Laptops vs. Desktops in a Google Groups Environment: A Study on Collaborative Learning

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***Abstract*—Current literature on m-learning refers to the lack of studies on real use of m-learning applications and how they can compete with current desktop counterparts. The study consists of an experiment involving one hundred and twelve students of higher education and a set of learning activities that they have to accomplish. This study has the main objective to validate if the students that use laptops or desktops are in the flow experience and which of them are more in the flow experience, when using Google Groups. The used approach is based on the flow experience introduced by [1]. It was possible to conclude that students have experienced the flow state both by students using laptops or desktops, but having the laptop students a more positive effect in the flow experience.**

***Index Terms*—comparing mobile with desktop, flow experience, mobile devices**

I. INTRODUCTION

Computers are becoming increasingly indispensable in our current habits, and as a result, the market has increasingly invested in this reality. 10 years ago, a mobile device only served to send text messages and for calling. Today, because of the large advances in technology, these mobile devices let us do almost everything a computer does, besides telephone calls and sending text messages.

With the advancement of mobile technologies, the use of a computer is no longer restricted to a computer lab, a classroom or an office. We can transport them anywhere and anytime we want [2].

Technological applications and the way they are used has advanced in such a way that the manipulation of learning objects is no longer limited to a desktop, but extended to the use of mobile devices, to provide a greater range of application and obtain the benefits that mobile computing offers to the education sector. This results in the establishment of a new area of activity, related with the use of mobile technologies in learning, named m-learning.

II. COLLABORATIVE ENVIRONMENTS

Collaborative learning can be seen as an act that results in a coordinated process of building and solving a particular problem [3].

Collaborative learning provides an environment that can animate and enrich the learning process. The participation of various people in a collaborative environment permits the creation of an educational system more realistic in a particular social context, thereby increasing the effectiveness of the system. This type of environment helps to sustain the interest of the student, providing a more natural habitat [4].

To learn in a collaborative environment, we need to follow these characteristics [5, 6]:

- Develop and share a common goal;
- Contribute to the understanding of the problem;
- Work, respond and understand the issues of other members;
- Responsibilities for all elements of the group;
- Dependency between group members so that everyone understands that the group's success depends on everyone.

Also [7] reports that through the collaborative environment, participants gain a deeper learning, a shared understanding, critical thinking and the retention of long-term learning as the main benefits for such learning activity.

The collaborative environments contain behaviors that improve learning. These environments contribute in a positive way for both situations where the participants are physically or through technology communicating with each others [8].

[9] defines collaborative learning as a situation where two or more people try to learn something in common and together. Each element of this definition can be interpreted in several ways:

- "Two or more persons" may be interpreted as a pair of people, a small group (3 to 5 persons), one class (20 to 30 people), community (a hundred or a thousand people) or a company (one hundred thousand people), and so on.
- "Learn something" can be interpreted as an accompaniment to a course, a determine lecture of a discipline, solving a problem, as many other ways.
- "Together" can be interpreted as different forms of interaction: face to face or through the new technologies of information and communication.

A group of people can never reach a perfect consensus of all of life, they need only to reach a reasonable consensus in order to continue the job they are doing [10].

The use of information activities has been considered crucial to the success of collaborative activities [11].

In nowadays, we see daily information activities, since we go to the Internet and we see appealing symbols about some new news, the publicity that we receive in our homes on promotion of a product, from receiving in our mobile phone SMS to inform us of new promotions, etc.. Due to a competitive society that we live in, it is crucial

that there are such information activities, so that our society can survive and strive.

The same is true in education, that is, if there is a greater volume of information activities the greater is the students' attention. If students have information about what is happening in a particular subject the greater is the interest of students, as demonstrated by [11].

It is necessary that the group members are aware what each is doing, so that the collaboration between them can succeed [12].

In a collaborative environment, it is necessary to have social awareness of other members, this is, if they are reachable or not, if they are well prepared or not, if they can be disturbed. This social knowledge is essential because we can act according to their situation, for example, if an element is sick maybe we should save the discussion for another day [13].

Information services have been developed in collaborative environments, in order to monitor and notify members of the group if any work has been done during the group work [14, 15].

Since the notion of cooperation is inherent in collaborative learning, research can also be applied to collaborative learning environments. Both the cooperative and collaborative learning are built around the idea of socially constructed knowledge [16].

The two terms (cooperative learning and collaborative) are therefore often used synonymously, there is a considerable ambiguity [17].

Sometimes the collaborative and cooperative environments can be interpreted in the same way, but these two types of environments have different aspects.

[18] make a distinction between cooperative and collaborative learning. They indicate that cooperative learning is a protocol, which at the beginning the initial task is subdivided into subtasks, so that the various participants are able to develop them independently. Collaborative learning describes situations where two or more subjects are built synchronously and interactively in order to reach a common solution to a problem [18].

Cooperative learning generally leaves the authority structures unchanged. The end is defined in the beginning by an instructor, who also describes the means by which the objective will be achieved and evaluate the whole process [16]. As reported by [17] who defended that cooperative learning is based on the use of small groups, so that students can work together to maximize the learning of them self's and to others.

Collaborative learning is relatively cooperative, but it takes all participants a step forward: involving participants in a self-reflective process that often generates a series of questions, "meaning" and "power" and that forces them to confront issues that are implicit in any process of learning in the classroom, but are rarely explicitly defined and treated [16].

III. TECHNOLOGY ENVIRONMENTS

Imagine that we are living in a time where cars could not go faster than 25 km / h; where letters were only written on paper; and where computers were only used for writing text. How could one live in this global economy and in this century? If you can not work with obsolete tools and services when it comes to survival, how can we continue to support an educational system that ignores the new researches on learning and continues to "educate" using outdated tools? [19].

For a long time, people thought that teaching consisted on the transmission of knowledge and on the training of the memory, and instil in students the values of society. People felt that learning was to acquire knowledge through a process of attention, memorization and reproduction of it, which is an individual and homogeneous task, that can be standardized [20].

"*The integration of the computer in education is now a reality impossible to ignore and that we must understand*." [20]. That also brings new ways of working with data, information and knowledge and to relate with others. We can say that computers and networks have turn learning in a more open and freely activity.

The use of computers in teaching fits the constructive approach of learning (although other approaches are possible). Although the computer is not a technology designed for the education system, its characteristics of interaction and its capacity to deal with information, makes it a very useful and promising tool [20].

Teaching using computers is an added value to our society; it is certainly very appealing to students and more motivating, stimulating them to interact with different situations and depictions of real life, forcing the student to think creatively and independently about new subjects and materials.

Information technologies are rapidly changing the way we live. Computers, calculators and other technologies for processing information, help our brains to create knowledge from data and available information. Until recently they have being used in the majority of cases, for repetitive tasks (writing and printing), performing these in a more rapid and with minimum possible of errors. Since the evolution of computers, they are already capable of being used for tasks far more complex than in the past. These tasks have a direct implication on how to create a better learning environment [21]:

Access to unlimited information: computers allow users to access a vast amount of information;

Interactive teaching: computers may be chosen for interactive learning environments allowing students to learn at their own pace;

Multimedia: since the arrival of the CD-ROM, these have enabled us to integrate teaching with voice, video, text, graphics and music getting sights and sound from real world;

Simulation: The computers allow students to simulate different kind of experiences. This allows the exploitation of various kinds of experiences without students being limited to physical environments;

Virtual Reality: Allows users to create experiences in an environment in three dimensions and try even new approaches and perspectives for interaction;

Distance learning: The technology allows students to learn at any point in time, at any place, without having to be in a particular geographical place (at least at the same time);

New connections: Computer networks allow students to connect with each other in order to share a common knowledge among them.

When using technology for education we should use this in a fair and moderate way. We must not use it too much, because it may lead to cases where the users are so addicted to the technology that they cannot release it or its use superposes to the learning. Also if users are far removed from it, they never benefit from its advantages [22] (as the technology becoming a barrier).

We can list the main advantages that contribute to technology as an asset to a school environment as [23]:

The technology is attractive: You cannot think of using a particular technology if it is not attractive. The attractiveness of technology is achieved by the mode of operation, and its appearance;

The technology is available: A particular technology has no value to society if it is not used. The technology should not be locked behind a door where nobody can access it;

Technology is addictive: This is an ambiguous feature of technology. This feature reflects the learning effort that users do to use the technology and also place some restrictions for future change.

Educational technologies can be considered simply as a set of information technologies. However, important is what we do with these technologies, it is the way we are encouraged to use this set of technologies that becomes the ultimate challenge for the learning outcome (Buchan, 2008).

Technologies for education are a key part of a learning environment [22].

IV. MOBILE DEVICES

Quin cited by [24] states that m-learning is the interaction of mobile computing (small applications, portable, and wireless communication devices) with e-learning (learning facilitated and supported through information and communication technologies).

M-learning is not a substitute of e-learning, but a subset of the e-learning environment. However, m-learning can improve some of the e-learning advantages. This new form of learning is a method with potential, as it enables students to learn anywhere, away from the traditional classrooms [25].

There is a widespread use of mobile devices in an m-learning environment, in our modern world: mobile phones, PDA's, MP3 players, portable gaming devices, Tablet PCs and laptops, which predominate in our everyday lives. From children to older people, they are increasingly linked with each other, communicating through communication technologies, something that didn't happen just few years ago.

There are a number of mobile devices that can be considered for an m-learning environment [24]:

A. IPod

The media player from Apple, allows users to download music, books, audio, podcasts, photos and video from the Internet. It also includes an address book and a calendar that syncs with Microsoft Outlook or Outlook Express. It can also serve as a storage device.

With the iPod, students can download podcasts of relevant educational materials, along with audio and video lectures. Although most models have a small screen, future versions will probably have bigger screens, so that users can read e-books on them. The iPod video (iPod Touch), for example, takes a step in this direction. And recently Apple has launched the iPad that has a bigger screen, offering the user a much more convenient way for reading (and interact with them!) electronic materials.

With the iPod, students can exchange files, review materials for a particular discipline, prepare them self's for exams, show their work to others and share the results of a project, with their colleagues.

Pros: With 87% of the market share, the iPod has proven its popularity among students. Apple's iTunes U (http://www.apple.com/education/itunes-u/), allows teachers to upload their lessons for students to download these materials, so they can study from them.

Cons: First, consider the cost. An iPod cannot be accessible to all students, and also because this device requires an application owned by Apple, the iTunes. We should also consider the screen, these are generally too small to be used by sophisticated applications or even to read large amounts of text (although this will probably be changed in the future versions, we can see this change already in the iPod touch and iPad) and also because these devices do not record sound (their major critique).

B. MP3 Players

This digital music player reads music and audio files. Some of these models have an integrated voice recorder.

Students can use these MP3 players to download and listen to podcasts and audio lessons. Students can also review the materials for a particular course, study for exams, stay informed about course contents, listen to audio books, and with some devices, record lectures.

Pros. MP3 players are compact and light. They have an excellent audio quality and they are upgradeable and expandable.

Cons. An MP3 player may be replaced with other devices that also play audio files.

C. PDA

The PDA combines the computing power and Internet access in one single system, with a calendar, notepad, address book, and also productivity tools. It is a device integrated with Bluetooth, Wi-Fi and a mini USB interface.

A PDA plays audio, video, Flash animations, allows editing of text documents, allows users to access their e-mail and also web contents; supports instant messaging and text messages, and can be used to store information.

These PDA's provide support for collaborative learning environments. Students can use them to present projects, write documents in Word, and take notes in a classroom.

Pros: The PDA's have a big screen (for a portable device) that makes reading easier. They also combine the various types of computing and communications tools in one single device. Data entry is possible through the on-screen keyboard, a pen, or through external peripherals.

Cons: The PDA's are big when compared to other mobile devices. They are not efficient for the introduction of long e-mails or text, without the use of an extra input peripherals device.

D. USB drive

The USB drive is a storage device that connects easily to multiple computers and other types of devices.

The USB drive is ideal for storing work files, audio and video. Students can share files for collaborative work. They can also copy files from this drive to school computers and vice versa, and send their work to the teachers.

Pros: The drive is small and portable and the USB interface is compatible with all newer computers. It works well for transporting files from home to school and vice versa. There are applications with the autonomy to run in a USB Drive.

Cons: A USB drive is a device with just one purpose only. Other devices can also serve for storing information.

E. E-Book Readers

E-book readers are used to download text-based materials. They can store hundreds of e-books, newspapers and magazines. The zoom and the search function are one of the fundamental characteristics of these types of devices. There are recently strong activity and visible technology enhancements in this kind of devices, which turn them a more viable alternative to paper.

Pros: The e-book reader has a large screen for reading, and also has a light to facilitate the reading in dark places. The digital marker allows users to mark their texts, and the search function enables users to easily find a particular text. An e-book reader can also store the entire contents of books from various courses.

Cons: An e-book reader is a device with only one purpose, with limited computing capabilities. These may require proprietary file formats and there are a limited number of e-books available today, although the market is rapidly evolving.

F. Smart Phone

A smart phone combines the capabilities of a PDA, USB drive, MP3 player in one single compact system.

Students can download audio, video lectures and podcasts to their Smart Phones. They can play audio, video, flash animations, view and edit text documents, access e-mail and Web contents, send instant messages, send SMS and use the phone to storage files.

Pros: Smart phones can also be used in collaboration environments. Users can also access global information. These devices can support collaborative learning.

Cons: The small screen makes Web browsing and reading difficult. The small keyboards or the virtual keyboards make writing text inefficient for long emails and texts. Finally, some smart phones cost as much as a normal PC with only a fraction of their capacity.

G. Ultra-Mobile PC (UMPC)

The UMPC have the entire main features of a tablet PC, but on a much smaller size device. They offer support for audio, video, games, Internet and other types of communications and networking applications. They have Bluetooth, Wi-Fi and also Ethernet controllers.

Students can download audio, video lectures and podcasts for their UMPC, surf the Web, send emails, send instant messages, send text messages and also log into sites of distance learning courses.

The UMPC allows users to participate in collaborative learning environments.

Pros: These ultra-small, ultra-portable PC's have a 7'' touch screen, which is great for Web browsing and viewing multimedia contents. The small size makes these devices great for travelling.

Cons: These units are expensive, costing more than a high-powered PC. Due to its small size, most UMPC do not have a full-size keyboard.

H. Laptop / Tablet PC

The most complete system of all the mobile devices. Laptop/Tablet PC came with Bluetooth, Wi-Fi and Ethernet. These devices offer additional features such as handwriting and voice recognition.

Students can download audio, video lessons, podcasts, browse the Web, send emails, send instant messages, send text messages and log into the course website at home or while they are on the road. These devices are great for collaborative learning.

Pros: The Laptop/Tablet PC are very good for students who need to take their work with them. They provide greater power and capacity of all other mobile devices.

Cons: The Laptop/Tablet PC are still relatively expensive, and its size makes it more difficult to transport when compared with other mobile devices.

V. ONLINE DISCUSSION FORUMS

In the growing context of the use of digital media to support the business of teaching and learning in higher education institutions, there has also been an increased use of online discussions. This enhance was due to the increasing use of the information technologies and communication, in the context of the courses in higher education, which are related with their school activities, applications of discussions and interactions with issues associated with objects of knowledge.

This new reality changes the processes of teaching and learning and allows students to interact with teachers and other colleagues on various issues, more openly, more often and more easily. One of the advantages of online discussions, is that it leaves recorded everything that was written to then be analyzed and discussed whenever possible [26], providing a memory of the work done, giving the opportunity, among others, to evaluate the interactions or even to analyze the results of the work done.

These online discussion forums are important factors for the virtual communities and can be considered an excellent collaborative tool, so that students can make the best environments possible for learning.

The virtual learning communities, where students can interact with the content, with technology, and more importantly, with each others, provides a powerful approach in distance learning environment [27].

For a collaborative learning to be successful, it is crucial that students feel part of a learning community, where their contributions can add knowledge to the community in which he is involved and where the spirit of community is promoted through social interactions [28].

The virtual learning communities have the potential to solve problems in a distance learning environment [29].

There are many online discussion forums, available on the Internet, free, that allow students to work collaboratively, to discuss various topics with each other. Google Groups (Figure 1) and Yahoo Groups (Figure 2) are just two examples of online discussion forums that can be found.

Google Groups (http://groups.google.pt/) is a service created by Google, which allows participants to discuss about a particular subject of interest among the participants of this group. Participants can either discuss using the electronic mail (e-mail) or by using a Web page provided by Google, requiring, for this last case, an e-mail account at gmail. Google Groups besides allowing discussions of various users online, this service also allows the creation of Web pages for the group, where the users can adjust the visual aspect of each page, or even insert images and change the background colors. It also allows file sharing among group members and also access to personal information of each group member.

Yahoo Groups (http://groups.yahoo.com) is a service similar to Google Groups. It is a discussion group developed by the company Yahoo. Yahoo groups as like Google groups offer a set of groups of interest, in which users can register themselves in. The Yahoo Groups allows participants to share photos with each other and share a calendar of events.

VI. THE FLOW EXPERIENCE

An aspect related with the interaction of the users with collaborative environments has to see with the flow experience introduced by Csikszentmihalyi (1975). The experience of the flow means the sensation that people feel when they are completely involved in what they are doing, that is, people like the experience and want repeat it [30]. This means that for students to be involved with collaborative environments, it is necessary that they presence the flow state.

The theory of the flow allows us to measure the interaction of users with the computer systems, verifying if these are more or less playfulness [31].

The flow experience is used in this article to characterize the interaction between the human and the new technologies [31].

When one is in the presence of the flow experience, this will bring to the users, a sense of pleasure of what he is doing. This satisfaction will encourage the user to repeat the task again [32].

Csikszentmihalyi says that a person who is in the presence of the flow state has the following characteristics [1, 33]:

Clear goals and immediate feedback;

Equilibrium between the level of challenge and personal skill;

- Merging of action and awareness;
- Focused concentration;
- Sense of potential control;
- Loss of self-consciousness;
- Time distortion;
- Autotelic or self-rewarding experience.

For a person to be in the presence of the flow experience it is necessary a balance between the level of challenge and personal skill [30] (Figure 3).

The sensation of an excellent experience in the accomplishment of any daily task is our reason of living. If we do not feel this excellent experience with our everyday tasks, we will question our self, if it is worth living [30].

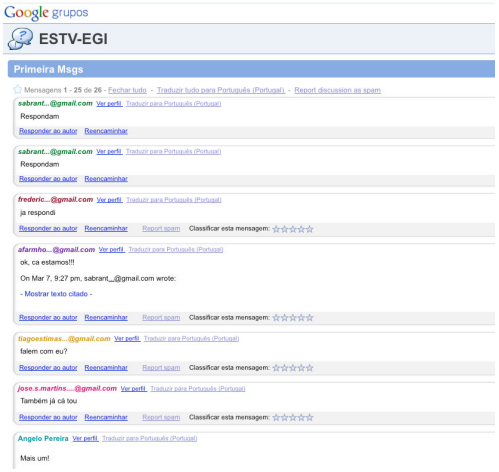

Figure 1. Google Groups

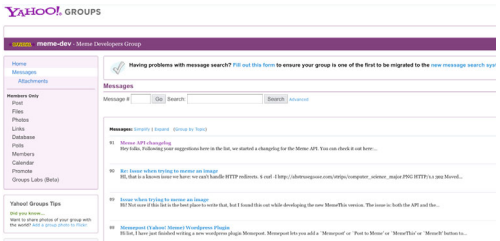

Figure 2. Yahoo Groups

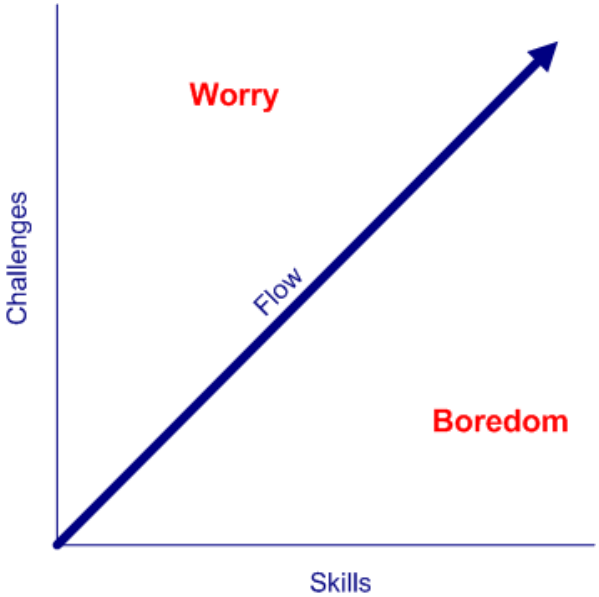

Figure 3. Flow Experience [30].

Previous researches have used the flow experience to measure playfulness, involvement, satisfaction and other states with the involvement in computational environments [31, 34-37].

Trevino and Webster (1992) define four dimensions for the flow experience:

- Control;
- Attention Focus;
- Curiosity;
- Intrinsic Interest.

There is one more dimension, sense of time, that is also important to measure the flow state [38].

A. Control

Individuals should experience, feelings in control, within computer interactions [1].

B. Attention Focus

Attention focus is another important element of flow. When individuals are in the flow state, their minds are narrowed to what they are doing, filtering out irrelevant thoughts and perceptions [32].

C. Curiosity

Curiosity is aroused when in the flow state. The curiosity sensation can be aroused through varied, new and admirable stimulations. For example, the new technologies will be able to cause this sensation of curiosity through colors and sounds [32].

D. Intrinsic Interest

When people feel they are in the flow state, these are involved for the amusement and pleasure [32].

E. Sense of time

When people feel they are in the flow state, there is a perceptual transformation of time, characterized by the sensation of time slowing down or speeding up [38].

People who interact with computers, with an entertainment spirit, transmit a much more positive experience, of those, who are in the computer for obligation [32].

VII. THE STUDY

To evaluate the flow experience and to verify its occurrence in collaborative tools, an experience was carried through involving students from a university school. The main tool used was Google Groups, for this experience. This section presents the efforts carried through experience, the data obtained, as well as the statistical procedures applied.

Previously to this study, a test with five students was done, to analyze the effectiveness of the survey. From this previous study, we concluded that some questions were ambiguous for the population in the study.

After the accomplishment of the project given by the teacher, in witch they used Google Groups, the students answered the questions of the survey.

The survey was passed through the Internet with the help of "LimeSurvey" Web-based tool. The data collection was performed in the first week of November of 2009.

The Instruments used were Google Groups, Google Docs and Facebook and a survey consisting on some questions, in order to verify, in the end of the study, if the students were in the presence of the flow state. This survey will use the four dimensions: control, attention focus, curiosity and the intrinsic interest [32], as well as the dimension sense of time [38]. Beside these questions, this survey also contains other generic questions. All the related questions from this survey were built on a Likert scale of five points, since one (I totally disagree) up to five (I totally agree). Two questions for each dimension were elaborated.

A. Sample

This study intends to determine if the students inquired are in the flow state. The data has been collected through one hundred and twelve surveys of students. The surveys have been submitted to a rigorous test, having not excluded any individual; therefore, the sample consisted on one hundred and twelve valid surveys. The criteria of exclusion of inquiries were: students who had not discriminated their sex or age in the survey; students with incoherent answers throughout the survey (e.g answers that always presented values in the extremities of the scales, or incompatible); students who left 80% of the survey in blank. Once, one hundred and twelve valid inquiries were obtained, the sample is considered sufficiently satisfactory.

The statistical treatment of the data and the respective procedure [39, 40], that will be announced next, was carried through the software "S.P.S.S. - Statistical Package will be Social Science" (version 12.0 for Windows, http://www.spss.com/):

- Descriptive Statistics of the variables in the study;
- Evaluation of the index of internal consistency (Cronbach's alpha) for the dimensions of the flow experience;
- Correlation between the variables of the flow;
- Factor analysis in order to reduce the number of variables.

B. Analysis

This study was composed of 78.57% males and 84,82% had ages between sixteen and twenty four years. Most of the students have already used discussion forums in a fairly way.

The majority of the respondents used the laptop (72.32%) to access the tools for the project development, followed by the Desktop (27,68%).

We verified that Cronbach's alpha is always superior to 0.7, being able to conclude that the data is related to one same dimension, that is, the questions of the survey for the use of Google Groups, allowed us to determine if the individual finds himself in the presence of the flow experience, for students using a laptop or a Desktop.

To determine how the variables are correlated with each of the different devices used (laptop and Desktop), a correlation matrix was created for both types of the devices, where the correlation coefficient, R, is presented, that is a measure of the linear association between two variables. We can conclude from the correlation analysis that the correlation between the variables, for laptops, has a greater number of variables positively correlated than the desktop.

After the studies mentioned previously, we used the factor analysis in order to reduce the number of variables, both for laptops and desktops.

The extraction of the factors is given by considering the percentage of variance explained by the factors (Table 1).

To set the number of components to be retained, we choose, by default, those that have eigenvalues greater than one. If the total variance explained by the factors retained is less than 60%, then, at least, one more factor should always be selected. Thus, for this case study, two factors were retained in each type of device. For the mo-

TABLE I.
NUMBER OF FACTORS TO BE RETAINED (MOBILE DEVICE AND DESKTOPS)

Component	**Mobile Devices Initial Eigenvalues**		
	Total	***% of Variance***	***Cumulative %***
1	2,371	47,422	47,422
2	,881	17,625	65,047
3	,707	14,136	79,184
4	,631	12,613	91,797
5	,410	8,203	100,000

Component	**Desktop Initial Eigenvalues**		
	Total	***% of Variance***	***Cumulative %***
1	2,374	47,475	47,475
2	1,053	21,053	68,528
3	,704	14,077	82,604
4	,565	11,301	93,905
5	,305	6,095	100,000

bile device, it appears that the first factor explains 47.422% of the total variation and the second 17.625%, both explaining 65.047% of the total variation that exists in the five original variables. For the Desktop, the first factor explains 47.475% and the second 21.053%, explaining both, 68.528% of the total variation.

The matrix of components after rotation (Varimax method) aims to exaggerate the value of the coefficients that relates each variable to the factors retained, so that each variable can be associated with only one factor. The higher the value of the coefficient that relates one variable to a component, the greater is the relationship between them. We present below the matrix of components after rotation (Table 2) and the bold factor associated with each variable.

TABLE II.
THE MATRIX OF COMPONENTS AFTER ROTATION

	Mobile Device Component		**Desktop Component**	
	1	***2***	***1***	***2***
Concentration	,411	**,614**	**,751**	,001
Control	**,653**	,317	,011	**,955**
Curiosity	**,874**	,057	**,714**	,461
Intrinsic Interest	**,705**	,383	**,841**	,155
Sense of time	,033	**,877**	**,694**	,121

Having concluded the following for the case of the laptops:

- Factor group 1: (Intrinsic Interest, Control and Curiosity)
- Factor group 2: (Attention Focus and Sense of time)

And for the case of the desktops:

- Factor group 1: (Attention Focus, Sense of time, Intrinsic Interest and Curiosity)
- Factor group 2: (Control)

VIII. CONCLUSIONS

In order to evaluate the use of mobile devices and desktops and the potential of mobile devices in collaborative environments versus desktops, it was performed an experiment involving students of higher education. This study has the main objective to validate if the students that use laptops or desktops are in the flow experience and witch of them are more in the flow experience.

Most people all around the world use mobile devices. Due to the advance of the new technologies, and its size, users can carry them anywhere; can connect with a wide range of information to anywhere whenever they go.

Despite the widespread use of mobile devices today, there is a lack of reference to identify the advantages and disadvantages of the m-learning in collaborative environments, this is, we can not see the m-learning as an extension of e-learning but a rupture in the process of teaching and learning.

The analysis of data allows us to conclude that the majority of the students were males, had ages between sixteen and twenty-four years and that most of the students have already used discussion forums.

When going further to the analysis of the data, we verified that the variables described all the same characteristic (threw the determination of the Cronbhach's alpha), that is, the variables describe the flow experience.

We can conclude from the correlation analysis that the correlation between the variables, for laptops, has a greater number of variables positively correlated than the desktop.

From the factor analysis it was possible to isolate two factors that explain the majority of the total variation. Such factors had been Factor group 1: (Intrinsic Interest, Control and Curiosity), Factor group 2: (Attention Focus and Sense of time) for the laptops and Factor group 1: (Attention Focus, Sense of time, Intrinsic Interest and Curiosity) Factor group 2: (Control) for the desktops.

In order to determine the presence of the flow experience for each type of device, it was verified that, on average, the students were above value three (Likert scale of five points), that is, the majority of the students, in each of the different devices used (laptop and desktop), are in the presence of the flow experience, for the five variables mentioned for this study (attention focus, curiosity, control, intrinsic interest and sense of time). We can also see, that the average of the five variables associated with the flow experience, for students who used the laptops, were greater than those using the desktop to access the tools of the project development.

From this study we can conclude that the flow experience exists for people that use Google Groups, both for people that used the laptop or even the desktop, but having a more positively effect for users of the laptop. With this we can say that mobile users interact with Google Groups, with a more entertainment spirit and sense of involvement and satisfaction then the users that have used the desktop to access Google Groups. Considering that people use mobile device for m-learning and desktops for e-learning, we can conclude that people that use m-learning have a

more positive effect on learning, when using Google Groups, than the people that use e-learning.

With these statements we can say that Google Groups is a good way for students to learn when using laptops and desktops, but having a more positive effect for the laptop users. We can also say that, m-learning when associated with the usage of Google Groups, it is a good tool for students to learn.

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