The use of mobile devices - Tablets - In the pedagogical mediation of higher education students

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ABSTRACT

This article intended to examine the use of educational mobile devices (Tablets) as complementary mediation pedagogical agents on high education. For this matter, this study attempted to investigate the implications and potential of the use of Tablets, as educational promoting agents throughout the articulation between the players involved on the learning process.

Keywords: Mobile devices, Pedagogical mediation, Information and communication technologies.

1 INTRODUCTION

Contemporaneity is marked by the penetration of Information and Communication Technologies (ICT) in the daily life of social reality, expanding the perception of space and time, towards the construction of a new understanding of society. This scenario has led to transformations in all areas of knowledge, of course, and education cannot be left out. Through technological advancement and the insertion of digital media, numerous changes have occurred. In addition, education has become more complex, generating new ways of teaching and learning and consequently affecting educational standards and models.

For Moran (2003), "education will be more complex because it will incorporate dimensions that were previously less integrated or visible, such as intellectual, affective and ethical competences." (MORAN, 2003, p.2) These changes cited by Moran (2003) cover several areas of knowledge: from the philosophical, pedagogical, technological field, to the field of medicine, psychology and sociology. With the introduction of new educational trends, the educational process added values, modifying pre-established standards.

In recent decades, ICT has gradually increased its importance in the teaching-learning process, thus justifying the growing investments in technology applied to education (MORAN, 2000). The incorporation of ICT into the educational environment has forged the need to translate these changes, leading society to feel the need to modify the pedagogical method, making it more flexible and dynamic. ICT, now adding to the mobility of information, opens up the possibility of new social

structures. With the recent advent of small artifacts that converge telephony, Internet and database technologies in a single device, humanity is truly experiencing the first generation of ICT portability (PETERS, 2007).

Mobile telephony and the Internet are increasingly becoming affordable, which is expanding their use. Mobile technologies have enabled new forms of communication, typical of youth, a generation for which mobile communication is part of daily interaction. This generation is characterized by always being connected to networks of geographically dispersed communities organized by common interests. The possibilities of communication and data transfer created by mobile technologies (*m-technologies*) significantly reduced the limitations that fixed locations established for work and study. This acquires the potential to revolutionize the way we work and learn. However, in a mobile and connected society, new educational challenges are established, because it is expected that teaching occurs with the same speed (PETERS, 2007).

However, even though it is believed in the advantages of the use of computational devices in education, its use in the educational sphere should not be restricted to the simple insertion of equipment in the classrooms. In order to have positive results, it is necessary to identify the expectations of the actors involved, seeking to adapt them to the best teaching practices. Changes of this nature demand reflections and theoretical and practical studies, in order to identify whether they result in better learning experiences or not (ALMEIDA and AZEVEDO, 2009).

In this context, the purpose of this article was to examine the use of mobile devices, in this case tablets, as complementary agents to pedagogical mediation in Higher Education.

2 MOBILE DEVICES IN EDUCATION

In the last decade the use of mobile digital devices - Cell Phones, PDAs and *Tablets* - in education, especially in higher education, has gained space. Considering its degree of portability, mobility and resources, the *Tablet* has been pointed out as the new didactic material (VILAÇA, sd). Tablets are lightweight and practical notebooks, where interaction can be via mouse, keyboard or electronic pen. Another advantage of *the Tablet* is that, for its lightness and mobility, it can be used supported on the table or on the user's own arm. This differentiates it from the notebook, whose screen is vertical, creating discomfort between the user and his interlocutors (EMBYSK, 2010).

Studies (SCOOT et al., 2006 apud CACEFFO et al., 2011) point out that students prefer to use *Tablets* instead of traditional notebooks in the classroom. However, as with the use of any other technology, the use of *Tablets* can generate anxiety and even distraction. Other studies (Klopfer, Squire, Holland and Jenkins, 2002 apud PETERS, 2007) suggest that mobile devices make it possible to explore unique educational potentialities, such as:

a)   Social Iterativeness.

b)   Ability to bring together unique aspects of a certain context, environment, or moment.

c)   Connectivity, relative to other mobile and network devices.

d)   Individualization, through the unique ability to customize individual research trajectories.

Like many other technological advances - television, radio, cinema, CDs, DVDs, just to name a few, the *Tablet* was also not planned for educational purposes, but ended up benefiting education (VILAÇA, sd). In education, the convergence between digital and face-to-face, promoted by educational practices that combine face-to-face activities and resources with digital, has been driving the use of *Tablets*. Teachers can use mobile devices as complementary agents to pedagogical mediation, for example, by asking their students to conduct research and online activities. This hybrid teaching, called *blended learning* (TORI, 2009 and 2010), despite favoring the integration of mobile digital technology, runs into issues that deserve attention. The high cost involved in the adoption, on a large scale, of the *Tablet* as a complementary agent to pedagogical mediation, makes its adoption still an isolated initiative of a few educational institutions (VILAÇA, sd).

Thus, in order to examine the use of *Tablet by* students of higher education, with special interest in the formal use of this device, we sought to investigate the degree of satisfaction and difficulties experienced by students of an undergraduate course, as well as their perception of how much this experience added to their learning.

3 METHOD

The objective of this article was to reflect on the potential of the use of mobile devices in the classroom as complementary agents to pedagogical mediation in higher education. To verify this question, information was collected on the perception that students of a higher education institution (HEI) X had of the use of *Tablets* during an academic semester, attending the discipline Political Science, in the course of Law.

This investigative scenario is part of the efforts of a higher education institution (HEI) X to implement a new education system. As a pedagogical strategy to capture and maintain students, IES X distributed *Tablets* to all students of the courses considered most important for the institution, these being the Law and Engineering courses. The equipment was made available on *a lending basis,* so that it could be used, instead of the printed didactic material, until the end of the course.

3.1 PARTICIPANTS

The sample of this study was composed of two classes of 2nd semester, of the Law course. One of the classes consisted of 34 students, 16 of whom could request the *Tablet.* The other class had 59 students, where 32 had the option to request the equipment, totaling 48 students with *Tablet*. Of these,

only 32 participated in this study. Below you can see the demographic data of the sample (see Table 1, Table 2 and Table 3).
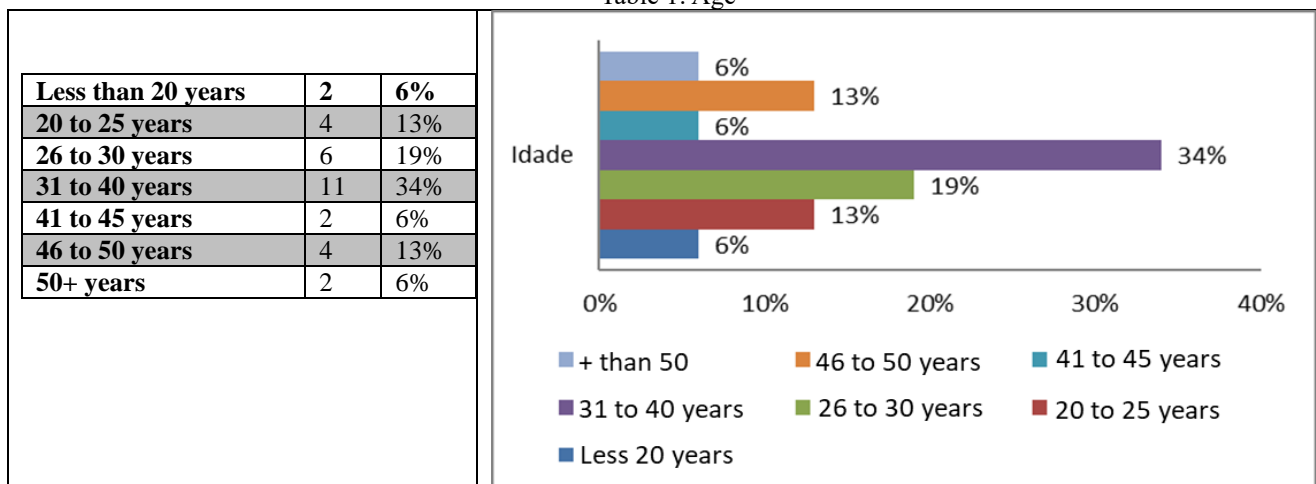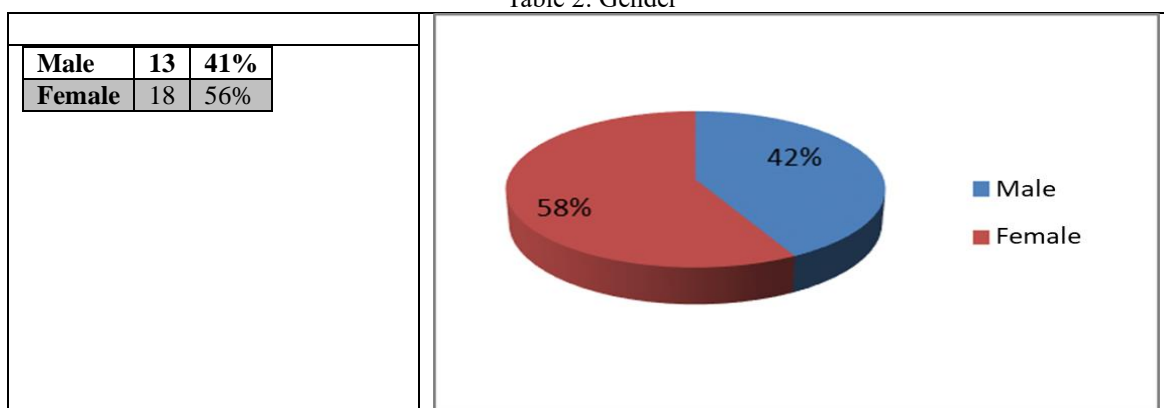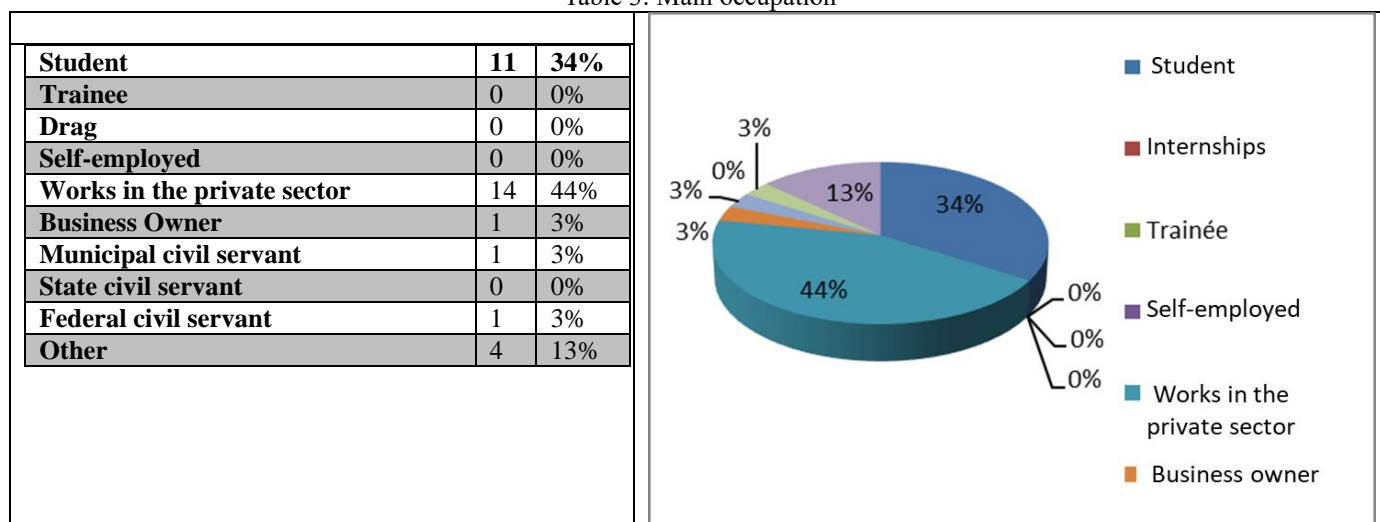
Table 1: Age

Less than 20 years	2	6%
20 to 25 years	4	13%
26 to 30 years	6	19%
31 to 40 years	11	34%
41 to 45 years	2	6%
46 to 50 years	4	13%
50+ years	2	6%

Table 2: Gender

Male	13	41%
Female	18	56%

Table 3: Main occupation

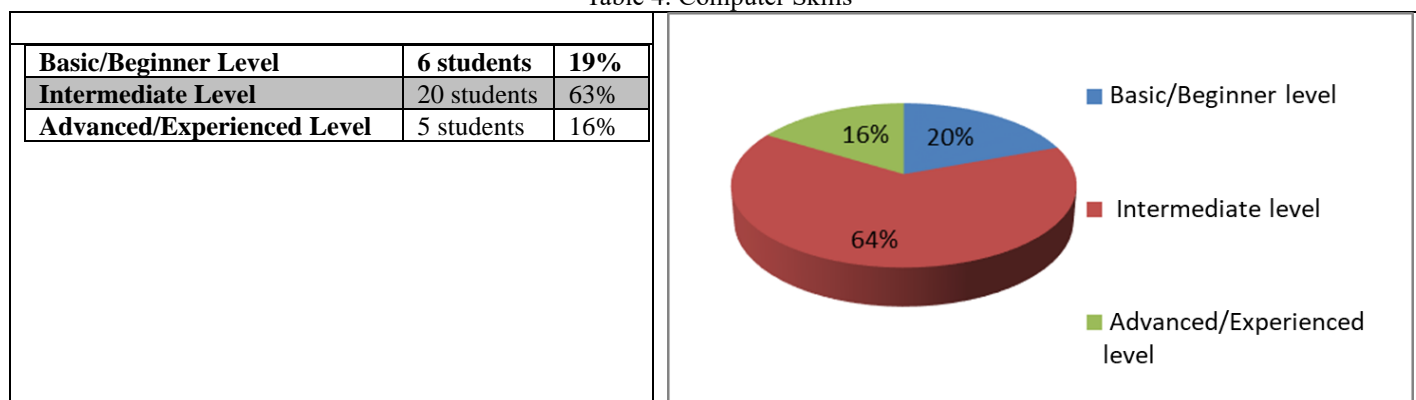| Student	11	34%
Trainee	0	0%
Drag	0	0%
Self-employed	0	0%
Works in the private sector	14	44%
Business Owner	1	3%
Municipal civil servant	1	3%
State civil servant	0	0%
Federal civil servant	1	3%
Other	4	13%

3.2 EQUIPMENT AND SUPPORT

The *Tablet* used in the study was of the Positivo brand and although all the students received the same model, the equipment provided did not contain the necessary applications for the execution of the most desired functions, such as: editing a text, a spreadsheet or any other type of document. Thus, even though the institution offered in the first week of distribution training on the use of the equipment, each student was responsible for installing the applications on their equipment, being forced to seek solutions on their own.

Although the student had been given the freedom to install the applications he wanted, due to the extensive need for customization, performing these operations required a minimum of computer knowledge. Even though more than half of the students (63%) declared to have an intermediate level of computer knowledge (see Table 4), this situation led many students to become discouraged in starting to use the equipment.

Table 4: Computer Skills

Basic/Beginner Level	**6 students**	**19%**
Intermediate Level	20 students	63%
Advanced/Experienced Level	5 students	16%

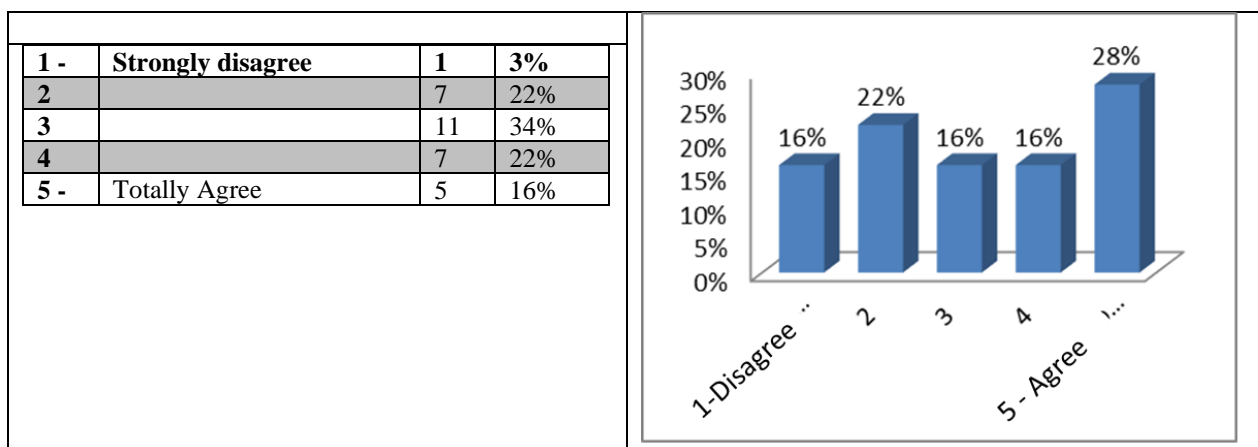

4 DATA COLLECTION AND ANALYSIS

Data were collected through questionnaires applied at the end of the academic semester, as well as through observations conducted in the classroom throughout the semester. The duration of the course was 3 months and data were collected from September to November. The questions of the questionnaire sought to examine different aspects of the experience in the use of the *Tablet*, by students of a Law course. The dynamics of this use was also observed through the performance of activities, having been given the option of presenting them, both in conventional (printed) media and in the *Tablet*. In addition, throughout the academic semester, observations of situations that emerged in the classroom about the experience of using the device were conducted.

The questionnaire was designed considering four categories: satisfaction, use and intention to re-use, individual benefits and quality of the system. Each category contained questions, to be answered in Likert scale format (from 1 to 5, from 1 – Strongly Disagree to 5 – Totally Agree), whose analyses are presented below.
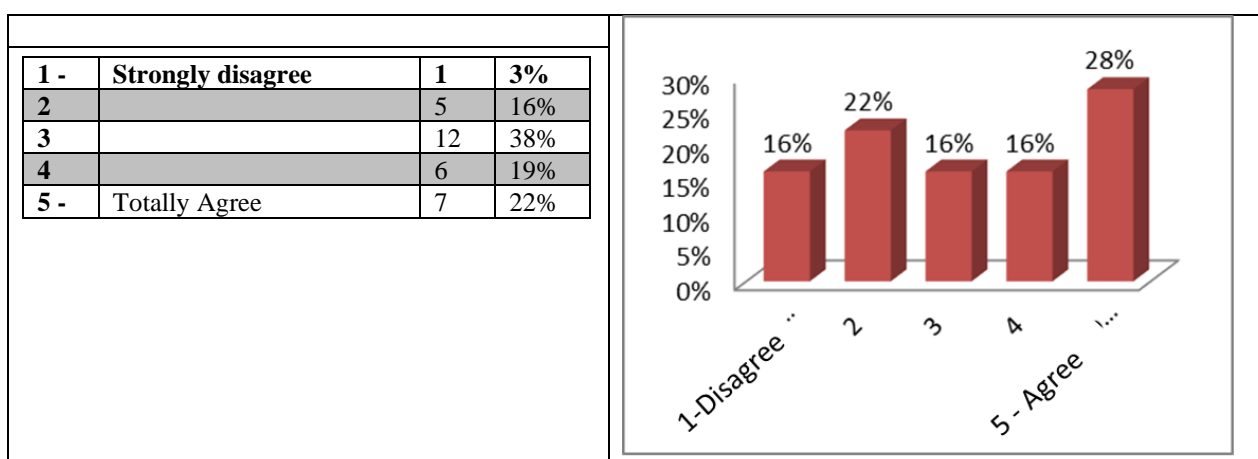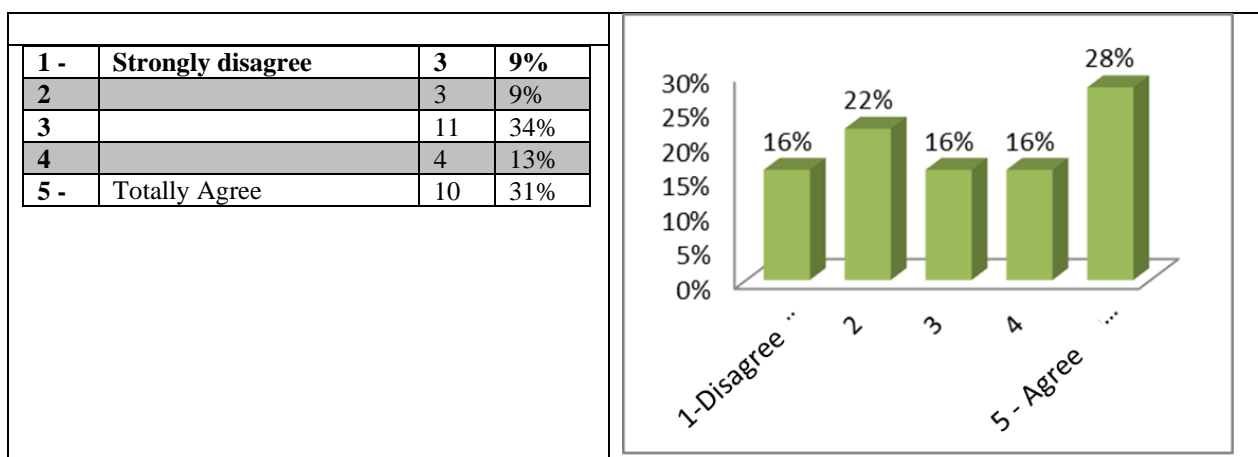
4.1 SATISFACTION

4.1.1 I feel satisfied with using the Tablet

1 -	Strongly disagree	1	3%
2		7	22%
3		11	34%
4		7	22%
5 -	Totally Agree	5	16%

4.1.2 The Tablet provides an attractive learning environment

1 -	Strongly disagree	1	3%
2		5	16%
3		12	38%
4		6	19%
5 -	Totally Agree	7	22%

4.1.3 I like to use the Tablet

1 -	Strongly disagree	3	9%
2		3	9%
3		11	34%
4		4	13%
5 -	Totally Agree	10	31%

4.2 USE AND INTENT TO RE-USE

4.2.1 I frequently use the Tablet

1 -	**Strongly disagree**	**4**	**13%**
2		5	16%
3		9	28%
4		4	13%
5 -	Totally Agree	9	28%
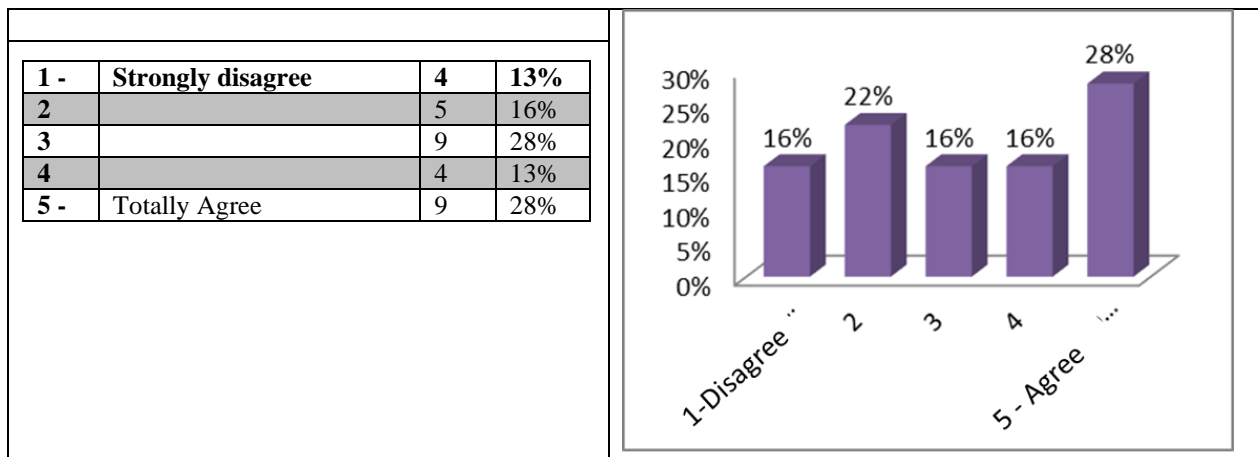
4.2.2 I intend to continue using the Tablet whenever I can

1 -	**Strongly disagree**	**3**	**9%**
2		3	9%
3		8	25%
4		2	6%
5 -	Totally Agree	15	47%
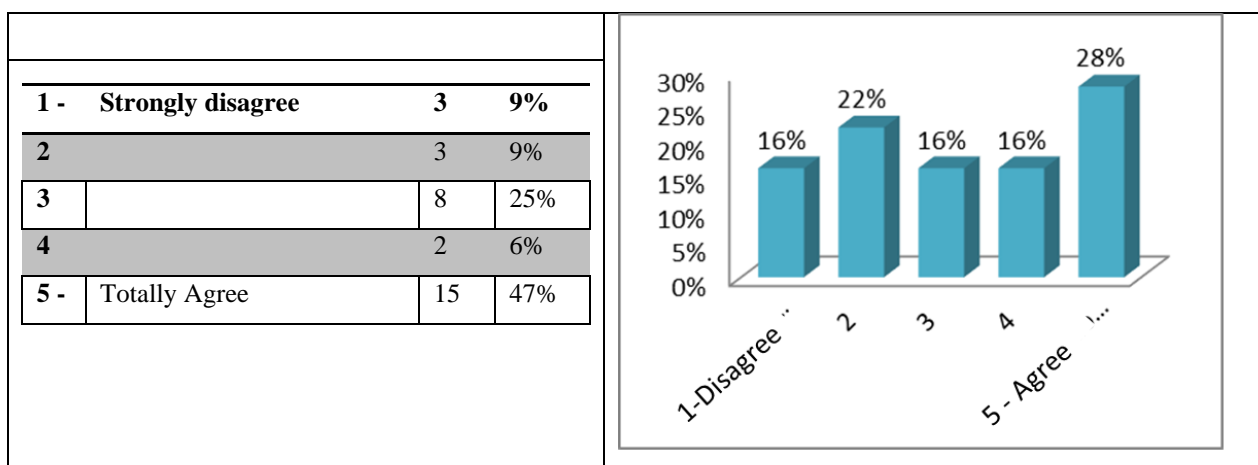
4.2.3 I intend to increase the frequency of use of the Tablet while studying at the institution

1 -	**Strongly disagree**	**2**	**6%**
2		5	16%
3		5	16%
4		5	16%
5 -	Totally Agree	14	44%
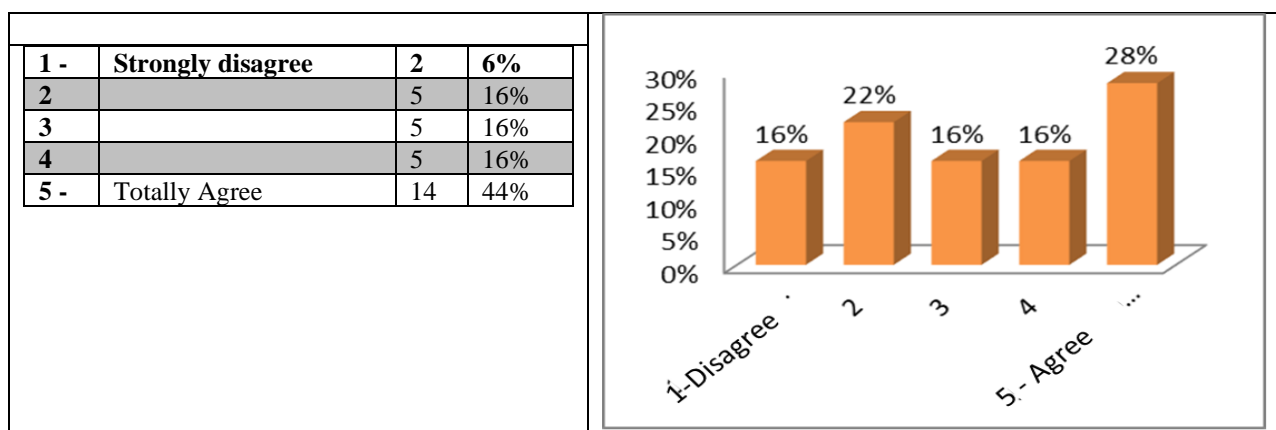
4.3 INDIVIDUAL BENEFITS

4.3.1 The use of the Tablet stimulates my interest in learning

1 -	**Strongly disagree**	**4**	**13%**
2		8	25%
3		5	16%
4		4	13%
5 -	Totally Agree	10	31%
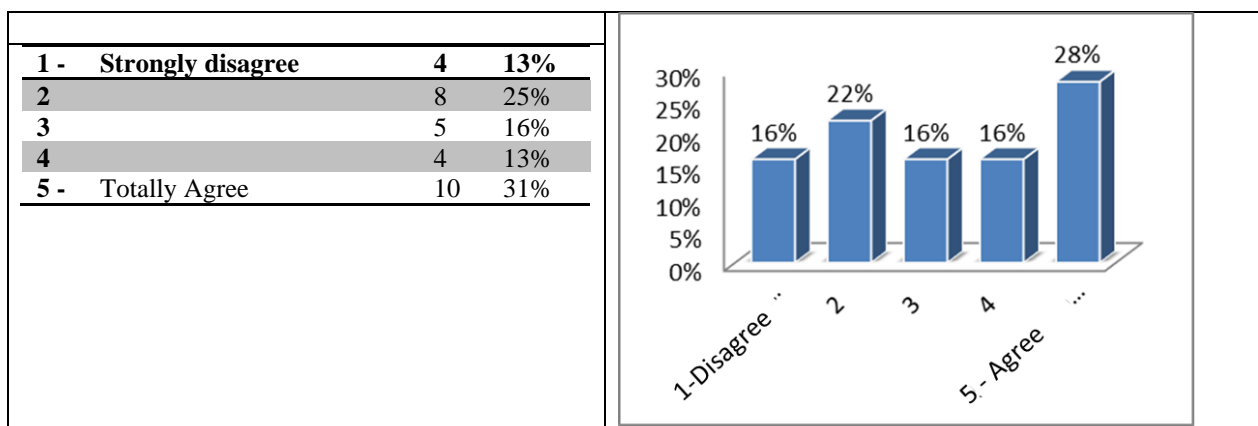
4.3.2 I put more effort into learning and focus better when I use the Tablet

1 -	**Strongly disagree**	**8**	**25%**
2		5	16%
3		7	22%
4		8	25%
5 -	Totally Agree	3	9%
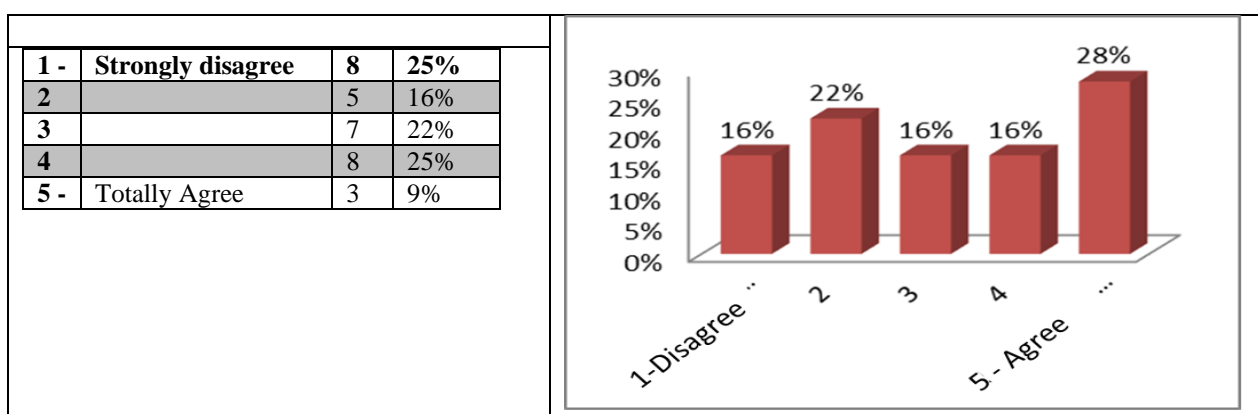
4.3.3 Using the Tablet increases my learning performance because it allows me to perform tasks faster

1 -	**Strongly disagree**	**4**	**13%**
2		9	28%
3		5	16%
4		6	19%
5 -	Totally Agree	7	22%
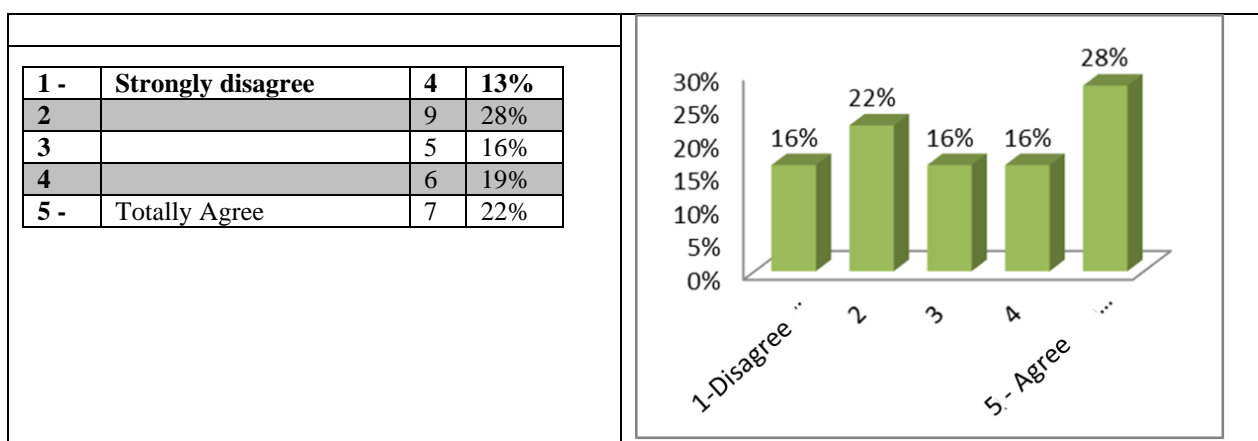
4.3.4 Using the Tablet facilitates the learning process by improving teaching

1 -	Strongly disagree	6	19%
2		8	25%
3		4	13%
4		8	25%
5 -	Totally Agree	5	16%
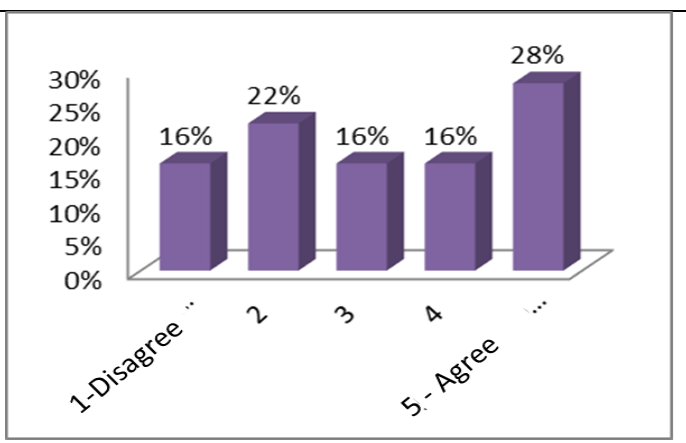
4.4 SYSTEM QUALITY

4.4.1 Learning how to operate and navigate the Tablet was easy

1 -	Strongly disagree	4	13%
2		5	16%
3		5	16%
4		3	9%
5 -	Totally Agree	14	44%
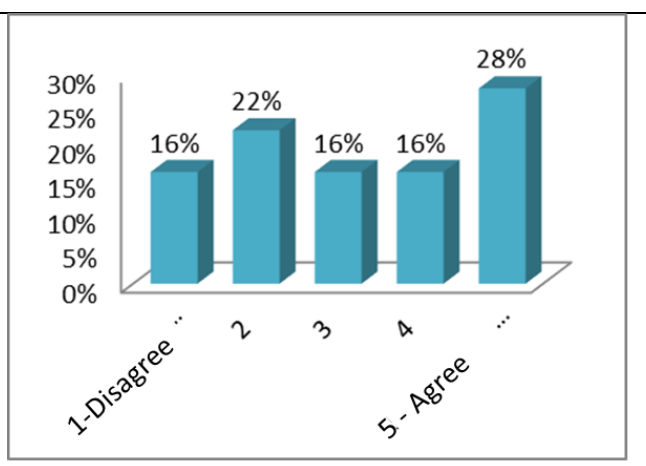
4.4.2 The Tablet interface is visually pleasing

1 -	Strongly disagree	1	3%
2		6	19%
3		7	22%
4		7	22%
5 -	Totally Agree	10	31%
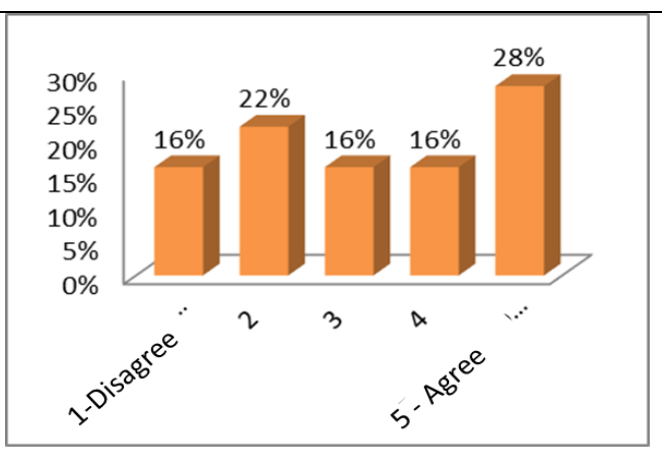
4.4.3 Tablet pages and apps load quickly

1 -	Strongly disagree	6	19%
2		7	22%
3		11	34%
4		5	16%
5 -	Totally Agree	2	6%
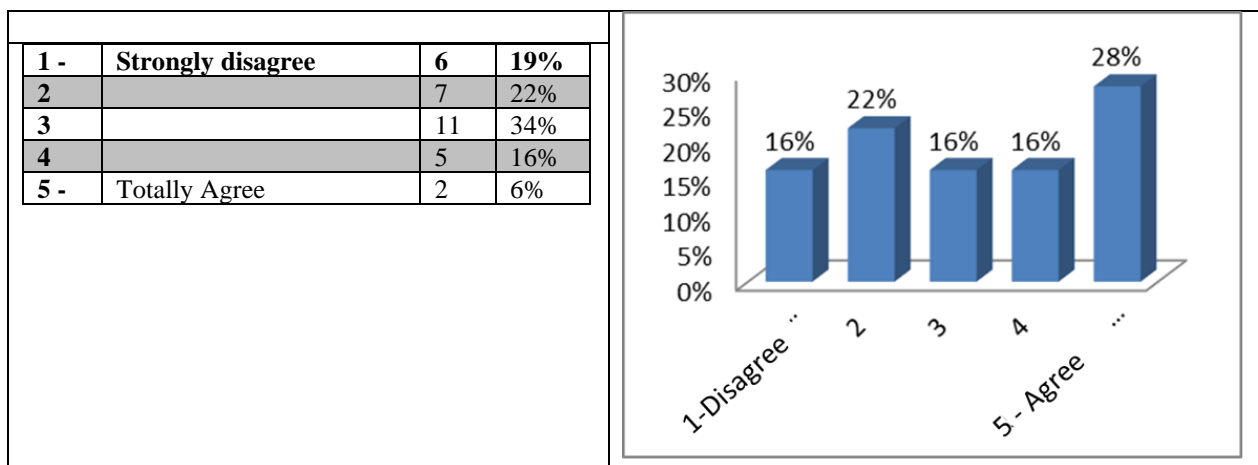
4.4.4 The Tablet has applications that helped me in the activities

1 -	Strongly disagree	4	13%
2		5	16%
3		8	25%
4		6	19%
5 -	Totally Agree	8	25%
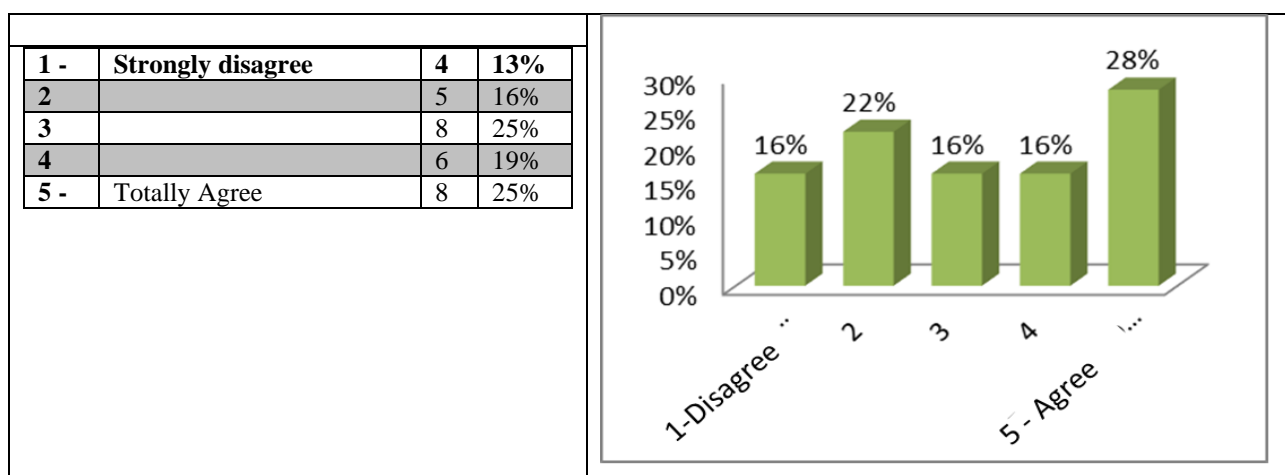
4.4.5 In general, the Tablet offered by the institution has good quality

1 -	Strongly disagree	5	16%
2		7	22%
3		5	16%
4		5	16%
5 -	Totally Agree	9	28%
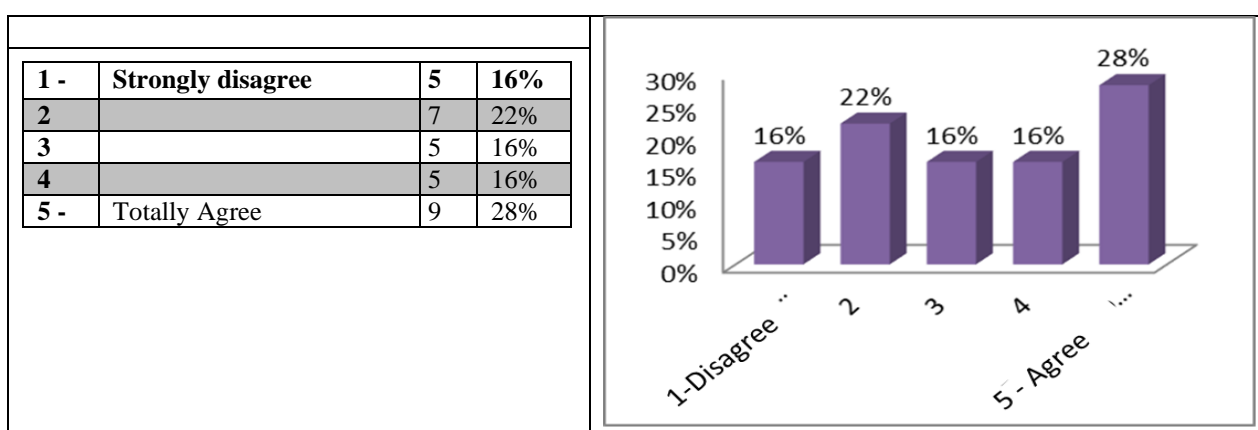
5 RESULTS

When asked to present the correction of an activity, although the students had the option of performing it both on the Tablet *and in a conventional (printed) medium, of the 48 subjects, only 5 had brought it on the* Tablet. This may be explained by the fact that the activity was requested at the

beginning of the second month of use of the equipment, without having had the time of acclimation to the device. Probably the result would have been different if the same activity had been requested at the end of the semester.

Another interesting fact is that of the 48 students who requested *the Tablet*, 6 either did not use it or practically stopped using it in the first week of the academic semester. Asked why, the subjects pointed out as justifications: lack of interest/need, preference for printed material, technical problems faced in the use of the equipment, lack of familiarity with the technology, lack of technical quality of the equipment and fear of using equipment that did not belong to them, among others.

Regarding the data collected in the questionnaire, in relation to the patterns of use, when asked about the Use and Intention of Re-Use, of the 33 students, 24 stated that they use and intend to continue using the *Tablet regularly*. The reason for this can perhaps be attributed to the fact that the student envisions possibilities of its use as a personal benefit related to increased interest in learning by allowing the accomplishment of academic tasks more quickly. However, opinions were divided when asked if its use improves their effort and their concentration on learning and if it facilitates their learning process by improving teaching.

As for System Quality, the study revealed the expected difficulties in relation to hardware and software, such as: slow performance of the equipment and lack of credibility in data security. But the main difficulty faced was the need for customization that the equipment initially required. Another limiting element in the diffusion of the use of the *Tablet was the lack of* WiFi access in the *facilities of the IES, because it was not possible to access the Internet, it could only be used in the computer function.*

As for the most popular activities performed with the *Tablet*, the following were indicated: Internet browsing, creating, reading and editing electronic files (Word, Excel and Power Point), consulting the didactic materials and studying and annotating comments during classes. The activities where *the Tablet* was less used by the students were: watching videos, listening to music, updating agenda, Facebook, Blog, Twitter and chatting. It is worth mentioning that the main activity in which the Tablet was used - Internet browsing - not necessarily an activity exclusive to the *Tablet platform*.

6 CONCLUSIONS AND COMMENTS

This study found evidence that the use of *Tablets* is a breakthrough towards transformation and, why not say, improvement of learning. Although the interface of mobile devices still presents limitations, the main observation raised in the data collected and corroborated by the feedback of the students is that the greater the use of the *Tablet* - both inside and outside the classroom - the greater the comfort and interest in its use to carry out academic activities.

However, the mobility and flexibility of a *Tablet* (on and above all other factors) is what enhances the insertion of this sociotechnical artifact in almost all aspects of the student's formal learning. This innovative aspect enables a transformative effect on learning, opening new paths for contemporary education.

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