)

It is the end of this dissertation, as a PhD research needs to conclude in order to open up to other developments. It is the beginning of various possibilities and research perspectives.

This last part summarizes our main results (section 1), it also sums up the emerging discussion and demonstrate the link between our results and theory (section 2). The main contributions (section 3 & section 4) are presented and the limits that were encountered (section 5). Further studies will be suggested (section 6).

1. Result

When starting our PhD, our main aim was to understand why and how the universities use mobile technologies.

Our studies had different objectives:

- > To understand the utilization of mobile technology according to empirical results from university's participants,
- > To see how the same participants perceive mobile technology implementation
- ➤ To analyze the participant's behaviors towards the implemented mobile technology
- > To understand the university's main strategy behind the mobile technology adoption and evaluate its impact on university's participants

In total, two case studies were conducted. Two French engineering universities were selected as our fields of study:

• First case study is carried out during a 6-month direct observation at engineering university A (equal to 1155 hours) including 193 students and 88 faculty members.

• Second case study is carried out during a 4-month direct observation at engineering university B (equal to 704 hours) including 115 students and 29 faculty members.

In addition, 15 semi-directive interviews were conducted with professors in charge of iPad project, the university's director, head of the department as well as IT and administrative staff. All data were coded and analyzed. Much data has been analyzed like internal information exchange among faculty members (emails), university websites and student's iPad reports).

The main results are summarized in the following table.

Chapter 3 is a description chapter presenting 10-month observations in two case studies. It described the mobile technology utilizations of students and faculty members in different situations. As well, it introduced a definition set for mobile technology in education. In addition, it explained in details the uses types and participants perceptions of mobile technology and its changes over time.

Chapter 4 presented four types of perceptions of university's participants. The results explained that different appropriation behaviors appear according to the different adoption logics. As well, it showed a link between the primary appraisal and identified adoption factors. Furthermore, this chapter demonstrated a conceptual framework in order to show the link between process of adoption and appropriation.

Chapter 5 presented adaptation activities at individual level (self-oriented and task-oriented activities). The results proposed a new framework in order to explain that adaptation is a continuous process and would be a subject of episodic modifications which can be made at the individual, group and organizational level.

Chapter 6 presents the university strategy behind the adoption of mobile technology and evaluates how far it supports changes towards mobile technology appropriation. The result indicates an additional strategic response to the institutional pressures.

Table 21 - Main Results

Table 21 - Main Results		
Main questions	Results	
Chapter 3: What is going on in the university? how do university's participants use mobile technology?	 Types of mobile technology uses (iPad uses) Definition of mobile technology in education by students Definition of mobile technology in education by faculty members Utilization, perceptions and experiences of faculty members 	
Chapter 4: How do university's participants perceive the induced changes brought by mobile technology?	 Framework: the process of adoption and appropriation of mobile technology Three primary appraisals Adoption factors Link found between the adoption factors and primary appraisal of individuals 	
Chapter 5: What are the actions taken by university's participants in the adaptation process of mobile technology?	 Individual adaptation behaviors Emotional coping acts Active behaviors Adaptation at the organizational level (coping activities) Adaptation at the group level (coping activities) Coping activities between individuals and mobile technology Coping activities between mobile 	

	technology and work system - Coping activities between mobile technology and learning environment - Framework: Continuous process of adaptation
Chapter 6: What is the university's adoption strategy and How far does it support changes towards mobile technology appropriation?	 University's strategy Six developed strategic responses of university and participants Evolution of a "professionalization" of university work Institutional work

2. Discussion

The highlighted results were discussed in details in the dedicated section of each chapter. This part is only a short summary of the three discussions that were discussed at the end of Chapters 4, 5 and 6. The short summary of discussions is presented in the following table.

Table 22 - Discussions summary

Results	Discussions
CHAPTER 4 - Three primary appraisals	Chapter 4: How do university's participants perceive the induced changes brought by mobile technology?
- Adoption factors	Individual's perceptions (Folkman, 1992)
 Framework: the process of adoption and appropriation of mobile technology Link found between the adoption factors and primary appraisal of individuals 	Social influence, Task technology misfit, Subjective norms, Prior experience, Performance expectancy, Innovative performance, Effort expectancy, Top management-commitment Karahanna et al. (1999), Moore and Benbasat (1991), Agarwal and Prasad (1999), Agarwal et al. (2000), Taylor and Todd (1995a), Venkatesh (2000), Venkatesh et al. (2003), Lewis et al. 2003, Taylor and Todd (1995b), Ajzen (1985), Davis et al. (1989), Thompson et al. (1991), Venkatesh and Davis, (2000) Adoption at the organizational level (Gallivan, 2001) External pressure for adoption (DiMaggio & Powell, 1983) Adaptive Structuration Theory (DeSanctis and
	Poole, 1994) Organisations IT adoption (Orlikowski, 1992)

CHAPTER 5

- Individual adaptation behaviors
- Emotional coping acts
- Active behaviors
- Adaptation at the organizational level (coping activities)
- Adaptation at the group level
- Coping activities between individuals and mobile technology
- Coping activities between mobile technology and work system
- Coping activities between mobile technology and learning environment
- Framework: Continuous process of adaptation

<u>Chapter 5: What are the actions taken by university's participants in the adaptation process of mobile technology?</u>

Individual's adaptation behavior (Orlikowski and Robey, 1991)

Episodic modification (Tyre and Orlikowski, 1994)

Activities at the group level (DeSanctis and Poole, 1994)

Changes in terms of technology and work system (Tyre and Orlikowski, 1996)

IT adaptation at the organizational level (Orlikowski, 1996)

Coping Model (Lazarus and Folkman, 1984)

Coping Model of User Adaptation (CMUA) (Beaudry and Pinsonneault, 2005)

CHAPTER 6

- University's strategy
- Six developed strategic responses of university and participants
- Evolution of a "professionalization" of university work
- Institutional work

Chapter 6: What is the university's adoption strategy and How far does it support changes towards mobile technology appropriation?

Developments on normative (or cognitive) isomorphism (DiMaggio & Powell, 2012)

Strategic Responses for legitimacy (Oliver, 1991)

The neo-institutional theory (Powell & DiMaggio, 1997)

3. Theoretical implications

The added pedagogical value of this research is to understand why and how universities implement and use mobile technologies. Although our studies belong to the field of management, we tried to understand and classify the different involved factors in the adoption of the organizational level which influence the adoption and appropriation at the individual level. As we stated in chapter 4, it appears that adoption and appropriation are closely linked. As far as we know, these two notions (adoption and appropriation) have been separated in the IS literature and the presented conceptual framework enables us to understand the adoption process.

As we could not find any argument explaining effect of the adoption process and its link with the adaptation behaviors of individuals. In fact, chapter 5 is intended to present this effect on the whole adaptation process of the adopted mobile technology. These results are interesting as they propose a basis for discussion.

Despite its limitations, this study has identified antecedents to individual behaviors which is related to the implementation of a mobile technology. Indeed, the literature in information system reports many adaptation behaviors, appropriation, reinvention or infusion. However, no study had investigated the antecedents of various behaviors and their link with the adoption. The coping theory has provided an interesting track to identify some of these antecedents. In addition, the proposed frameworks are emerged from our empirical results which are developed from our back and forth between the fields of study and the literature review. Moreover, as demonstrated in Chapter 4 and 5, all these studies suffer from the lack of an integrating framework. It is reasonable to

believe that the coping theory and frameworks developed in this study may be useful for integrating knowledge from these studies.

This study aims to study the implementation of mobile technology in education by focusing on adaptation aspect rather than learning aspect. There are numerous studies to understand the learning aspects of mobile technology in education which was not the aim of this study. Our study suggest that the more mobile technology is adapted by individuals and institution into working and learning system, the outcome will be more about acquiring new knowledge and skills.

Indeed, the frameworks are emerged from previous information system studies and a solid theory therefore, it is reasonable to believe that it can guide future research toward achieving a better understanding of this phenomenon and its role in the institutions.

4. Managerial implications

This research demonstrates the need for university's directors to understand firstly the influence of their mobile technology adoption logics on the adoption logics of their actors (students, faculty members and staff) which further impact on their perceptions and their appraisal of the implemented mobile technology. Secondly, the proposed framework helps university's directors to realize that providing only mobile device for actors is inadequate in the project of mobile technology implementation and they need to understand the importance of their adaptation activities in the whole adaptation process. They should provide them adequate resources, technical requirements, pedagogical innovations and adapted system by modifying the behavioral routines, assisting and trainings/help desk etc. Therefore, university's directors can promote adaptation strategies that are likely to minimize negative associated emotions with the implementation of

mobile technology and improve the coping activities of university's participants in the process of adaptation which differ from the students to the faculty members as well as from one individual to another.

Furthermore, the proposed framework helps the university's director to manage mobile technology induced changes before and after the implementation of a mobile technology. As well, it provides them some tools which are helpful in predicting the coping activities of participants to manage them more efficiently.

At the practical level, this study emphasizes the importance of the prior evaluation of participants about the mobile technology adoption and its link to subsequent coping acts at different levels. Indeed, a better understanding of the relationship between the perceptions, assessment of a mobile technology and activities help institution's directors to develop coping appropriate implementation strategies. In addition, they will able to develop appropriate training programs and provide effective mechanisms to support the mobile technology implementation. In this sense, the study suggests institution's directors to understand the participant's perceptions which influence their actions. The individual's coping actions differ depending on whether participants consider mobile technology as a threat, a loss, or an opportunity. If the goal of implementers is to improve the working and learning environment of participants, it may be useful to know how participants perceive mobile technology. Therefore, this knowledge helps us to predict their potential behavior. The study lays the base for the development of a useful diagnostic tool that could be used even before implementation. This tool helps institution's directors set up appropriate strategy in adoption of an appropriate technology and to ensure participants adopt a task-oriented coping activity as soon as it is implemented.

In addition, an interest lies in the frameworks set for adoption and adaptation process. These may be useful for organizations to clarify their own vision of mobile technology adoption and to articulate their strategy in harmony with a clear vision of individual's adaptation activities towards the implementation of mobile technology.

At the end, the research shows that universities do not manage mobile projects as they should. This situation is certainly related to the fact that mobile technologies are still new in education and furthermore, the universities have a limited perception and knowledge about them. Moreover, mobile technologies introduce many changes relating to time, space and control, which need a new way in pedagogy. Then a true nomadic culture (Chen et al., 2005) is needed to get the best use of mobile technologies.

Concerning the methodological value, this research contributes a demonstration of a realized work by leading to the qualitative method that conduct a vast scale of observation which is less utilized in studies of adaptation. It is proved a very useful method in order to understand deeply the behaviors and activities of the actors in the university and the relationship between them.

5. Research limits

This research has several limits like other studies. The first limitation relates to the cultural aspect. In fact, culture of participants did not consider in this research. Most of the participated individuals were French. However, some participants were international students who are studying and living in France. Therefore, this is a limit to the understanding the influence of various cultural approaches on the assessments of individuals and their coping activities in the process of mobile technology adaptation.

Using the Grounded Theory can be quite time consuming and it may be challenging to have a broad and detailed understanding of all the data and the potential results. More time would be needed to free our mind from existing results and allow additional results to emerge.

As this research is specialized in management, our knowledge of Education and Psychological sciences is limited. This PhD is specialized in Management and covers some issues that are linked to the education and psychology. More knowledge must to be gathered to understand certain related factors to psychology. For instance, character of participants or other factors relating to the individuals themselves are likely to affect users' primary appraisal. These factors can show "an individual's anxiety regarding a specific situation tends to generate further anxiety through anticipatory self-arousal" (Bandura, 1977; Rosen et al., 1987).

Those observed university's participants were not visited before the implementation of mobile technology. The coping process has been found to occur at different points in time for various individuals (Folkman, 1992). The anticipation period (which is called pre-implementation) is when the participants shape the expected consequences of the future technology adoption. We visited our participants in the universities where mobile technology has been implemented for a year or for two years. Therefore, it can be considered as the second limit of this study which may have influenced our results, especially the primary appraisal of participants. However, we tried to understand the perceptions and expectations of students during our informal conversations and faculty members with a semi directive interviews but at the same time it is possible that some participants have reported weaker stories about their appraisal in the *anticipation* period (called pre-implementation). Clearly, these efforts will not have eliminated the random error in this part of data.

During this research, we conducted certain interviews with the head of departments or the persons who are in charge of iPad project but it was not possible to make interviews directly with the dean of the visited universities. Therefore, third limitation of this study is related to the missing of direct interviews with the deans of universities in order to better understand the adoption and implementation of mobile technology strategy particularly Tablet from their point of views.

The fourth limitation of this research is related to the similar characteristics of the both research sites (fields of study). Therefore, more studies and investigations are needed in other research sites with different characteristics in order to generalize the framework of this research to the other contexts.

6. Further research

We thus wonder if the main developed framework in this study can be validated with other mobile technologies, within other educational institutions (primary, secondary schools, and high schools), within other academic fields and within other participants and tasks.

Our first conceptual framework demonstrates that the adoption process can start at the individual level (prior to the adoption by the university) or can start by making adoption decision at the organizational level. As we stated that, the different mobile technology adoption factors at institutional level influence the adoption at the individual level. It is the value system of the university that drives the allocation policy such as a symbolic, status and imitation logics. Further research can be done to test our conceptual framework in a case where individual adoption occurs prior to the adoption at the organizational level. However, we studied the adoption logics at the individual level in a context where the mobile technology adopted first by the university.

The collection of data on coping activities is better to start in the anticipation period until the time that it is implemented in the university. This data collection period limit the problems which are associated with retrospective data and, by the same token, provide much more accurate data about the assessment and perceptions of participants.

We can very well imagine measuring the assessment of the situation twice. We believe that coping activities start to be executed not only after implementation, but also during the announcement of the forthcoming implementation. In this case, it may open a window for further studies.

Cultural impact: nowadays we see high involvement of the mobile technologies in the educational systems, then further studies could be done on other continents. This study was done in one of the western country (France). Therefore, the same study can be held in other countries in order to study the impact of culture in the process of adaptation and the strategy of mobile technology adoption.

Future studies would be well worth by considering different personality characteristics. For example, it would be interesting to check whether certain individual factors, such as 'self-efficacy' and 'innovativeness' undoubtedly influence the assessment of the individuals. However, this is the case, one should investigate their effect on the individual's appraisals and the coping efforts.

The impact of pedagogy type on the process of adaptation: the nature of mobile technology user is nomad and it seems inconsistent to the studied pedagogy methods of the universities. Thus, it influence on the coping activities of students and faculty members in the adaptation of mobile technology. Therefore, the further studies are recommended to understand, how does type of pedagogy influence the adaptation process of the university's participants to the

implementation of a mobile technology? Which kinds of pedagogy do encourage this adaptation process? however, the further research can be conducted by focusing on the science of education.

Study the goal and motivation of universities dean about the mobile technology adoption, further research can be conducted to understand the priorities and the strategy of the universities better. Deans should be interviewed to evaluate their interest and support for mobile technology implementation and also to better understand the factors that encourage them to move towards such adoption.

Nevertheless, more studies and investigation have to be done to better understand adaptation process and highlight different hidden aspects of mobile technology adoption. We shall leave it for now as we need to conclude, but much could be said, imagined and written on this philosophical matter.

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Annexes 1:

INTERVIEW GUIDES

Faculty members

Introductory Questions:

• Could you present yourself (experience, position, activity) and describe your current responsibilities?

Kinds of mobile technologies used

- What kinds of mobile technologies did your university give you?
- Could you tell me a bit about your experience with mobile technology?
- How long have you had the experience of using this specific mobile technology?
- How do you define mobile learning?
- Who do these mobile technologies belong to?
- For which activities do you mainly use these mobile technologies?
- Who are the other users of mobile technologies in your university?
- Do you personally have mobile technologies?

Reasons for adoption

- Could you explain the reasons that led your university to adopt and give you mobile technologies?
- Strategic reasons? An improvement in pedagogy?
- What are, according to you, the goals pursued by the implementation of mobile technologies in your university?
- Do you think other universities (same education domain) used mobile technologies before your university?
- How would you characterize your institution's culture and do you think such a culture had an impact on mobile technologies implementation?

• Did you ask your university director to be equipped with mobile technologies or any other technologies?

Mobile technology deployment

- When were you informed of the decision to implement mobile technologies in your university?
- How was this mobile project presented to you?
- Do you think the potential benefits, drawbacks, and costs of mobile technology project were analyzed?
- Did you express your needs before implementation?
- Did you feel associated with this project?
- Could you describe your role in this implementation process?
- What is the goal of the university's mobile technology project?
- Who have a specific role in this implementation process?
- How do you think these mobile technologies are allocated in the university?

<u>Individual reactions and perceptions</u>

- How did you get involved in the university's mobile technology project?
- How did you react to the introduction of mobile technologies? Did you have negative reactions? Did you have difficulties?
- Were you willing to use such technologies?
- Do you think these mobile technologies address your needs?
- How does mobile learning change your role as a teacher?
- What does mobile learning bring for you and your students?
- Do you think that the use of mobile technologies improves your performance?
- Do you feel satisfied?
- Do you think that mobile technologies are symbolic tools?
- Do these technologies have an impact on stress?
- What has mobile technology project changed for you, in your professional and private life?

- Do you feel supported by your superiors or by IS function when you use mobile technologies or when you have problem with them?
- If we imagine that you have the management position of the university, do you adopt mobile technology at your university?

Usages

- How often do you use these mobile technologies?
- Is use of mobile technologies mandatory or do you have the choice to use them or not?
- Do you feel a certain pressure from university's director to use mobile technologies?
- Are there incentive mechanisms to encourage you to use mobile technologies?
- Do you have the possibility to use these mobile devices for private goals?
- Do you exploit all the functionalities of these mobile technologies?
- Do you think mobile technologies are easy to use?
- Did you get training in order to use mobile technologies?
- Did your personal circle (family, friends) have an influence on your use of mobile technologies?

Impacts

- What benefits do you get from mobile technology use?
- Are there drawbacks of mobile technology use?
- What is, according to you, the impact of mobile technologies on work practices, education, structures, processes and values?
- Does it have an impact on your personal work, on the time you work?
- Do you feel more autonomous?
- What is the impact on pedagogy?
- Does it have an impact on image? Does it give you a better image?
- Has the introduction of mobile technologies changed the culture of your university?
- Do you feel that you have to be more responsive?

Director and in charge of mobile technology project

Introductory Questions:

- Could you present yourself (experience, position, activity) and describe your current responsibilities?
- Could you describe your university? What are the Size and Structures of your university?
- Could you describe the evolution of your environment (in terms of technology, competition)?

Kinds of mobile technologies used

- Could you tell me what kinds of mobile technologies are deployed in your university?
- For which activities do you mainly use these mobile technologies?
- Who are the different categories of users of mobile technologies in this university?
- Do you personally use mobile technologies? Did your university give you mobile technologies?
- How long have you had the experience of using this specific mobile technology?
- How do you define mobile learning?
- How many people use these mobile technologies within university?
- Who do these mobile technologies belong to?

Reasons for adoption

- Could you explain the reasons that led your university to adopt and use mobile technologies? Strategic reasons? An improvement in pedagogy?
- What are the goals pursued by the implementation of mobile technologies in your university?
- What is the link between your strategy and the implementation of mobile technologies?

- Did your competitors use mobile technologies before you? Did it have an influence on the decision to adopt mobile technologies?
- How did you have the idea to implement mobile technologies?
- How would you characterize your university's culture and do you think such a culture had an impact on mobile technology implementation?

Mobile technology deployment

- When was the decision taken to implement mobile technologies in this university?
- Did you plan the implementation decision?
- Did you analyze the needs satisfied by such technologies?
- Did you analyze potential benefits, drawbacks and costs of this project?
- What was the role of Information Systems Department in the mobile technology initiative and deployment?
- Did other directions have a specific role in this implementation process?
- How were these mobile technologies allocated in the university? What is the allocation logic?
- Were there some difficulties in the deployment of mobile technologies?
- What is the goal of the university's mobile technology project?

<u>Individual reactions and perceptions</u>

- How did individuals react to the introduction of mobile technologies? Were there negative reactions?
- Were they reluctant or were they willing to use such technologies?
- How was the implementation of mobile technologies announced to students?
- How was the implementation of mobile technologies announced to_faculty members?
- How did you get involved in the university's mobile technology project?
- And you, how did you personally react when you were equipped with mobile technologies?

- Do you think that the use of mobile technologies improves your performance? Professor's performance? Students' performance?
- Do you feel satisfied?
- Do these technologies have an impact on stress?
- Do these technologies have an impact on your private life?
- What has mobile technology project changed for you, in your professional and private life?

<u>Usages</u>

- Is use of mobile technologies mandatory or do individuals have the choice to use them or not?
- Are there incentive mechanisms to encourage people to use them?
- Do they have the possibility to use these mobile devices for private goals?
- Do you think mobile technologies are well used? Misused? Underused?
- Are the functionalities of mobile technologies fully exploited?
- Do you think mobile technologies are easy to use?
- Were people trained to use mobile technologies?
- Do you personally use mobile technologies outside of university, during the weekend or holidays?

Impacts

- What benefits do you get from mobile technologies use?
- Are there drawbacks to mobile technologies?
- What is the impact of mobile technologies on work practices, education, structures, processes and values?
- How do you see the situation of your colleagues in this project?
- What is the impact on management?
- What will be the university plan for next year?
- Does it have an impact on the university's image?
- Does the introduction of mobile technologies change the culture of your university?
- Do you expect more responsiveness from faculty members? Students?

Annexes 2:

The graph and 4 tables created from our analysis with the purpose to compare the answers collected from the participants of two fields of research (university A and university B) in order to see whether the words matched any of the categories and as well to see if there were additional topics brought by the participants.

	Secondary Appraisal	Adaptation efforts
Threat (university B)	"There is nothing to do about it really, we have no choice"(1) "The Tablet is given to us, that's it"(2) "I have so much work to do; I don't have time to learn this tool"(3) "I don't have time to go for training sessions which isn't even sufficient for learning it"(4)	Emotion focused act: "My colleagues don't really use it as they should do" (iPad project responsible)(8) "I tried to convince my colleagues to use Tablet but after months they still don't do it" (Responsible of iPad project) (9) "finally I stopped to complain and use it like others even though it is not a big use"(10) "It could be faster if we could have a help desk, I ask my colleagues when I have a problem rather than wasting time and look for the answer"(11)
Three	"They impose Tablet on us. It's been years that I am working here, if I don't use it, they won't kick me out"(5) "With using iPad or without, I am still the professor of this university and I do my job"(6) "I try to find some hours in a week to learn how to work with iPad"(7)	Emotion Focused act: "At the beginning he resisted to use iPad, he was acting as there is no Tablet" (department director)(12) "I didn't use it at first, I didn't want to"(13) "at first, I was so angry about this project and I voiced my opinion that we don't need this"(14) Problem Focused act: "I changed the way of my work a little bit and I spend more time learning the functionalities of Tablet"(15) "I use it at home, my son has Tablet, he helps me to learn"(16) "I decided to try learning how to use it, one of my colleague is very goo in this, he helps me but we need training sessions"(17) "We have a plan to start a help desk with the help of some colleagues and paying extra hours to them" (iPad project director)(18)

Outcomes "I am busier than before, iPad is with me everywhere, I am always connected and I receive e-mails every minute. Answering bunch of e-mail on the way or at home is an increase in work time"(19) "correcting exam papers were easier and faster than correcting them through *Tablet* "(20) "Unfortunately, so many of our professors don't use their iPad. They didn't even open their device since they got it" (Responsible of iPad project at engineering university B)(21)"I calmed down after a while, I realized that I have more important things to focus on"(22) "More reachability and overload of information make us less efficient"(23) "Using such a mobile tool is very time consuming and it can really make us waste time and being less efficient but the documents that I produce for students have a much better look and more organized"(24) "Presenting my work with Tablet looks to use it, one of my colleague is very good only more professional"(25)

Secondary Appraisal		Adaptation efforts	Outcomes
Threat (university A)	"We control our job, I don't want it because I don't see the point of using Tablet at an engineering university"(I) "I won't let this device disturb my class which has nothing to do with Tablet"(2)	Emotion focused act: "My colleagues got the Tablet but they don't really use it, they don't come for the monthly meetings where we discuss about their problems and we share our knowledge about its usage" (iPad project responsible)(5) "I don't use iPad in my class, It is not an appropriate tool for my classes which are mostly technical and it needs Mac computer"(6)	"I don't let my students open their iPad in the class, I am not interested wasting time of my class" (11) "I don't see any changes in my pedagogy and it is simply a good tool for administrative stuff" (12) "I know that some say that Tablet is good but I am disagree, it is just reduced paper work" (13)
Th	"I need to be able to use this because I control my job so I think that this tool is given to be part of our job"(3) "I was convinced that with practice maybe I would learn more and I can be more efficient in interaction with my students" (4)	Emotion Focused act: "By the beginning I didn't want to use this but I was telling to myself; the more you use, the better you become at using it"(7) "After all, It is our responsibilities to learn new tools and help our students to learn how to work with the latest technology as well"(8) Problem Focused act: "Finally I decided to go for iPad meetings few times to discuss my problems which were better than nothing"(9) "I decided to get help from one of my laboratory colleague and learn the useful applications related to our subject"(10)	"My students like to see me using Tablet or we do some short quiz with it during the lecture" (14) "We are more organized by Document app. And me and my students can work on the same file which gives the possibility to correct them quickly" (15)

	Secondary Appraisal	Adaptation efforts	Outcomes
Challenge (university B)	"We don't have much control over things here. The university director decides and we must follow" (1) If we like it or not the iPad project is already implemented in the school and they bought iPad for every professor and student"(2)	Emotion focused act: "Apart from learning the basic things, I didn't do much about it"(3) "university director really insisted by sending us the official letters to attend the iPad presentation meeting so after while the only thing we can do is to use it"(4) Limited Problem Focused act: "I learned how to use it, it is not easy to change our habits and using this tool for what we were doing for a long time"(5) "We get help sometimes from each other to learn how to use this"(6)	"After all it didn't change a lot of things in my work"(7) "Be equipped with iPad somehow enhanced the image of our job"(8) "Tablet is a good storage of documents for students and professors that we can carry everywhere"(9) "Students can work on time and more organize at the same time that they are in the laboratory"(10)

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	Secondary Appraisal		Adaptation efforts	Outcomes
Challenge (university A)	Low control	"It is not really related to what we like or what we need, they already brought iPad to the university"(1) "We can't change things here we must just accept the taken decisions" (2)	Emotion focused act and limited problem focused act: "I try to go to our iPad meeting when I have time, maybe I can see what others do and I do the same"(6) "if I want be honest then I must say I don't do that much with iPad"(7) "After years of working with laptop, of course using Tablet would be a big change and it is not easy to learn it quickly but I did try"(8)	"iPad is a portable device, we have access to information easier and faster. It enables us to stay connected anywhere and anytime" (13) "I mostly use iPad to check our class planning and checking my mails" (14)
	High control	"Our work is flexible and I have a lot of autonomy in the way I do my work'(3)"I don't think that university director cares how we use it as long as we do our job so I use iPad when and how I want to"(4)'I had no doubts that this device will improve our pedagogy so I use it perfectly and still I find its functionalities"(5)	"Problem Focused act: "I spend hours trying to discover creative uses of Tablet and I quickly learned how to use it. I would like to share my knowledge with my colleagues in our monthly iPad meetings" (professor and new iPad responsible) (9) "I can make a quick excel of my student's quiz and share this with my labo colleague which was useful" (10) "I can eliminate extra works now with using (classe Inversée) which pass some works to students before coming to the class" (11) "The iPad allowed me to change the way I was used to teach and interact with my students" (12)	"I have a pretty good idea of my students understanding level of the given course by analyzing their quiz percentage very quickly in 5 min. it used to take me hours before" (15) "I make fewer errors and I am faster in answering to my students" (16) "It's obvious that I spend more time for preparing new case studies while before I used to give the same one for many years but its good because we share it online and they can work on that together" (17) "iPad enables you to transmit and receive the information more easily" (18)

