

Comparison of the Use of Personal Learning Environments (PLE) between Students from Chile and Ecuador: An approach

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ABSTRACT

The presence of Information Technology and Communication (ITC) in education has ensured new learning environments, such as virtual classrooms present today in most universities, the distance education (online) and the complement classroom education whose duality is known as B-Learning. This is the case of the National University of Chimborazo, Public Higher Education Institution of the Ecuador and Metropolitan University of Science of Education of the Chile, which five years ago has begun to gradually integrate these new computing learning's resources. The present study investigates the use of virtual classrooms, as tools constitute student's Personal Learning Environments (PLE) in Chile and Ecuador, the differences, similarities and characteristics. The main results, there is an increasing the number of subjects that support virtual classrooms for classroom teaching, but learning occurs both in and out of these new learning environments, thus, Web 2.0 tools are important in these processes either to access, process, publish and share resources and content. Finally, as to whether there are differences in the contexts of using of PLE among students in Chile and Ecuador, there are no major differences except for some particular parameters pertaining to the creation of content modules in each country.

Categories and Subject Descriptors

K.3.1 [Computers and Education]: Computer Uses in Education – collaborative learning, computer-assisted instruction (CAI), computer-managed instruction (CMI), distance learning

General Terms

Human Factors

Keywords

eLearning; Information Technology and Communication (ICT); Personal Learning Environments (PLE); Virtual Learning Environments (VLE); Higher Education; Virtual Classrooms.

1. INTRODUCTION

The development of Information Technology and Communication (ICT) in the located educational context in a special way in the Web 2.0 with related technologies, where the customization and mobility are a natural reference and is defined from the user. Thus, in this increasingly complex and dynamic world has begun with the use of Learning Management System (LMS).

In parallel, most classes implemented by LMS technology are mainly focused on the objectives of courses and institutions which organize their educational models through the development of traditional teaching, based on a specific curriculum and led by an instructor teaching [12; 3; 4]. This means that students are limited by the context in which they are formed, where there is innovative, thoughtful and constructive strategies, and a limited number of resources, tools and learning activities, which are only provided by the institutional environment, not always being contextualized to the needs of a highly dynamic society[6].

The main objective of this research is to determine the difference in the contexts of use of PLE among students in Chile and Ecuador, as well as having a diagnosis of these virtual learning processes to their classrooms.

This paper is structured as follows: Section 2 includes a contextualization of the technological reality on the adoption of ICT by the general population, both in Chile and Ecuador, with a brief comparative analysis between the two countries. Section 3 describes the materials, resources and methods of some research initiatives on PLE and how they are linked to the LMS. The results and discussion of the studies in both countries are presented in Section 4. Finally, in Section 5, some conclusions are posed.

2. TECHNOLOGICAL CONTEXT OF CHILE AND ECUADOR IN RELATION TO PLE

Chile and Ecuador have different technological landscapes, that is, the way in which ICTs are adopted is different. This section summarizes some of these facts.

2.1 Chile

In the case of Chile, the latest report published by the *CEPAL* provides information about ICT, and specifically ICT applied to teaching and learning processes. The 2011 report shows the following data [11]:

- 51.8% of households have a desktop computer or, a laptop.
- 40.9% of the population has Internet in their homes.
- 94% of the population has at least one mobile phone subscription.

According to the information above, it is possible to see that just one in two households in Chile has a desktop computer, basic tool to access and process digital information. With regard to the use of mobile phones, data indicates that they are very common; the 94% of Chileans have used the mobile phone in the last three months.

2.2 Ecuador

In the case of Ecuador, the latest report published by the National Institute of Statistics and Census (*INEC*) provides some information about ICT, and specifically ICT applied to teaching and learning processes. The December 2012 report shows the following data [10]:

- 26.4% of households have a desktop computer, while 13.9% have at least one laptop.
- 35.1% of the population has used the Internet in the last 12 months, and the 59.8% of them accesses the Internet at least once a day.
- 50.4% of the population has at least one mobile phone subscription, however only the 12.2% of the phones are smartphones

According to the information above, it is possible to see that just one in four households in Ecuador has a desktop computer, basic tool to access and process digital information. Also this report shows that Internet access is quite common and that one of every three Ecuadorians has used the Internet in the last 12 months, where currently most of the resources, information sources and networks that can be part of the PLE.

Regarding the access to the Internet and learning resources by using mobile phones, it is possible to see that one of every two Ecuadorians have a mobile phone subscription. However most of them use the mobile devices to phone people, send SMS and carry out multimedia activities (photography, video, games, etc.). Only a 12.2% of all mobile phones used by the Ecuadorians are smartphones, with which they could perform advanced tasks [9].

3. MATERIALS AND METHODS

This section describes different experiments in Chile and Ecuador that explore similar problems. Those experiments, although with different aims, take into account among other aspects the perception of students about the use of other tools beyond those provided by the institutions.

This research is quantitative and corresponds to a non-experimental study [6], and is transverse or transactional because the data collection process is applied in one moment and descriptive, because they are going to investigate the use of virtual classrooms as tools constitutive of PLEs of a group of college students.

3.1 Population and sample

The populations of this research work are, in the Ecuadorian case, students of the career of Informatics Applied to Education, of National University of Chimborazo Ecuador (UNACH) who are studying in the annual mode. It is noteworthy that the career in question is in the process of changing from annual to semi-annual mode. We have chosen the courses in annual mode, due to that the date of application of the instrument they have been working with virtual classrooms a considerable time (since September 2012) allowing their opinions to be more objective unlike courses semiannual mode, they have started the new semester academic recently. The students who attend regularly in the academic year September 2012 - July 2013 [7]. For Chilean case, they are students of the University of Educational Science (UMCE) who study the programs of the Faculty of History, Geography and Literature, in a semester mode. Likewise, we have chosen the courses in semiannual mode, due to that the date of application of the instrument students have been working with virtual classrooms a considerable time (since September 2011).

3.2 Instrument

The instrument applied in both cases has been prepared based on the information collection documents exposed in several previous investigations [5; 8]. We have tried to adapt the questions to the terminology used in the context of Latin American universities. Similarly, we have added additional classification tools that could a PLE highlighted by various authors [1; 2; 3]. In addition, we have taken the time to include questions about access to mobile devices and on how students see their learning the virtual classrooms are managing processes. This has allowed us to group the items in the following categories:

- The use of virtual classrooms and mobile technologies in general
- About the tools for access to information
- About the editing tools and disclosure
- About relationship and communication tools
- About the relevance of the use of virtual classrooms in the learning process

The instrument was implemented through Google Docs forms, online tool that allowed us to once refine the instrument to apply it

definitively in both universities and collect data through the Internet.

Records obtained by the online questionnaire were exported to matrix; they were analyzed using IBM SPSS Statistics 20 software, which were calculated with the main descriptive statistics; from which they have come to establish comparisons and conclusions of this studio.

3.3 Data analysis

After sampling the obtained data, we proceeded to the processing of it through the form entering and coding values IBM SPSS 20 program. The main statistical analysis based on the dimensions consulted that were performed with the program are:

- Descriptive statistics
- Correlations
- Comparison of means

The results were interpreted and analyzed in the context of research, establishing the respective characteristics and relationships based on sampling conducted.

4. RESULTS

4.1 Social and personal characteristics of the sample

From the geographical context of sampling performed within 85 valid records obtained, 51.8% were students from Chile and 48.2% to Ecuador. At the same time 60% of respondents were female, while 40% were male. As for the age distributions, students are located between 19 and 33 years, the average being 22.91 years (Figure 1).

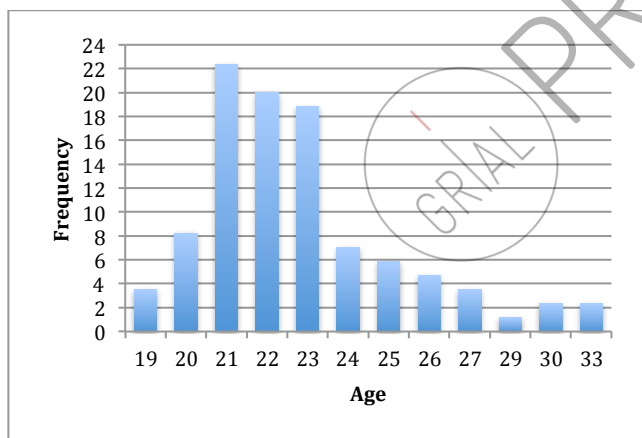


Figure 1: Social and personal characteristics of the sample

The standard deviation of the age (2.78) years corresponds to values related to the courses and levels of respondents in the sampling carried out.

4.2 Using tools to access information

As for the rating by students in virtual classrooms as a means of access to information and if this access is also given from other resources, the results were:

21.2% disagree or strongly disagree with the adequacy of the content (documents, presentations) exposed in virtual classrooms, while most do agree that these resources are sufficient (43.5%). 5.9% fully agreed. It is also important to mention that 29.4% is indifferent to this question (table 1). Explanation of these results would go through the content type provided by the teachers, the students' perception of the platforms and virtual learning environments, which in the first stage are only information repositories to the direct sessions.

Table 1: Is there enough content (documents, presentations) exposed in virtual classrooms?

	Frequency	%	Valid %	Accu %
Total Disagree	1	1,2	1,2	1,2
Disagree	17	20,20	20,0	21,2
Indifferent	25	29,4	29,4	50,6
Agree	37	43,5	43,5	94,1
Total Agree	5	5,9	5,9	100,0
Total	85	100,0	100,0	

As for work with virtual classrooms, really interested in knowing if students have access to all the resources exposed, 34.1% say they access to all content exposed, while a third of respondents is indifferent to these resources and a cumulative percentage of 30.6% concede to not accessing all that is published in virtual classrooms.

On the other hand, there are obviously other online electronic media that students use in their learning, where the 78.6% cumulative answers say that they use other online tools to review information regarding the subjects that are not found within virtual classrooms (YouTube, Wikipedia, forums, SlideShare, etc.). These values can be seen in Figure 2.

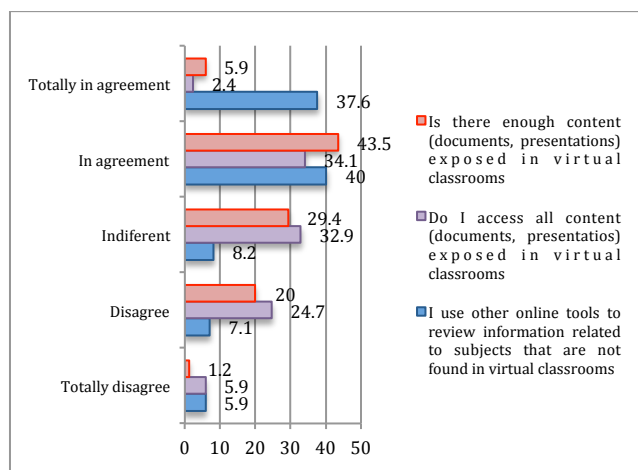


Figure 2: Using tools to access information

According to the application of the t test for independent samples and the lateral significance assuming equal variances in the comparison, we determine that there no differences between gender of respondents and use of tools to access information (table 2).

Table 2: T test for independent samples (Genre – using tools to access information)

	Average		t	Bilateral significance
	Male	Female		
I use other online tools to review information related to subjects that are not found in virtual classrooms	3,94	4	-0,231	0,818
Do I access all content (documents, presentations) exposed in virtual classrooms	2,88	3,12	-1,105	0,273
Is there enough content (documents, presentations) exposed in virtual classrooms	3,21	3,41	-1,028	0,307

4.3 Editing tools and publication of information

Today there are many tools through the system of processing and Cloud storage. This allows the management, analysis and publication of documents and educational resources. In this section we consulted about the adoption of these resources in the student group. We see that over 50% of respondents (63.5% cumulative) uses only programs installed on the computer for editing its contents, but also shows that one in three respondents (27.1% cumulative) disagrees or strongly disagrees with this statement, which suggests that this group of students are using online tools for editing documents, presentations, videos, images, etc.

With respect to the question of what students used for publishing the content developed, 36.5% disagree and 8.2% strongly disagreed that the virtual classroom is the only medium where they publish their content. However, a third of respondents, 35.4% cumulative says that only socialize their work through the tasks, wikis, glossaries, forums present in virtual classrooms.

The students not only publish content through virtual classrooms, socialized information through other online resources. Four out of five students (84.7% cumulative) say they agree and strongly agree with the use of online tools for editing and publishing content (documents, presentations, videos and images), not found in the classroom virtual (Google Docs, Blogger, WordPress, YouTube, Flickr, SlideShare, Scribd, etc.), and only just 7.1% of students think otherwise (figure 3).

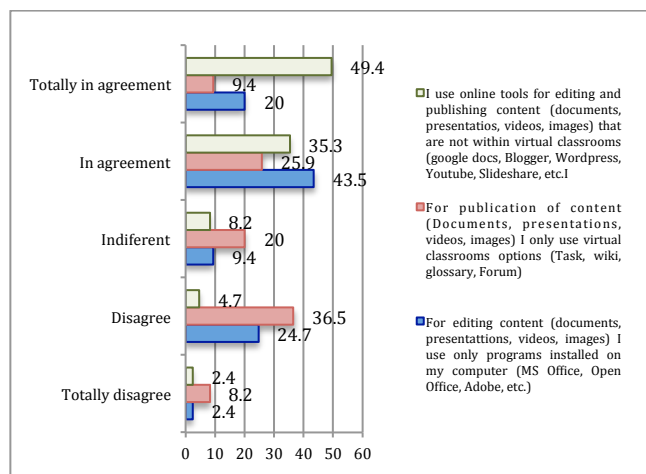


Figure 3: About editing tools and publication of information

Similarly as in the previous case we established that there are no gender differences between respondents and use of tools for editing and publishing content, as shown in table 3.

Table 3: T test for independent samples (Genre – Editing tools and publication of information)

	Average		t	Bilateral significance
	Male	Female		
For editing content (documents, presentations, videos, images) I use only programs installed on my computer (MS Office, Open Office, Adobe, etc.)	3,56	3,53	0,116	0,908
For publication of content (Documents, presentations, videos, images) I only use virtual classrooms options (Task, wiki, glossary, Forum)	2,82	2,98	-0,61	0,543
I use online tools for editing and publishing content (documents, presentations, videos, images) that are not within virtual classrooms (Google docs, Blogger, WordPress, YouTube, SlideShare, etc.)	4,21	4,17	-0,32	0,75

4.4 About the relationship and communication tools

This group of questions, research on the resources that students use for communication, where 44.7% of respondents used only for academic reasons channels like chat, messaging and virtual classrooms forums. Only 41.2% of students surveyed strongly disagreed with this statement, which implies an important demonstration of socialization of these tools. On the other hand, 45.9% of respondents felt that compulsory participation in forums of virtual classrooms is the reason for use, and to a lesser extent by 38.6% involved no obligation on these channels of communication, which suggests that functionality is important to this type of resource (figure 4).

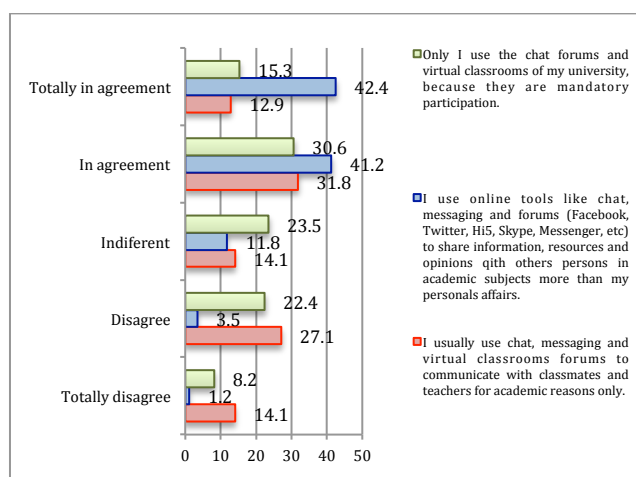


Figure 4: About the relationship and communication tools

In comparing this group of questions with the gender of the respondents, we found significant group differences (significance values > 0.05) which could be explained by the type of tools used

(communication tools) and the level of socialization that occur and are related to the gender of the students, as shown in table 4.

Table 4: T test for independent samples (Genre - About the relationship and communication tools)

	Average		t	Bilateral significance
	Male	Female		
I usually use chat, messaging and virtual classrooms forums to communicate with classmates and teachers for academic reasons only.	2,71	3,24	-1,86	0,066
I use online tools like chat, messaging and forums (Facebook, Twitter, Hi5, Skype, Messenger, etc.) to share information, resources and opinions the others persons in academic subjects more than my personals affairs.	3,91	4,39	-2,576	0,012
Only I use the chat forums and virtual classrooms of my university, because they are mandatory participation.	2,91	3,43	-1,992	0,05

4.5 Comparison between countries

Comparative analysis by nationality of the respondents is presented in table 5, which shows that there are no significant differences in the tools of access to information, the only case the values below 0.05 based on the questions about the content accessibility of online courses that are being developed, presenting the lowest values for the Chilean case.

Table 5: T test for independent samples (Nationality – About the relationship and communication tools)

	Average		t	Bilateral significance
	Ecuador	Chile		
I use other online tools to review information related to subjects that are not found in virtual classrooms	4,02	3,93	0,376	0,708
Do I access all content (documents, presentations) exposed in virtual classrooms	3,41	2,66	3,908	0
Is there enough content (documents, presentations) exposed in virtual classrooms	3,51	3,16	1,822	0,072

On the use of virtual classrooms as tools for editing and publication, to make the comparison significant differences by nationality, especially on items related to publishing content online where the Chilean case is dominant. By contrast, for the records of Ecuador, the use of virtual classes is essential and makes a difference against Chilean students (table 6).

Table 6: T test for independent samples (Nationality – Editing tools and publication of information)

	Average		t	Bilateral significance
	Ecuador	Chile		
For editing content (documents, presentations, videos, images) I use only programs installed on my computer (MS Office,	3,32	3,75	-1,772	0,08

Open Office, Adobe, etc.)				
For publication of content (Documents, presentations, videos, images) I only use virtual classrooms options (Task, wiki, glossary, Forum)	3,24	2,61	2,594	0,011
I use online tools for editing and publishing content (documents, presentations, videos, images) that are not within virtual classrooms (Google docs, Blogger, WordPress, YouTube, SlideShare, etc.	3,93	4,55	-3,11	0,003

In the last group of questions, contrasted with the nationality, there were no significance values less than 0.005. It is the set of values with greater homogeneity among the countries compared (table 7). The uses of collaboration tools for direct communication in these learning environments are similar for both cases.

Table 7: T test for independent samples (Nationality – Editing tools and publication of information)

	Average		t	Bilateral significance
	Ecuador	Chile		
I usually use chat, messaging and virtual classrooms forums to communicate with classmates and teachers for academic reasons only.	3,27	2,8	1,694	0,094
I use online tools like chat, messaging and forums (Facebook, Twitter, Hi5, Skype, Messenger, etc.) to share information, resources and opinions with others persons in academic subjects more than my personals affairs.	4,1	4,3	-1,048	0,298
Only I use the chat forums and virtual classrooms of my university, because they are mandatory participation.	3,2	3,25	-0,21	0,834

5. Conclusions

Throughout this research it is possible to know the contribution of virtual classrooms as constituting the PLE tools of university students in Chile and Ecuador, although it is important to note that while it is true that the nature of the investigation can not be reaching generalizations, you can open lines of research in the field of ICT for teaching and learning processes, allowing replication of the methodology used in different contexts. On the use of virtual classrooms, although 36.4% of students polled in this study, takes advantage of these virtual spaces for activities outside of university, the majority 63.6%, indicates that the use, is strictly academic. This invite to raise questions about the effectiveness of this practice, the impact on academic performance, the quality of learning and motivation in education in both universities in Chile and Ecuador.

Those resources exposed in virtual classrooms are considered to be sufficient by more than 50% of the students surveyed, although they do not access all of the resources exposed and also relying on other tools online (YouTube, Wikipedia, forums, SlideShare, etc.) to review information related to the subjects.

The programs that are installed on computers work for the students, are still the most used to accomplish their tasks, they socialized through virtual classrooms, but an initial use of online tools is also evident for editing and publishing content in the context of Cloud storage is now possible.

Finally, as to whether there are differences in the contexts of using of PLE among students in Chile and Ecuador, there are no major differences except for some particular parameters pertaining to the creation of content modules in each country. Also, you may note that in the general management of the technological aspects no significant differences, which allows inferring the same level of technological penetration.

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7. REFERENCES

- [1] Adell, J. and Castañeda, L. 2010. Los Entornos Personales de Aprendizaje (PLEs): una nueva manera de entender el aprendizaje. En R. & Roig Vila, *Claves para la investigación en innovación y calidad educativas. La integración de las Tecnologías de la Información y la Comunicación y la Interculturalidad en las aulas*. Marfil – Roma TRE Università degli studi.
- [2] Castañeda, L. and Adell, J. 2011. El desarrollo profesional de los docentes en entornos personales de aprendizaje (PLE). [Online]. Available: <http://digitum.um.es/jspui/handle/10201/24647>. [Accessed: 24-feb-2014].
- [3] Castañeda, L. and Adell, J. 2013. *Entornos Personales de Aprendizaje: claves para el ecosistema educativo en red*. Alcoy: Marfil.
- [4] Conde, M. A., García-Peñalvo, F. J., Alier, M., and Piguillem, J. 2012. How to Define and Apply Mobile Personal Learning Environments. In *Proceedings of the 1st International Workshop on Interaction Design in Educational Environments*. (IDEE 2012 in Conjunction with ICEIS 2012). Wroclaw, Poland, 57–66.
- [5] Conde, M., 2012. *Personalización del aprendizaje: Framework de servicios para la integración de aplicaciones online en los sistemas de gestión del aprendizaje*. Doctoral Thesis. University of Salamanca.
- [6] Hernández, R., Fernández, C., and Baptista, M., 2010. *Metodología de la investigación*. McGraw-Hill, México D.F.
- [7] Humanante Ramos, P. R. and García Peñalvo, F. J. 2013. Contribution of virtual classrooms to the personal learning environments (PLE) of the students of the Career of Informatics Applied to Education of National University of Chimborazo. In *ACM International Conference Proceeding*. 507-513.
- [8] Humanante Ramos, P. R., Conde González, M. Á. and García Peñalvo, F. J. 2014. Differences and similarities in use and acceptance of PLEs between universities in Ecuador and Spain. [Online]. Available: <http://gredos.usal.es/jspui/handle/10366/123341>. [Accessed: 25-jun-2014].
- [9] Humanante Ramos, P. R. and García Peñalvo, F. J. 2013. Aporte de las Aulas Virtuales a los Entornos Personales de Aprendizaje (PLE) de los estudiantes de la Carrera de Informática Aplicada a la Educación de la Universidad Nacional de Chimborazo. (Jun. 2013). [Online]. Available: <http://gredos.usal.es/jspui/handle/10366/121996>. [Accessed: 20-Jan-2014].
- [10] INEC. 2012. *TIC 2012 ECUADOR*. Technical Report. National Institute of Statistics and Censuses of Ecuador [Online]. Available: http://www.inec.gob.ec/sitio_tics2012/
- [11] Naciones Unidas, 2012. CEPAL - Estadísticas e indicadores sobre TIC - SOCINFO [Online]. Available: <http://www.cepal.org/cgi-bin/getprod.asp?xml=/socinfo/noticias/paginas/6/34206/P34206.xml&xsl=/socinfo/tpl/p18f.xsl&base=/socinfo/tpl/top-bottom.xsl> [Accessed: 2-jun-2014]
- [12] Saadatmand, M. and Kumpulainen, K. 2013. Content aggregation and knowledge sharing in a personal learning environment: Serendipity in open online networks. *Int. J. Emerg. Technol. Learn.* 8, 70-78.