Frequency and User Satisfaction on Using Communication Technologies to Support Learning: The Case of Portuguese Higher Education

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Abstract

This paper presents several results from a research project about the use of Communication Technologies to support education in the Portuguese Public Higher Education Institutions. The outline of the project, the Communication Technologies taxonomy adopted and the methodology used are described. The results revealed on this paper respect to students ($n = 2207$) and to teachers ($n = 639$), and the characteristics of the sample are summarized. Some results about the frequency of use and the user satisfaction of using Communication Technologies are reported, and the next steps are indicated.

Keywords: Communication Technology; Higher Education; Frequency and User Satisfaction.

1. Introduction

Higher education institutions have always faced new challenges. They can be challenged by external factors, such as the economic and political context, as well by internal factors, like their own governance structure or resources available. Other challenges also influence their activities. The technological evolution, in general, and the Communication Technologies (CT), in particular, are among those challenges.

Research has been published concerning the usage of CT to support educational purposes in higher education institutions. Some studies concentrate on national realities (Armstrong & Franklin, 2008; Collis & Wende, 2002; Minocha, 2009), and others conduct research about specific institutions (Heikkilä, Haarala-Muhonen, & Nevgi, 2005; Löfström & Nevgi, 2007). Several issues have been studied, like the use of specific CT (Weiss & Hanson-Baldauf, 2008), and the approaches of teaching and learning that take into account CT (Siemens, 2005; Siemens & Tittenberger, 2009).

This paper is about a research-in-progress project concerned with two main perspectives. One is the institutional perspective, which is considered in the literature, and is concerned with subjects like institutional strategy (Bates, 2000; Boezerooij, 2006; JISC, 2006), teacher training on the use of information and CT (Heikkilä, et al., 2005), security issues about the institutional use of CT (Gorge, 2007) and the management of digital content (Armstrong & Franklin, 2008; Harley, et al., 2006).

The other perspective is about gender. Research concerning gender issues, and their relation with technology, have also placed themselves in the eye of the scientific community. Regarding the use of CT and gender related issues several studies were identified (Papastergiou & Solomonidou, 2005; Guo, 2006; Imhof, Vollmeyer & Beierlein, 2007; Madigan, Goodfellow & Stone, 2007; Caspi, Chajut & Saporta, 2008; Colley, & Maltby, 2008;)), which reinforce the idea that gender influences the selection of the technologies used, and the activities developed with the use of CT, both in a learning and in a personal context.

On the next section the research project is described, the CT taxonomy adopted is summarized, followed by a presentation of the methodology used. Next, the participants in the project and their samples are characterized and some partial results are reported. Finally, the next steps of the project are shown.

2. Project Description

On the doctoral program on Information and Communication in Digital Platforms offered by the Universities of Aveiro and Oporto (Portugal), a research project about the Portuguese reality is underway aiming to identify and characterize the use of CT to support teaching and learning in Portuguese Public Higher Education Institutions (PPHEI).

The results of this research project are expected to be helpful to higher education institutions and staff with institutional responsibilities (SIR). Evidence will be available to support the decision making process regarding strategies, policies and resources about the use of CT to support teaching and learning.

Two main perspectives are being studied within this project. One perspective concentrates on the institutional perceptions from teachers and SIR on the use of CT (rectors, deans, e-learning units' staff and similar institutional roles). Under the institutional perspective, the research question is: "How are PPHEI using and planning to use CT to support teaching and learning?".

The other perspective focuses on gender issues and the perceptions of students on the use of CT, and its research question is: "What is the influence of gender in the student perception and evaluation of the use of CT to support learning in PPHEI?"

On this project, educational activities are every activity that aims to result in learning by students. This project is based on educational activities that use CT.

3. Communication Technologies Taxonomy

For the purpose of this paper, CT are the technologies that use the internet infrastructure and are conceived and used to communicate. There are many ways to classify them, no one being definitive. In fact, those technologies evolve at an important pace. Their users and the activities they perform with these technologies also evolve.

The CT taxonomy used on this project resulted from a synthesis from other authors work (Armstrong & Franklin, 2008; Grodecka, Wild, & Kieslinger, 2009; Hart, 2009), and it eventually considers other contributes. When preparing this taxonomy, it was intended to include the most important CT available.

The types considered are related with the communication activities each one allows users to do. In some cases, different types include the same technology, because some CT are useful in different uses. The resulted taxonomy, illustrated with examples, has the following categories:

1) Learning Management Systems (BlackBoard, Moodle, WebCT, etc.);
2) Publishing and Sharing Technologies (Blogs, Wikis, Flickr, Youtube, Podcast, Social Bookmarking, etc.);

3) Collaboration Technologies (Google Docs, Social Bookmarking, Mind Maps, Wikis, Blogs, etc.);
4) Social Networking (Facebook, Twitter, Hi5, LinkedIn, Ning, Academia.edu, etc.);
5) Interpersonal Communication Technologies (email, MSN, Skype, etc.);
6) Content Aggregation Technologies (RSS feeds, Netvibes, Google Reader, etc.);
7) 3D Virtual Environments (Second Life, Habbo, etc.).

4. Methodology

This is an exploratory and descriptive research project aiming to understand how PPHEI are using CT to support educational activities. This is a national-wide project, involving all the institutions mentioned, as far as it is possible.

A detailed model of analysis was prepared to each perspective under study, with proper indicators, and a data collection instrument was developed. Data was collected from three different participants: students are the data source to study the gender perspective; and teachers and SIR are the data sources to study the institutional perspective. Specific versions of the questionnaire were created to each type of participant. The questionnaire was tested in small groups. Some corrections were made and it was then retested.

The questionnaire applied to the students is divided into five different sections. The first section includes questions about personal data such as the student's age, gender and the scientific area of their program was included. Questions about their access to and use of CT were placed in the second section and the questions related with their use of CT as a learning support were listed in the third section of the questionnaire. The questions concerning their assessment in regard to the use of CT as a learning support were set in the fourth section and, in the fifth section, students were questioned about their attitudes and preferences in relation to the use of CT.

Specific versions of the questionnaire were prepared to teachers and to SRI, however their structure is similar. The first part is about personal issues, such as their institution, gender, or age. The second part has questions about institutional strategy, institutional resources and policies, and also questions about management. The third part includes several specific questions about the use of CT, including issues like the institutional introduction of CT, their availability, the activities and types of teaching/learning that use CT, the frequency and environment of use, and the user satisfaction.

In the last part of every version of the questionnaire, participants have the opportunity to give feedback about the way they have known about it. They were also asked to comment or make any suggestion they feel appropriate.

Considering the national nature of this project, the questionnaire was implemented online and its distribution was carefully planned to guarantee a wide spread and a large participation. The plan was implemented in several consecutive phases, and different strategies were used: direct contact with all the PPHEI, searching for an appropriate person or service; use of social networks, especially Facebook, to publicize the questionnaire; direct mail using email addresses available in institutional web sites and also personal contacts. This process was constantly monitored and data was regularly safeguarded.

5. Participants

Data was collected between October 27th 2010 and February 11th 2011. The data from SRI is being processed and it is not presented on this paper. Table 1 shows the main characteristics of the samples of teachers and students.

A sample of n = 639 Portuguese public higher education teachers was considered as valid. This sample represents 2,6% of the population (GPEARI - Gabinete de Planeamento, 2010). It includes more teachers from the polytechnic sub-system than teachers from the

universitary sub-system; slightly more woman than man; and the more represented NUTS II region is Lisboa (30,8%). Compared to the population under study, teachers from the polytechnic sub-system are over-represented on the sample, as they are 45,6% of the sample, but just 41,5% of the population. Woman are also over-represented, as they are 50,5% of the sample, but just 42,6% of population.

A second sample has $n = 2207$ validated students from the PPHEI. This sample has more students from the universitary sub-system than from the polytechnic sub-system; more woman than man; and the more represented NUTS II is Centro (53,3%). Compared to the population under study, students from the universitary sub-system are over-represented on the sample, as they are 67,0% of the sample, but just 63,0% of the population. Woman is also over-represented, as they are 60,8% of the sample, but just 52,0% of population.

Sample size		Teachers ($n = 639$)	Students ($n = 2207$)
Sub-sector	Universitary	45,6% ($n = 287$)	67,0% ($n = 1469$)
	Polytechnic	54,4% ($n = 342$)	33,0% ($n = 722$)
Gender	Male	49,5% ($n = 313$)	39,2% ($n = 865$)
	Female	50,5% ($n = 319$)	60,8% ($n = 1342$)
NUTS II	More represented	Lisboa: 30,8% ($n = 194$)	Centro: 53,3% ($n = 1342$)

Table 1 – The samples of teachers and students.

6. Results

Some results and analysis are described on this section. These are partial results from students and teachers, and respect to some issues that are common to the institutional and to the gender perspectives. Results about issues of frequency of use and user satisfaction are presented and analyzed.

6.1. Frequency of Use

Figure 1 presents some results about how frequently CT are used to support learning, by students and teachers. The Figure 1 also shows the question that students and teachers were asked to answer on this issue. The scale used to evaluate frequency is also shown. The question that students and teachers were asked to answer is similar to both and is about the perception each one has about their own frequency of using the different types of CT. The scale includes different grades of use frequency and an item to express the absence of use (never). The main results on this question are:

1) The CT more frequently used by students and teachers (daily or weekly) are Learning Management Systems and Interpersonal Communication Technologies;

2) Interpersonal Communication Technologies are used very frequently (daily or weekly) by 91,7% of teachers and by 80,6% of students. It is not surprising that teachers use this technology more frequently than students, as usually a teacher has a large number of students but, on the contrary, each student usually has just a small number of teachers;

Question (Student and Teacher):

How frequently do you use communication technologies to support learning?

Scale:

1: Never

2: Rarely

3: Monthly

4: Weekly

5: Daily

Learning Management Systems

	1	2	3	4	5
Student	11,0%	9,6%	9,2%	33,9%	36,3%
Teacher	9,1%	8,6%	10,4%	37,2%	34,8%

Publishing and Sharing Technologies

	1	2	3	4	5
Student	12,4%	21,0%	22,5%	29,7%	14,5%
Teacher	39,3%	19,1%	17,4%	16,8%	7,4%

Collaboration Technologies

	1	2	3	4	5
Student	9,2%	18,2%	20,7%	32,2%	19,7%
Teacher	34,4%	23,1%	17,8%	16,8%	7,9%

Social Networking

	1	2	3	4	5
Student	29,2%	23,1%	11,2%	16,6%	19,9%
Teacher	49,3%	17,1%	10,5%	14,0%	9,1%

Interpersonal Communication Technologies

	1	2	3	4	5
Student	3,0%	6,5%	10,0%	26,2%	54,4%
Teacher	1,3%	3,0%	4,0%	14,2%	77,5%

Content Aggregation Technologies

	1	2	3	4	5
Student	35,6%	30,2%	14,4%	13,4%	6,4%
Teacher	55,4%	20,5%	10,0%	8,3%	5,8%

3D Virtual Environments

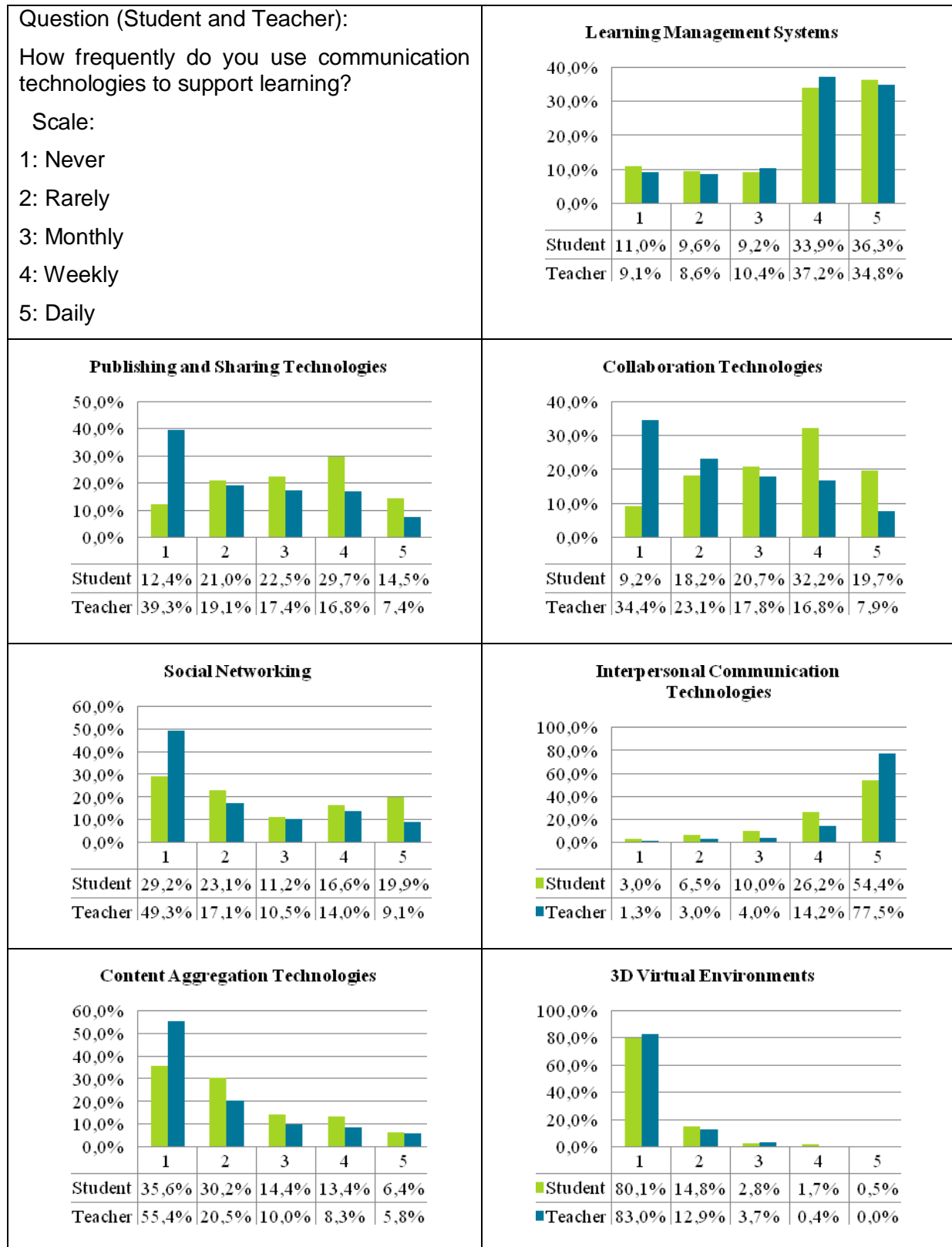|	1	2	3	4	5
Student	80,1%	14,8%	2,8%	1,7%	0,5%
Teacher	83,0%	12,9%	3,7%	0,4%	0,0%

Figure 1 – Use frequency of CT by students and teachers in PPHEI.

3) Some CT have low usage rates, by students and teachers: Social Networking, Content Aggregation Technologies, and 3D Virtual Environments are the technologies less used. The latter is the most evident case: it is not used (never) by 80,1% of students and by 83,0% of teachers;

4) In general, the rate of teachers not using (never) CT is higher than students. Exceptions are on Learning Management Systems and on Interpersonal Communication Technologies.

6.2. User Satisfaction

Some results about the user satisfaction that students and teachers have on using CT to support learning are presented on Figure 2. This figure also shows the scale used to evaluate the user satisfaction, and the questions that students and teachers were asked to answer. On this case, there is a question that is similar to both students and teachers (Student and Teacher_1). That question is about the user satisfaction each one has about their own use of CT. Teachers were also asked to answer about the perception they have of the students' user satisfaction on using the same CT (Teacher_2). The main results on these questions are:

1) Students are more satisfied (satisfied or completely satisfied) than teachers in every category of CT considered. Major differences are on Publishing and Sharing Technologies (students: 74,1%; teachers: 65,3%) and on Social Networking (students: 67,1%; teachers: 48,9%);

2) Higher rates of satisfaction (satisfied or completely satisfied) were declared, by students and teachers, on the use of Interpersonal Communication Technologies (students: 91,4%; teachers: 90,7%) and Learning Management Systems (students: 81,0%; teachers: 78,5%);

3) Higher rates of dissatisfaction (completely dissatisfied or dissatisfied) were declared, by students and teachers, on the use of Social Networking (students: 6,3%; teachers: 13,9%), Content Aggregation Technologies (students: 6,7%; teachers: 12,1%) and 3D Virtual Environments (students: 17,1%; teachers: 20,8%);

4) In general, the teacher's perception about the students' satisfaction using CT is lower than the level declared by students.

7. Next Steps

The results presented on this paper are about issues that are common to both perspectives under study. The research is in progress, and the next steps are:

1) Further analysis of the students answers to the questionnaire with special focus on issues about the gender perspective;

2) Further analysis of the teachers and SIR answers with special focus on the institutional perspective;

3) Dissemination of results: reinforce publications on peer reviewed journals and specialized international conferences;

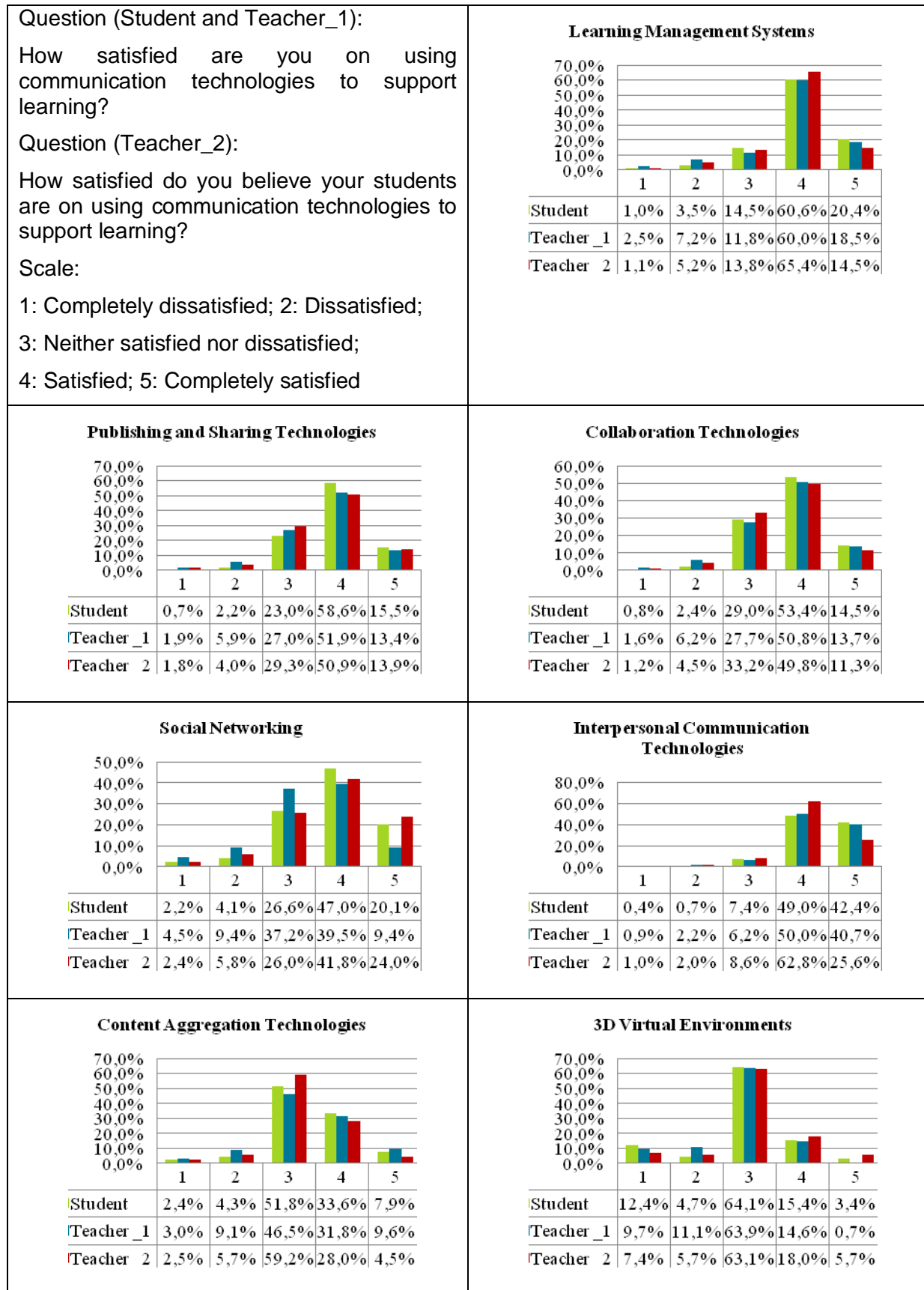4) Completing the two PhD theses that support the main objective of this project.

Question (Student and Teacher_1):

How satisfied are you on using communication technologies to support learning?

Question (Teacher_2):

How satisfied do you believe your students are on using communication technologies to support learning?

Scale:

1: Completely dissatisfied; 2: Dissatisfied;

3: Neither satisfied nor dissatisfied;

4: Satisfied; 5: Completely satisfied

Learning Management Systems

	1	2	3	4	5
Student	1,0%	3,5%	14,5%	60,6%	20,4%
Teacher _1	2,5%	7,2%	11,8%	60,0%	18,5%
Teacher _2	1,1%	5,2%	13,8%	65,4%	14,5%

Publishing and Sharing Technologies

	1	2	3	4	5
Student	0,7%	2,2%	23,0%	58,6%	15,5%
Teacher _1	1,9%	5,9%	27,0%	51,9%	13,4%
Teacher _2	1,8%	4,0%	29,3%	50,9%	13,9%

Collaboration Technologies

	1	2	3	4	5
Student	0,8%	2,4%	29,0%	53,4%	14,5%
Teacher _1	1,6%	6,2%	27,7%	50,8%	13,7%
Teacher _2	1,2%	4,5%	33,2%	49,8%	11,3%

Social Networking

	1	2	3	4	5
Student	2,2%	4,1%	26,6%	47,0%	20,1%
Teacher _1	4,5%	9,4%	37,2%	39,5%	9,4%
Teacher _2	2,4%	5,8%	26,0%	41,8%	24,0%

Interpersonal Communication Technologies

	1	2	3	4	5
Student	0,4%	0,7%	7,4%	49,0%	42,4%
Teacher _1	0,9%	2,2%	6,2%	50,0%	40,7%
Teacher _2	1,0%	2,0%	8,6%	62,8%	25,6%

Content Aggregation Technologies

	1	2	3	4	5
Student	2,4%	4,3%	51,8%	33,6%	7,9%
Teacher _1	3,0%	9,1%	46,5%	31,8%	9,6%
Teacher _2	2,5%	5,7%	59,2%	28,0%	4,5%

3D Virtual Environments

	1	2	3	4	5
Student	12,4%	4,7%	64,1%	15,4%	3,4%
Teacher _1	9,7%	11,1%	63,9%	14,6%	0,7%
Teacher _2	7,4%	5,7%	63,1%	18,0%	5,7%

Figure 2 – User satisfaction in the use of CT by students and teachers in PPHEI

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