

TABLETS AND MOBILE APPLICATIONS IN HIGHER EDUCATION: A FIRST APPROACH

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INTRODUCTION

Mobile technologies, such as smartphones or tablets, are gradually changing traditional ways of learning. These devices give students instant access to a huge amount of information and allow them to communicate with other students or teachers regardless of their location. They provide a comfortable and easy way to use technology anywhere, anytime, both within and outside the classroom.

The aim of this contribution is to study the use of mobile technologies by lecturers and students, and to analyze their impact on the way of learning in the classroom. The use of tablets is becoming widespread in the classroom and somehow is transforming the teaching-learning experience. As a matter of fact, the New Media Consortium's 2013 Horizon Report has predicted that mobile applications and tablet computing will be widely adopted in higher education within one year or less.

From this perspective, we argue that the use and incorporation of mobile technology by both students and teachers in higher education makes the learning experience more attractive. In 2006, the European Parliament presented eight recommendations, including the need of promoting digital competence and “learning to learn”. Both of them play a fundamental role in PLE, since they promote autonomous learning decisions.

In this work we intend to analyze and evaluate educational applications for Social Sciences available both in iOS and Android environments. This experience is being developed during the current academic course (2013-2014) in five colleges of the University of Las Palmas de Gran Canaria (Faculty of Geography and History, Faculty of Education, Faculty of Law, Faculty of Philology, and Faculty of Computer Science).

As a first step of our research, the students were asked to fill in an anonymous questionnaire (Edugedesis, 2013) concerning the use of mobile technologies in the context of higher education. The students who completed the questionnaire belonged to the following degrees: Social Education, IT, Geography and Planning, Law, Education, Tourism, and Spanish Language and Literature. This questionnaire has allowed us to collect information about their use of mobile devices and applications, their learning practices, and their demographic characteristics.

As a final result of our research, we intend to present to the university community a more comprehensive and accurate knowledge of the mobile applications available in Android and iOS environments. We also aim at describing strategies to incorporate friendly, accessible and flexible mobile solutions in the classroom. This experience will allow us to present both the lecturers and the students a list of applications that they could integrate within their teaching projects or in their personal learning environments. Several applications will be described in their advantages and disadvantages; and possibilities for their integration in higher education will be

identified and proposed. The development of digital skills and of the “learning to learn” competence will be fostered by the use of these applications. This work has been developed by the group of teaching innovation at the University of Las Palmas de Gran Canaria (Edugedesis, 2012).

THEORETICAL AND CONCEPTUAL FRAMEWORK

Currently, there are multiple devices that provide Internet connection: smartphones, laptops, PDAs, tablets, TV’s, portable game consoles, among others. The market for mobile devices is constantly growing and evolving, offering improvements each year. The *Horizon Report (2008)*, which is an initiative by the New Media Consortium (NMC) aimed at charting emerging technologies for teaching and learning, expects the introduction of mobile broadband within two or three years. It is also expected that within a decade the mobile phone will become the primary way of Internet access.

In the technological society in which we live, both in normal life and education, the personal computer is not the favorite technological tool. The tablets and smartphones complement the PC’s. Although all devices have advantages, the tablets are easy to handle and carry and they are equipped with high resolution, touch screens. The tablets are placed midway between the smartphones and laptops; they are intuitive, fast and do not require instrumental learning tools (Ortega, 2011).

As Mares (2012) puts it, a *tablet* is a digital device with information processing capabilities and Internet access similar to or slightly slower than a *netbook*. Its main features are long battery life (more than eight hours), touch screen, low weight (about five hundred grams) and small size (up to ten inches), which enhances its portability. They have specific operating systems (IOS, Android) and give connectivity to Internet through wifi or 3G/4G. These devices facilitate cooperative activities, promoting the development of cognitive skills, and providing new methodologies that enhance motivation and learning. Like any technology, tablets have advantages and disadvantages. Among the advantages, we can mention the content interactivity, which in many cases do not require prior knowledge. As disadvantages, the price of these devices is high, and many applications are not free.

Early reports (Mares: 2012), mention that the use of tablets by students, increase their motivation and willingness to learn. However, this may be due to the use of a new technology. The tablets are useful devices for accessing educational contents in different formats: books, games, and videos. The word processor installed on these devices allows to write documents, which can be enriched or supplemented with images, videos and audio.

According to Llorens (2012), the university classroom should expand the existing concept beyond the traditional idea, being open-minded to technological and communicative interaction.

While the classrooms have been transformed by the European Higher Education space, along with the incorporation into the classrooms of all types of devices (computers, laptops, digital slate). The concept of teaching-learning is being rewritten.

GOAL

This work forms part of the project entitled "The Use of Digital Tablets in the Classroom. Analysis and Evaluation of Educational Applications for the Social Sciences in iOS and Android Environments". The aim of this project is cataloguing, analyzing and evaluating mobile applications developed by several national and international education organizations which provide resources for subjects in the field of Social Sciences. The impact and integration of emerging technologies in the classroom have not yet been evaluated, especially at the University. The aim of this contribution is to study the use of mobile technologies by lecturers and students, and, more concretely, to analyze their impact in the way of learning in the classroom. It is a first step in this project, whose additional goals are:

- The creation of a catalogue that contains a descriptive record of mobile applications. This catalogue will be used for the supply of existing educational applications for mobile devices. This information about technology tools available for teaching in the Android and iOS environments, otherwise hardly traceable, will be especially valuable for non-expert users.
- To improve the quality of the teaching-learning process through the inclusion of new technologies in the classroom.
- A SWOT analysis of the proposal and a description of its alternatives for a successful integration of these applications in the classroom.

STUDY OF THE USE OF TABLETS: QUESTIONNAIRE

The experience described in this paper focuses on the knowledge of tablets in the classroom and their impact on the teaching-learning process. Data collection was the first step to understand the level of knowledge, on this technology and the applications available, of the groups (both teachers and students) involved in our research. The questionnaire is a tool that allows us to identify the use and knowledge of TIC's to further analyze the different profiles. We used *Google-forms* tool for creating questionnaires and summarizing the students and teachers answers.

STUDENT QUESTIONNAIRE

The student questionnaire was designed to survey the student skills in the Internet, especially concerning tablets. This questionnaire has taken into account the answers of students who do not use tablets. We are aware of the difficulties that exist nowadays for the purchase of these devices. On the one hand, the students who have tablets can provide us with their personal experience-based opinions, and, on the other hand, those who do not have them, are able to offer

a different point of view about prejudices, difficult access or interaction with the new technologies.

The aims of this questionnaire are the following:

- To identify the number of users of tablets at the University according to the degree studied. This questionnaire takes into account the students involved in subjects of the second semester of this current course (2013/2014).
- To define different profiles according to the gender, course, degree, age, language, and social network they use.
- To classify the students according to their skills, knowledge and previous experiences with the tablets.

The questionnaire has 21 questions and it is divided into three sections:

1. *Student profile*: Gender, age, degree, semester and subject, language, work activity, and involvement in social networks.
2. *Knowledge about tablets*: Definition, benefits of a tablet, opinion regarding tablets (versus notebooks).
3. *Experience on tablets*: whether they know what a tablet is. If they answer positively, they are asked to give a definition and explain which activities they usually perform with the tablet, which their opinions are about its usefulness, and, finally, when and where they use it.

In figure 1, a screenshot of the first 13 questions of the student questionnaire is presented. As a result of this questionnaire, we could get an idea about the degree of acceptance of this new technology in the classroom. In those subjects where students are used to employ them, it would be easier to incorporate learning activities involving tablets.

Cuestionario inicial. Proyecto de Innovación Educativa. El uso de las tabletas digitales.

Este cuestionario se realiza al grupo de estudiantes de la asignatura para conocer el manejo de las herramientas tecnológicas en su aprendizaje y, en concreto, el uso de las tabletas digitales.

Título del Proyecto: "El uso de las tabletas digitales en el aula. Análisis y evaluación de aplicaciones educativas para las ciencias sociales de entornos iOS y Android".
Publicado en: Boletín Oficial nº 8 de la ULPGC de 1 de agosto de 2013, páginas 34 a 35.
Enlace en: https://www.ulpgc.es/idesc/argadirecta.php?codigo_archivo=7105667.

***Obligatorio**

1. Género *

Femenino
 Masculino

2. Edad *

3. Estudias la titulación de *

4. Curso *

5. Asignatura vinculada a este cuestionario *

40130 - Geografía para el desarrollo local y territorial
 40131 - Metodología para la elaboración y gestión de proyectos
 41306 - Recursos territoriales turísticos
 41536 - Tratamiento jurídico de las relaciones comerciales: desde el Derecho Romano al ...
 41646 - Alfabetización Audiovisual
 41702 - Organización, procesos e innovación
 41805 - Tecnologías de la información y la comunicación
 40909 - Estéticas y Contextos Artístico-literarios de la Literatura Universal
 50288 - Procesos y contextos educativos
 Otro:

5.1. Semestre en el que se imparte o impartió la asignatura *

Primero
 Segundo

6. ¿Qué idiomas puedes acreditar?

Inglés
 Francés
 Alemán
 Italiano
 Portugués
 Ruso
 Otro:

7. ¿Realizas alguna actividad laboral reconocida? *

Sí
 No

7.1. Sector profesional

7.2. Carácter

Público
 Privado
 Otro:

8. ¿Sabes qué es una tableta digital? *

Sí
 No

8.1. Selecciona cuatro palabras con las que definirías a una tableta digital *

Agilidad
 Complementariedad (con otros dispositivos)
 Conectividad
 Facilidad
 Flexibilidad
 Intuitiva
 Movilidad
 Rapidez
 Resolución de pantalla
 Seguridad
 Otro:

9. ¿Tienes cuenta en las redes sociales? *

Facebook
 Twitter
 Flickr
 LinkedIn
 Tuenti
 Google+
 Otro:

10. ¿Tienes actualmente una tableta digital? *

Sí
 No

11. ¿Qué procesos más habituales realizas con la tableta digital? *

Agenda
 Anotaciones
 Fotografía
 Compras
 Contactos
 Correo
 Disco en la nube
 Descifrar códigos QR
 Juegos
 Redes sociales
 Telefonía
 Televisión digital
 Vídeo y música
 Otro:

12. ¿Cuánto tiempo diario le dedicas al uso de las tabletas digitales? *
Marca la casilla que se ajuste al promedio diario

0 1 2 3 4 5 6 7 8 9 10

Horas o más

13. Con las tabletas digitales nos conectamos a Internet mediante wifi, ¿en qué lugar lo haces habitualmente? *

A través del proveedor de wifi del smartphone
 En espacios de redes abiertas
 En casa
 Trabajo
 Universidad
 Otro:

50% completado

Con la tecnología de Este contenido no ha sido creado ni aprobado por Google.
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Figure 1. Student questionnaire created with Google forms.

TEACHER QUESTIONNAIRE

The questionnaire of the teachers is focused, in its first section, on their skills in the Internet, especially in their use of these devices and their opinions about its usefulness. In the second part, it is focused on the technological skills concerning the teaching process (e.g. the use of the

tablets, digital skills and tools in their classes). This questionnaire, in contrast with that proposed to the group of students, was divided into four blocks:

1. *Teacher profile*: gender, age, degree and courses taught, language, involvement in social networks.
2. *Digital skills related to the tablets*: whether they know what a tablet is, if they have one, how they would define it, which activities they usually perform with the tablet and their opinions regarding its usefulness.
3. *The use of digital tools in their subjects*: whether they incorporate digital skills in their subjects, and, in that case, which type of tool they use, from which moment they use it and whether the use of these tools is included in the assessment process.
4. *Teaching process with the tablet*: whether they use the tablets, applications more commonly used, type of activities usually performed, grouping, problems which have been identified and consideration of what kind of skills the students would acquire as a result of working with tablets.

In figure 2, a screenshot of the first questions of the teacher questionnaire is presented. As a result of this questionnaire we could get an idea about the preparation of teachers in using this kind of devices in the teaching-learning process. If the teacher does not have enough skills and/or he is not able to take full advantage of the tablets, this device will become more a handicap than an aid in the learning process. Thus, this questionnaire allows to identify which teachers are not yet ready to incorporate this technology into their classrooms and which activities are the most recommended when using the tablets.

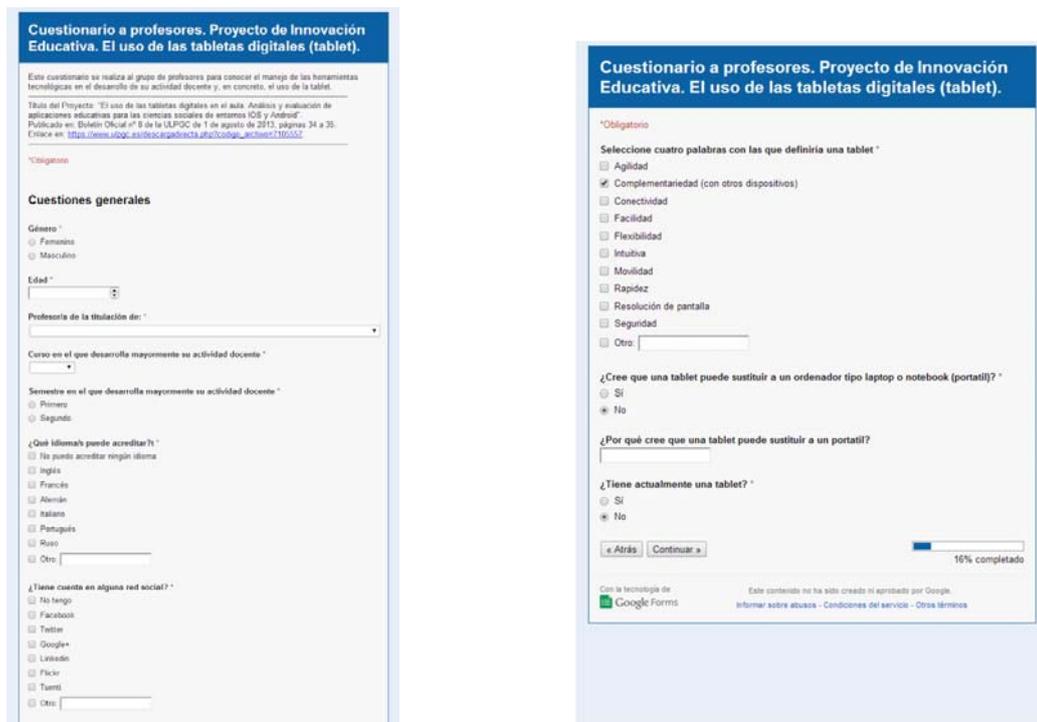


Figure 2. Teacher questionnaire created with Google forms.

RESULTS

In this section, we analyze the answers of both questionnaires (for students and for teachers).. We identify the most significant variables and we discuss the results obtained.

Google forms tool has simplified the tasks of data collection and analysis, presenting the results (answers) in a simple, compact and visual way, as it can be appreciated in what follows.

The results are presented and discussed in two parts: first, the results concerning students and, second, the results concerning teachers.

STUDENT PROFILES

The questionnaire was mainly (89%) filled in by students of the second semester, among whom 84 (60%) were female, and 56, male. These students are completing different degrees, in the proportions which are described in what follows: Bachelor's Degree in Law (60 students), Bachelor in Social Education (34), Bachelor in Geography (14), Bachelor in Spanish Language and Hispanic Literatures (24), Bachelor in Tourism (7), and Bachelor in Computer Science (1). 85% of these students are currently enrolled in the two first courses (first four semesters) of their degree. The use of technological devices is associated to technical degrees. However, the

students of Social Sciences are also familiar with this technology, according to the answers obtained: 97 students have a tablet, whereas the others usually employ other types of digital device.

98% of students declare that they know what tablets are and they define them by using the following terms:



Figure 3. Terms used by students to define what a tablet is

54% of the students have an account on Facebook or Twitter, and 57% use their tablet mainly for multimedia tasks (such as watching videos or listening to music) or communication tasks (sending or receiving emails, accessing to social networks). About 71% use it at home or in college, and 63% consider more comfortable the Android operating system. These results reveal that, on the one hand, the tablet allows easy access to Internet contents (either interactive or not), and, on the other hand, that the tablets qualities (large screen, long battery life and low weight) facilitate mobility.

Among the benefits, 38% highlight easy access to information; 15% emphasize that tablets allow collaborative work and access to social networks. It is relevant to indicate that 87% believe the tablet can help them in their learning process. More precisely, they use tablets for tasks such as those indicated below

- Answer1. “Search for words in a dictionary”.
- Answer2. “There are several document viewers where you can highlight and write down notes”.
- Answer3. “It allows me to access academic materials needed in the subjects that I am currently studying”.
- Answer4. “It is useful to search or write down my own notes during the classroom”.

- Answer5. “It is a device which allows me to increase the information I receive from the teacher”.
- Answer6. “The tablets are useful for receiving messages and URL links from teachers, since we can download them. When we travel we can ‘carry books and papers’ in the tablet”.
- Answer7. “Quick and easy access to information”.

In the previous answers we appreciate that most of the students use tablets to search for information, to access to the virtual campus or multimedia content. We notice that many students (40%) mention some drawbacks of these devices, such as connectivity problems and typing difficulties.

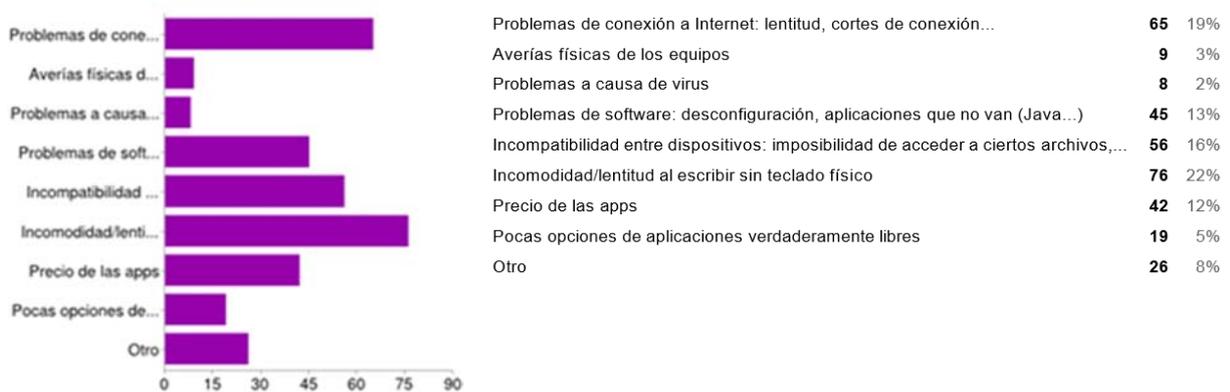
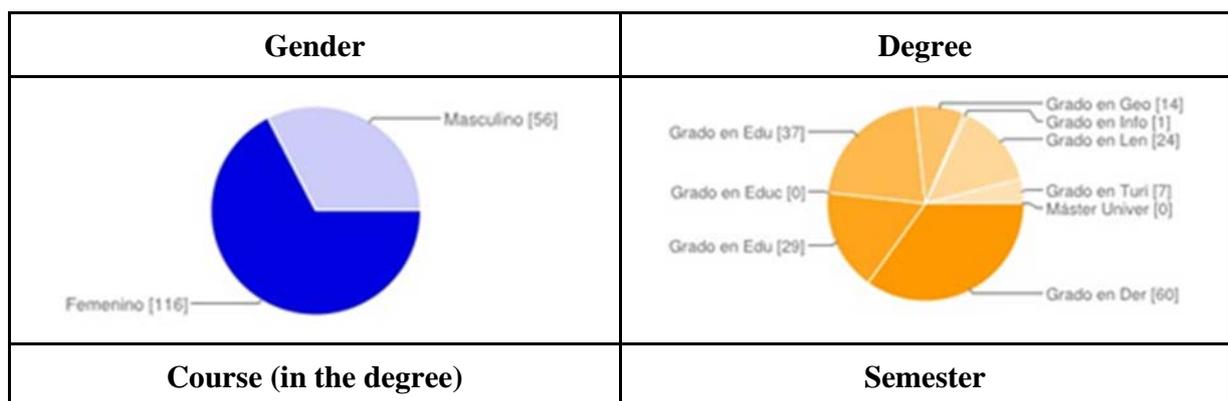


Figure 4. Drawbacks of using tablets

In figure 5, we summarize the most significant questions that should be taken into account.

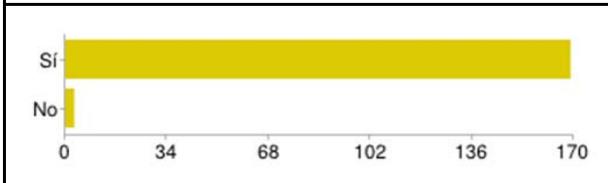




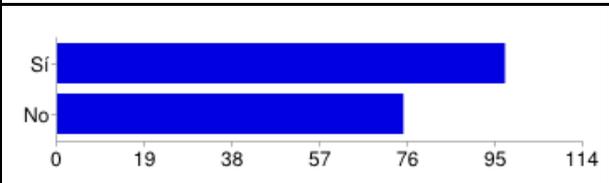
Most valued features in a tablet



Do you know what a tablet is?



Do you have a tablet?



Social networks

Applications used in a tablet

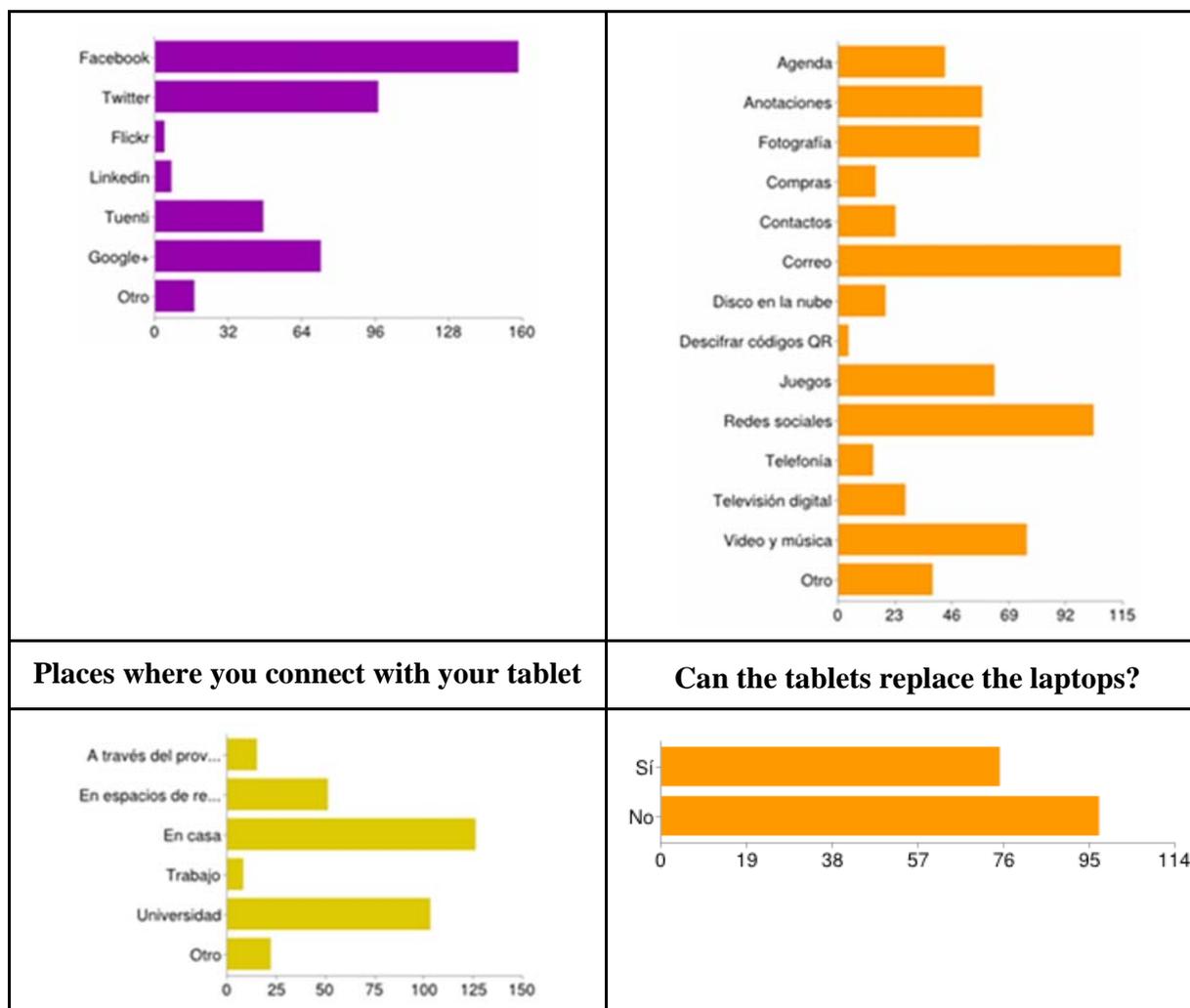


Figure 5. Summary of the answers obtained in the student questionnaire

TEACHER PRACTICES

The second questionnaire was filled in by teachers who were teaching in the same degrees that the above students. Half of the teachers were male, and half female. Most of the teachers belong to the Degrees of Geography and Law. They teach in subjects of the first courses and 50% of them have an account in a social network, mainly Facebook. The tablets are associated by them with values such as mobility or connectivity, and are considered as a complement of other

devices (such as laptops or desktops). 62% believe that tablets can not replace laptop, while other offer the following reasons to sustain the opposite:

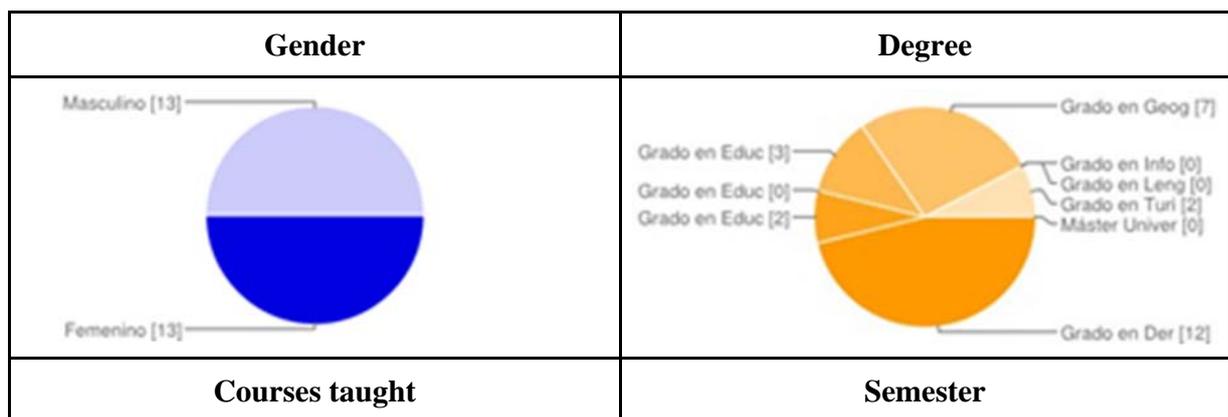
- ‘Because it offers the same performance’.
- ‘Because the applications that I use for my teaching are also available for mobile devices, in a 90%’.
- ‘Once the tablet is connected to a projector, its expository-didactic possibilities are multiplied’.

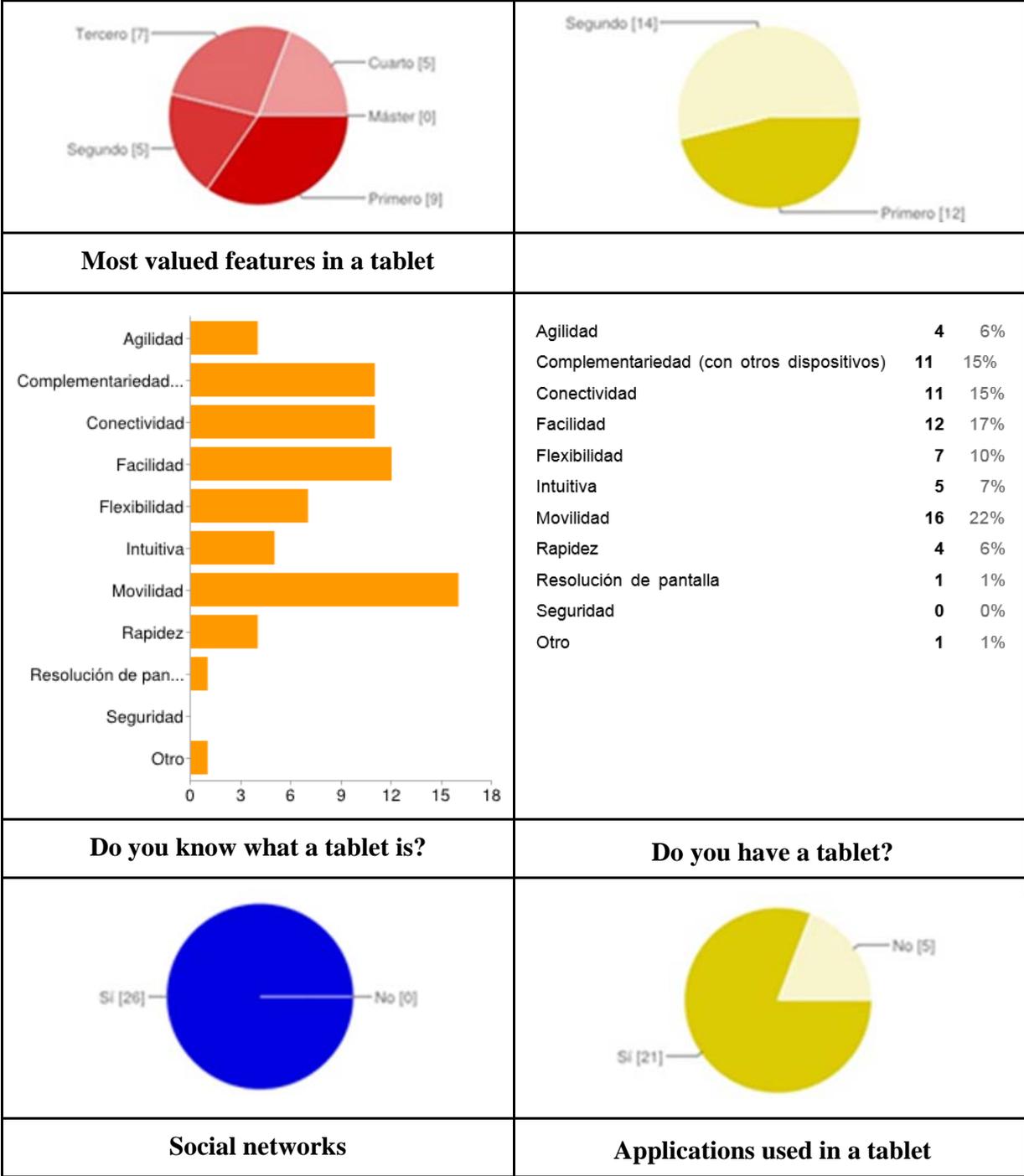
Teachers use tablets mainly for web browsing and consulting email, and consider that their most important benefit is easy access to information. 69% introduce some technological tools in the teaching process, in order to exercise digital skills in their subjects. The teachers who do not include them argue the following:

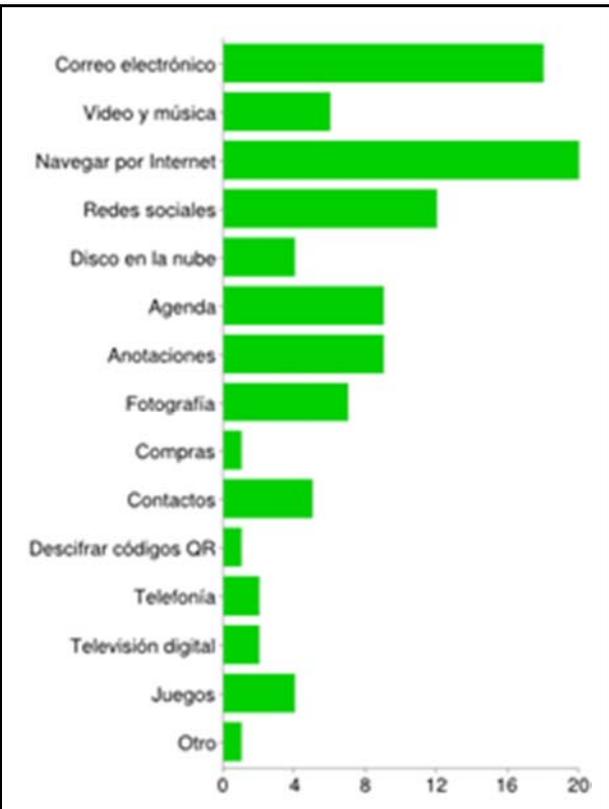
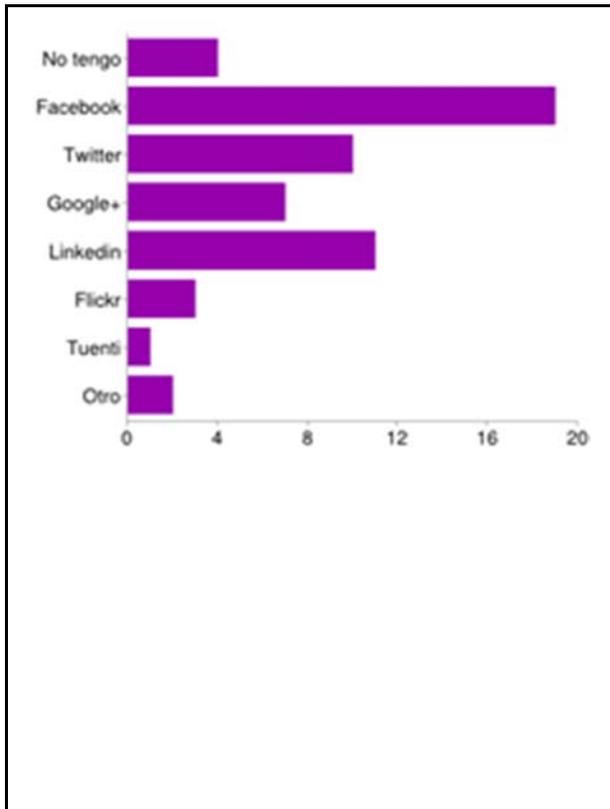
- ‘It requires that all pupils have this digital device’.
- ‘In my case, a high percentage of students do not work with tablets’.
- ‘Digital skills are not specified among the competences to acquire in my subject’.

100% of the teachers use technological tools in the classroom, such as computers with Internet connection, digital whiteboard, digital presentations and other tools. In contrast, 68% declare that they do not use tablets in their teaching. 54% consider that tablets can improve their teaching. Over 50% of the activities in the classroom are typically performed individually while a 33%, in small groups. The activities are related to searching information, using word processor, concept mapping presentations, and access to the e-learning platform.

In figure 6 the most significant aspects that should be taken into account are summarized.

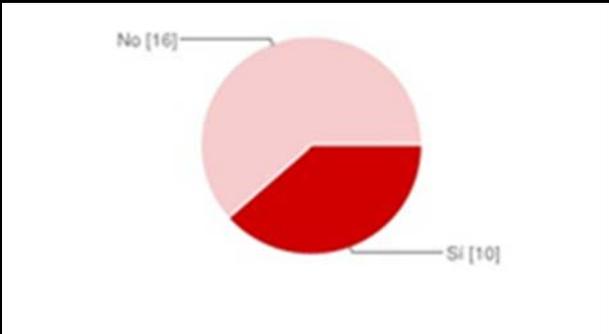
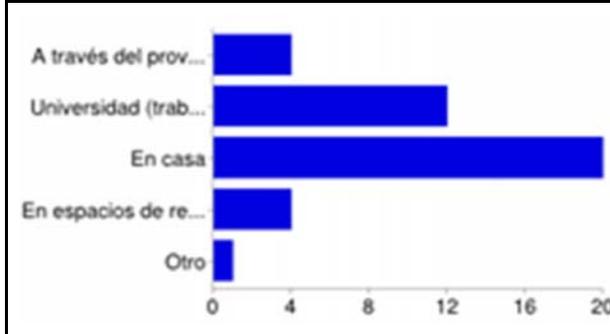






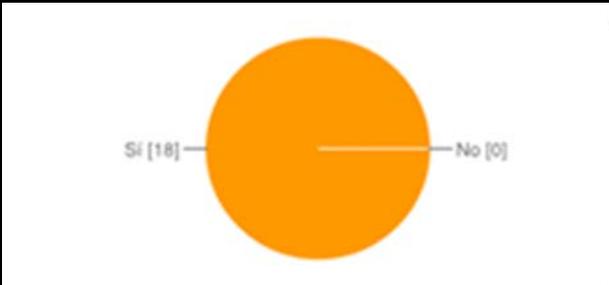
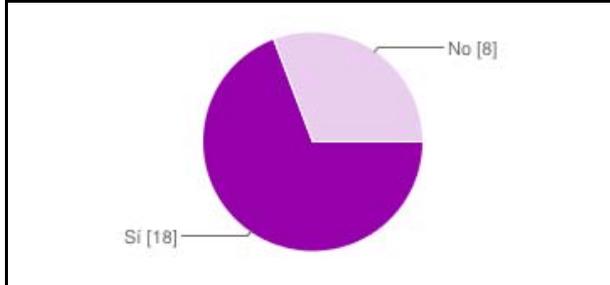
Places where you connect with your tablet

Can the tablets replace the laptops?



Do you include digital skills in any of your subjects?

Do you use technological tools in the classroom?



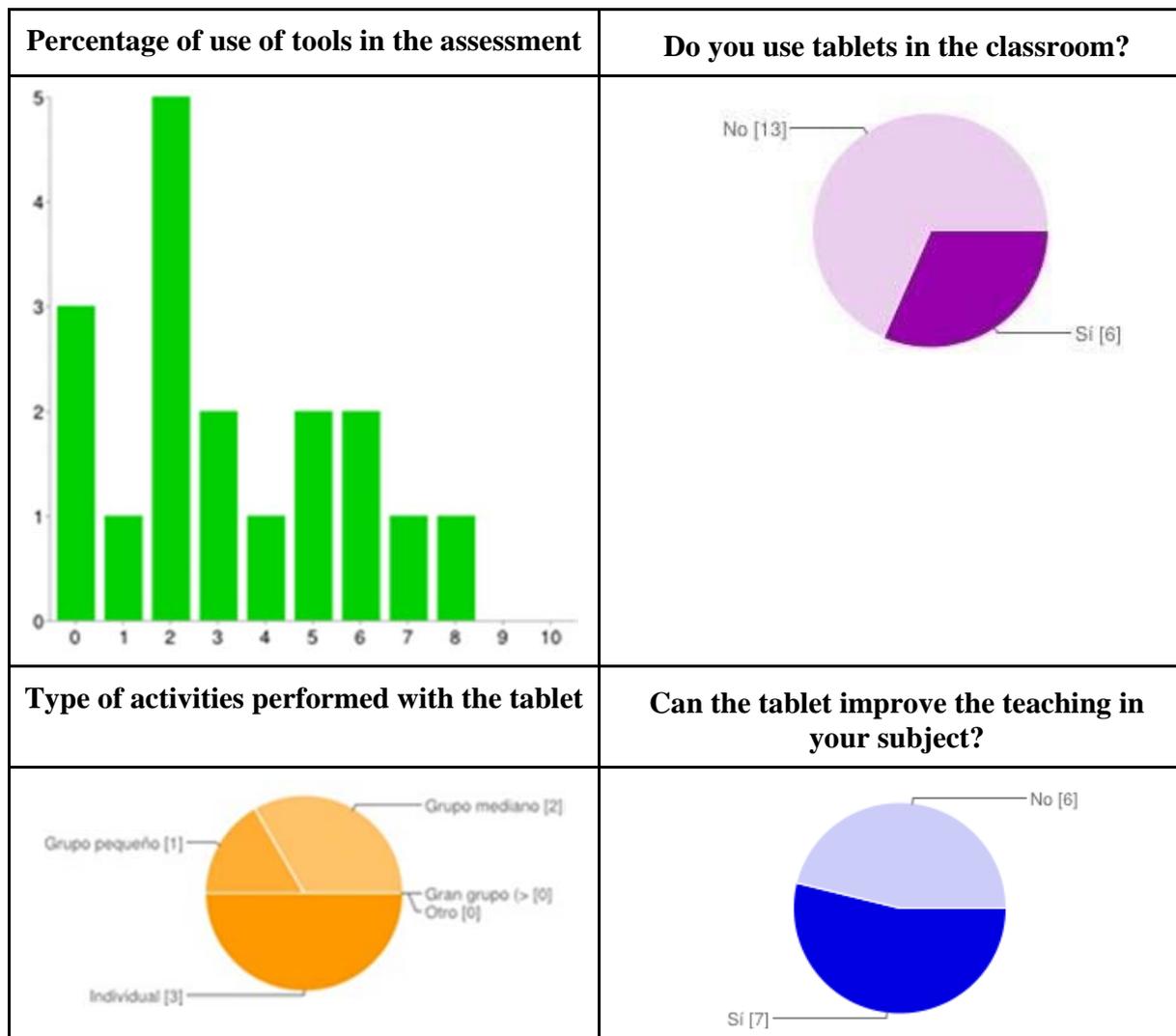


Figure 6. Summary of the answers obtained in the teacher questionnaire.

Teachers usually employ technological devices in their classroom. However, many of them do not consider this use necessary, for the alleged reason that they do not provide a substantial improvement to the teaching process.

CONCLUSION

In this paper, we analyze the use of tablets and mobile applications in higher education. The information has been collected through a questionnaire, which has been filled in by students and teachers, mainly of Social Sciences degrees. Two questionnaires have been designed, to identify the profiles of both students and teachers, and with the aim of defining how tablets can improve the teaching process and how teachers make use of these devices in the classroom. These questionnaires were completed by 172 students and 26 teachers. Most of the students are currently completing their degrees in Law and Geography. In general, all respondents know what a tablet is. Respondents highlighted mobility and ease as features offered by the tablets; and they identified web browsing, email and play multimedia content as the main uses of these devices. Today the Internet and mobile devices are closely linked by the benefits they offer. Many teachers use the tablets but do not agree with the idea that tablets can replace the computer in the classroom. The reasons are manifold, but they mainly argue that their subjects do not require the use of new technologies or that the tablets do not provide substantial improvement with respect to computers.

The current level of incorporation of digital tools in the classroom is high. The use of mobile devices in the classroom depends on the specific subject. It is expected that in the future more multimedia content will be available on any subject, making more attractive the use of tablets in the classroom.

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