UbiCamp: Results of A Pilot Interchange of Virtual Mobility

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Abstract: *Aware of the potential of the Virtual Mobility (VM) in the European Higher Education and after the study and previous participation in several European VM projects, the authors have analysed which have been the strengths and weaknesses of this kind of experiences, and, its impact in our university education systems. Thus, UbiCamp project arises to try to solve the main obstacles or difficulties encountered in this type of experience. During the UbiCamp project, the partners have designed a framework in which to establish the basic criteria, necessary to define and carry out a pilot of Virtual Mobility. These basic criteria are composed of the main elements of virtual mobility, which have been divided into five dimensions: Academic, training, administrative, technological and sociocultural. In order to assess the viability of each dimension of the framework, an online questionnaire have been designed for the main stakeholders; teachers and students. The main goal of this article is to show the solutions to the main barriers identified in the previous projects and that they have been put in practice in the UBICamp framework. Then, to analyse the most important data from the questionnaires for each dimension of the framework that have been implemented in the pilot. From this study, a view of the expectations and motivations of students and teachers can be obtained, before and after the VM, and also an assessment of the organization, methodologies and technological tools used to test if they are appropriate for the development of the Virtual Mobility. Finally, a reflection about the encountered difficulties and a list of the main challenges to be solved in the future of the VM are stated.*

Keywords: Virtual Mobility, Erasmus, TICs, E-learning, Strengths, Weaknesses, Challenges, VM Barriers

1. Introduction

In 2010, the European Commission launched the Europe 2020 strategy, which stress the need for learning mobility at all levels of training. The goals of this strategy are: to acquire new intercultural competencies and to promote social cohesion between de European countries. (European Comission, 2010).

In 2009, it is adopted the Leuven Communique between the institutions in the Bologna Process. This communique specifies that "in 2020 at least 20% of those graduating in the European higher education area should have had a study or training period abroad" (Ministerio, E. d., 2009).

It does not mind if it is achieved or not, this goal is insufficient compared with the great number of students that will not be able to participate (80%), own to different reasons.

In this context, Virtual Mobility appears as support activities that facilitate international collaboration experiences between different European universities without traveling; only by using the ICTs. It is a viable and profitable alternative to physical mobility.

Aware of the potential of the Virtual Mobility (VM) in the European Higher Education and after the study and previous participation in several European VM projects, UbiCamp project arises as a pilot experience to try to solve the barriers and problems founded in previous projects.

2. Virtual Mobility concept

The most common definition of VM was provided by "E-learningeuropa.info" (nowadays called "Open Education Europa"). They defined it as "the use of the ITCs to obtain the same benefit than a student with physical mobility and without travelling" (Open Education Europa, 2013).

EADTU project and E-move project defines Virtual Mobility "as an activity based on a co-operation of at least two Higher Education institutions: two or more institutions agree to offer their students the opportunity to acquire a number of ECTS-points at one of the foreign partner universities or through a joint activity of the partners. The ECTS-points of this international experience will then be counted to the student's degree at his/her home university" (EADTU, 2007)

TeaCamp project points out that: "VM offers the possibility to students taking a course in another country through the use of ICTs, in which, in addition to obtain the credits granted by the host universities and acquire specific skills of the subject selected, the students obtain academically important skills like: knowledge of other cultures, language, different education systems, acquisition of technological skills, etc. without traveling to the host University".

Bearing in mind the TeaCamp definition, it is essential to provide the participants with the tools that should allow them to acquire academic knowledge related to the student's training area and enable them to develop an experience exchange to promote the knowledge of the university organizing the mobility, that is, its social and cultural context. If the final aim of the VM is to give the students an experience similar to the physical one, that is, to use the TICs to study

a course without travelling, it is also necessary to promote the sociocultural interchange because, in a physical Erasmus, students always acquire this kind of knowledge.

2.1. Characteristics of Virtual Mobility

According to Movinter (Movinter, 2010) VM have some distinctive elements which distinguish it from other kinds of online learning. In first place, it is necessary a constant *interactivity and communication* among students belonging to different countries. The second instance dials with the creation of *international teaching groups,* it is necessary that lecturers and tutors belong to different institutions of the European countries in order to guarantee that the different perspectives: national and cultural are available to students. Furthermore, it is necessary a *joint curricula design* to coordinate the academic offer between the participating universities.

Multicultural exchange is one of the most relevant issues of VM and makes it different from a traditional e-learning process. To provide students with information or activities related to the political, cultural and other aspects of the behaviour of a society are essential elements in a VM. These issues will contribute to improve learning on intercultural information.

Other distinctive characteristic of VM is the use of *appropriate technological solutions*; it is important to provide students with the Information and Communications Technologies (ICT) tools needed to attend the online learning. It means, providing a learning management platform (LMS) to develop the courses, a videoconference system for online classes, forums, wikis, etc. and also, other web 2.0 tools to promote social interaction, such as social networking, bookmarking etc.

Finally, it is essential to ensure the students' *recognition of credits.* It is necessary create an agreement between the universities to guarantee the credits recognition at the end of the study program. This is a powerful factor of motivation, which allows participants to demonstrate their expertise in Virtual Mobility experiences and academic achievements.

3. Barriers and obstacles to VM

Our team have participated in several European VM projects. This experience joint to the literature review of other previous experiences, have showed us several types of barriers, already mentioned by Schreurs (Schreurs, et al., 2006) and classified them in three main categories: pedagogical, technological and organizational issues.

3.1. Pedagogical dimension

There exist some troubles and barriers related to teachers' activity. For example, insufficient technological experience to dial with the necessary ICT tools, the command of the official language in the VM experience and the methodology to teach in a VM environment.

Even though most teachers think to be experts in e-learning tools, the possibilities of the ICTs and the specificity of some tools makes it difficult, for a wide range of teachers, to be comfortable in the VM environments.
Having a minimum level of command of the official language is necessary, because, in most cases, the language is not the native language of the teacher.

On the other hand, near all the teachers know methodologies to teach in a face to face environments, even most of them know how to teach using e-learning processes, but not all the teachers know the specificity of the VM methodologies; for example, how to teach sociocultural items at the same time as teaching academic ones.
Finally, we have identified other problems as, for example, insufficient information on curricula and students' unrealistic expectations.

Because of these questions, teacher's team must adopt the adequate pedagogical training, having technological knowledge and mastering languages which perform the three key factors for taking part in a VM experience, as identified in (Bijnens, et al., 2007).

3.2. Technological dimension

On the same way as teachers can have problems with the technological aspects of the VM tools, students can also be neophyte using this kind of means to learn. So, at the beginning of the experience it is necessary for students to explore and know which tools are most commonly used in each institution, to adapt themselves to them and to train themselves to use them.

On the other hand, the teaching staff needs technological training related to the main tools used in the distance learning; some lectures haven´t got enough knowledge about how to use tools like the LMS, email, videoconferences, virtual reality tools, social networks, virtual tours, etc.

3.3. Organisational dimension

Among other aspects, we can highlight the academic recognition, the mobility assessment, the legal framework, the coordination, the quality, the aspects related to cultural identity and others such as the length of the VM projects.

Based on these elements and barriers of the VM mentioned above and having participated previously in several projects of Virtual Mobility, the team developed the UbiCamp project to design a VM experience that considers all the related problems and tries to solve them.

4. Goal and research questions: UbiCamp Project Description

As mentioned before, the main goals to be solved are the barriers and problems identified in our previous projects. According to these premises, the team starts the UbiCamp Project as a project that attempts to overcome the usual barriers for virtual mobility (VM) within HEIs in the EU.

This project was a partnership of seven universities belonging to the European Community collaborating through face to face and virtual meetings and coordinated by the Oviedo University.
The participating institutions were; Vytauto Didžiojo University (Lithuania), Yaşar University, Autonomous University of Madrid, Kaunas University of Technology, University Telematica Pegaso (Italy), University of Southampton and University of Oviedo.

UbiCamp is the acronym of "Ubiquitous Campus", which is a model of Virtual Mobility that allows the integration of new institutions through a decentralised model. Each institution would only have to respect the established minimum quality requirements and standards, to achieve an easy technological integration.
The main aims of the project were:

- Developing a "Virtual Mobility Practical Framework"
- Creation of open educational resources.
- Integration of the cultural element into the virtual learning processes.
- Creation of virtual environments for sharing experiences.
- Developing training materials and implementing training sessions in at least 35 Universities in Europe, involving students, teachers, Erasmus officers and administrators.
- Raising awareness of virtual mobility among HEIs.
- Testing the "virtual mobility practical framework" through the implementation of Virtual Erasmus Exchanges among those Universities that have been trained and wish to participate.
- Dissemination of project results widely at national and European level and anticipating exploitation activities for multiplying project impact.

This article refers mainly to the design and implementation of a theoretical and practical framework for the implementation of a project of Virtual Mobility in the first semester of academic year 2014-15, in which students from every partner institutions of the project, participated. Moreover, it has been possible to validate the methodology used, in such a way that the framework was justified as a solution for some barriers as in the Table 1.

Table 1. List of barriers classified by pedagogical, technological and organizational dimension.

Dimension	Barrier
Pedagogical dimension	Insufficient technological experience to dial with the necessary ICT tools
	Command of the official language in the VM experience
	Methodology to teach in a VM environment
	To teach sociocultural items
	To teach academic items
	Insufficient information on curricula,
	Students' unrealistic expectations
	Problems with credit recognition
Technological dimension	Problems to use technological tools (like the LMS, email, videoconferences, virtual reality tools, social networks, virtual tours, etc.)
Organisational dimension	Academic recognition
	Mobility assessment
	Legal framework
	Coordination
	Quality
	Aspects related to cultural identity
	Length of the VM projects

5. Methodology: Implementation of the project

In this section, we will develop all the steps that has been considered to design a VM programme. We had followed the NetAcive (NetActive, 2009) guidelines:

5.1. Designing the VM framework

The UbiCamp VM framework was designed considering the elements and barriers mentioned above and it is divided in five categories:
- **Academic dimension** defines all the aspects related to the minimum requirements and quality standards that must comply the learning courses (pedagogical methodologies), but more important yet, with the evaluation of the contents designed for the VM course and the tools and the means selected to support it, as well. Curriculum must be harmonized with peer-university curriculum in terms of study outcomes and assignments
- **Cultural dimension** defines learning resources to promote cultural exchange among participants during the VM. As in physical mobility, virtual mobility should also provide cultural and linguistic learning. The acquisition of this knowledge needs also to be assessed in order to validate the whole virtual mobility experience.
- **Technological dimension** defines all aspects related to the technologies used in the project, specifies the minimum ICT tools that every institution must provide to participate in the VM.
- **Training dimension** defines the available resources to train in VM issues to all those involved in the experience (professors, students, administration staff, etc). VM procedures, requirements, use of technologies, etc. Moreover, it is necessary for them to raise awareness of the benefits and the objectives of the virtual mobility.
- **Management dimension** defines the different administrative processes necessary to carry out a VM experience like institutional arrangements for teachers and students, the credit recognition and define the roles of each involved institution.

This legal framework contains the minimum requirements that institutions should accomplish to participate in the project.

This way, a solution to all the previously related barriers can be designed as showed in Table 2.

Table 2. Framework dimensions as solutions for VM barriers

Barrier	Framework dimension
Insufficient technological experience to dial with the necessary ICT tools	Training
Command of the official language in the VM experience	Training
Methodology to teach in a VM environment	Academic Technological
To teach sociocultural items	Cultural Technological
To teach academic items	Academic
Insufficient information on curricula	Academic Management
Students' unrealistic expectations	Complete framework
Problems with credit recognition	Management
Problems to use technological tools	Training Technological
Academic recognition	Management
Mobility assessment	Complete framework
Legal framework	Management
Coordination	Management
Quality	Complete framework
Aspects related to cultural identity	Cultural
Length of the VM projects	Management

5.2. Pilot planning

At this stage, the team began to prepare the entire process of VM. The main decisions were: to decide the number of students that can participate, the final list of modules, to prepare a call with the requirements and the procedures to apply the VM, training teachers and students on VM procedures, etc.

In this phase, we also established the minimum requirements about sociocultural contents which the partners should accomplish with.

Every institution involved in the project must develop contents with information on history, gastronomy, important places in their countries, etc., as well as implement some evaluation to assess whether the students have acquired a minimum knowledge about the culture of the host institution.

This way, as shown in Table 3, the barriers can be solved or eased by mean of some solutions implemented in the UBICamp project.

Table 3. Barriers and solutions from UBICamp

Barrier	Solutions
Insufficient technological experience to dial with the necessary ICT tools	Technological teachers' training
Command of the official language in the VM experience	English teachers' training
Methodology to teach in a VM environment	Distance learning solutions (LMS, Videoconference, etc.)
To teach sociocultural items	Designing of a platform to show sociocultural contents
To teach academic items	Standard curricula definition
Insufficient information on curricula	Standard curricula definition
Students' unrealistic expectations	The UBICamp framework performs the complete VM environment for students and teachers. All the possible services by the experience are integrated into the framework.
Problems with credit recognition	Definition of a procedure for ECTS recognition like the Erasmus Physical Mobility one
Problems to use technological tools	Technological teachers' training
Academic recognition	Definition of a procedure for ECTS recognition like the Erasmus Physical Mobility one
Mobility assessment	Definition of quality requirements, assessment procedures and process to VM recognition
Legal framework	Definition of a procedure for ECTS recognition like the Erasmus Physical Mobility one. On the other hand, a VM recognition, shared by all the partners, is also necessary.
Coordination	Definition of procedures and protocols to coordinate the VM experience
Quality	Definition of VM quality
Aspects related to cultural identity	Identification of the cultural items to be modelled as contents
Length of the VM projects	Validation of the VM procedures

Finally, partners selected 18 modules to participate in the VM project. These modules belong to different academic areas of study as computer engineering, education and information technologies, commerce & marketing, tourism, public administration and management, etc.

Table 4. Final list of the modules offered in UbiCamp project for the academic year 2014-2015

Title of the course	Learning Area	Institution
Web Science: How the web is changing the world	Inter-disciplinary	University of Southampton (EN)
Learning in Connected World	Elect. & Com. Sc. Education	University of Southampton (EN)
Project Management	Economics	Kaunas university of technology (LT)
Management	Economics	Kaunas university of technology (LT)
Introduction to Programming in C and Linux Operating System	Computer Science	Universidad Autonoma de Madrid (ES)
Introduction to Videogames programming	Computer Science	Universidad Autonoma de Madrid (ES)
Multimedia Educational Resources	Computer Science	Universidad Autonoma de Madrid (ES)
Corporate Social Responsibility	Economics	University of Oviedo (ES)
Introduction to Economics	Economics	University of Oviedo (ES)
Software Architecture	Computer Science	University of Oviedo (ES)
Innovation and Project in Primary Education	Education	University of Oviedo (ES)
Digital graphics programming	Computer Science	Vytautas Magnus University (LT)
Information Technologies in Education	Education	Vytautas Magnus University (LT)
Collaborative learning	Education	Vytautas Magnus University (LT)
Open Educational Resources	Education	Vytautas Magnus University (LT)
EU Education Programmes and Project Management	Education	Yasar University (TK)
Aesthetics Culture	Education	Yasar University (TK)
International Business Communication	Economics	Università Telematica Pegaso (IT)

5.3. Pilot implementation

The pilot was implemented in the first semester of the academic year 2014-2015 and there was a total of 28 teachers involved belonging to different European institutions.

The initial list of students accepted to participate was 72, and some of them were enrolled in several modules simultaneously.

During the pilot, the teachers evaluated the academic modules offered. At the same time, tutors were responsible for assessing the cultural knowledge acquired by the students using the sociocultural contents offered by the partners.

With respect to the "To teach sociocultural items" and "Aspects related to cultural identity" barriers, the University of Oviedo designed a parallel course offered at the same time than the official modules. This course was called "UbiCamp: Sociocultural contents" and all incoming students have been enrolled in it. This course is performed by several contents about the most important aspects of the Asturian culture. It was created using multimedia means and in an interactive way to make it more pleasant to the student visit. These contents are also posted on the official website of UbiCamp for anyone who is interested in visit them[1]. In the paper "*Diseño de una biblioteca digital de contenidos culturales para soporte a experiencias de Movilidad Virtual*[2]" (Juan Fuente, et al., 2012), authors explain the methodology used to design and create sociocultural contents.

Despite the efforts from all the partners, it was impossible to agree in a standard of quality for sociocultural contents and assessment. Every partner design their own model and the way to assess it. For example, Universidad Autonoma de Madrid created Virtual Worlds (Berns, et al., 2011) to promote the virtual interaction between students because, in these environments is possible to interact with other students through their avatars (Bello-Orgaz, et al., 2012) and see, hear and touch virtual objects (Gonzalez-Pardo, et al., 2010)

In the rest of this article, the references to sociocultural aspects are from the point of view of the University of Oviedo, and not from the complete project.

Because of this, it was impossible to solve the barriers "Mobility assessment" and "Quality[3]" satisfactorily, more research should be done in that field. Even though this kind of recognition have no academic effect, this could be in the future the main difference between VM and a distance learning processes.

With respect to the academic barriers, all of them was satisfactorily solved and all the students get the credits recognition in their curricula. This was possible by means of a specific Erasmus agreement which solves all the legal problems (Legal framework barrier), and the problems related to "Academic recognition", "Problems with credit recognition", "Coordination",

In this sense, once the academic evaluations were made, as well as in traditional Erasmus process, these evaluations were sent to the origin institutions (by means of the corresponding transcripts) for the academic recognition of studies. Students who could demonstrate an extensive knowledge about the culture of the host country obtained a certificate of VM signed by the corresponding tutor.

With respect to the barriers "Methodology to teach in a VM environment", "To teach academic items" and "Insufficient information on curricula", was solved by agreeing in a model of course curricula, with all the valuable information in a standard form.

Because of all the previous comments, students have some more realistic expectations on the experience, solving the "Students' unrealistic expectations" barrier: students know at first the way they have to attend the courses and the way they can get the recognition of their efforts.

During the UbiCamp project, a list of courses was designed and taught covering the main problematic aspects: technology and language—teaching in English. These courses were a solution to the barriers "Insufficient technological experience to dial with the necessary ICT tools", "Command of the official language in the VM experience" and "Problems to use technological tools".

All these previous means give the project the necessary quality, solving the "Quality" barriers from all the aspects but the sociocultural recognition.

Finally, it is usual that most of the VM experiences do not continue after the end of the project, despite the exploitation plans. But UbiCamp project gives procedures to solve the more problematic legal aspects of the virtual mobility experiences, so it was used in later projects, like in the OUVM[4] project, solving the "Length of the VM projects" barrier.

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[1] http://www.ubicamp.eu/campuses/uniovi/sociocultural/presentation
[2] Design of a digital library of cultural contents to Support VM experiences
[3] From the point of view of the sociocultural aspects
[4] http://openstudies.eu/

5.4. *Pilot assessment*

With the aim of assessing the interchange pilot and the proposed solutions to the identified barriers, three surveys have been designed; the one for teachers and the other two for students; one to be filled in before and other to be filled in after the interchange.

The first student's survey was designed to obtain information about students' expectations on VM. In this survey, students were asked about the expected benefits of VM, their personal motivation to select this type of learning, and their opinion about the creation of a sociocultural module, etc.

The second survey, was divided in 5 sections, one for each of the five dimensions of the framework. In this survey, it has been evaluated questions related to the organizing of the VM, structure of the modules, the used ICT tools, the sociocultural competences development, learning methods, etc.

Finally, in the teacher´s survey, teachers were asked for several questions related to the course design, the use of the ICT tools for the e-learning—LMS, Videoconferences system, forums, etc., and to comment the difficulties encountered during the period of lecture.

The objective of all these surveys was to validate the framework as a valid way to solve all the barriers in a VM process.

6. Findings and Discussions

6.1. *Preliminary results from the surveys*

6.1.1. Students' point of view

This section shows the main data from the students' surveys. A total of 60 students filled in the survey and through a virtual mobility course, they expected to improve their language skills, get knowledge about the modules studied and interact with people from different countries. As foreseen difficulties, they mentioned problems related to the management of time, with the language to follow the lessons and connection problems.
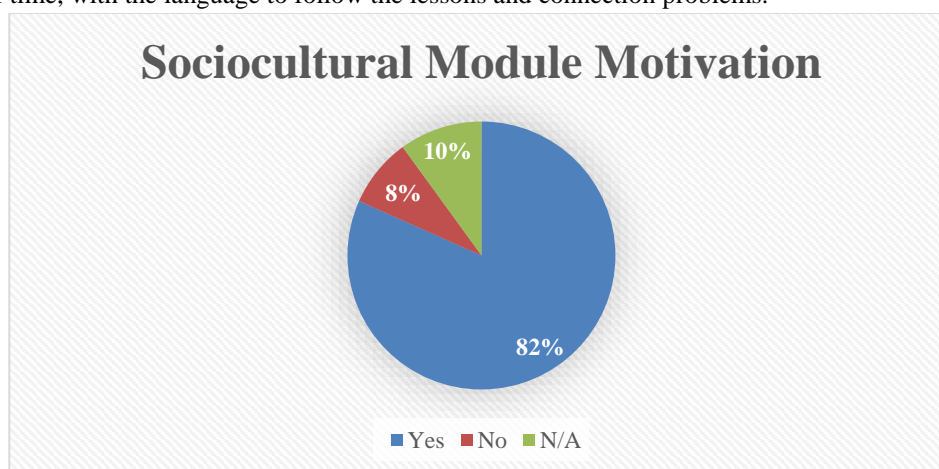

Figure 1: Motivation to follow a Sociocultural Module

Related to the sociocultural contents, the 82% of students surveyed were motivated to attend the sociocultural module in order to acquire sociocultural skills. These results can be seen in the Figure1. This result justifies the need of designing specific sociocultural contents, with quality and able to be assessed, and it also justifies that students consider different to learn by means of distance learning and to do it by means of VM.

The second survey was filled in by 35 students at the end of the pilot interchange. It will show the main results related to the items mentioned above and the organization of the virtual mobility as well as the elements designed in the framework.

The learning organization of the VM was designed by means of tasks and activities to work cooperatively, and in this survey, it was analysed if really teachers proposed collaborative task and created international groups of work. In this sense, 77% of the students have stated that they work in an international group. Figure 2 shows these data.

Figure 2.International Groups of Work

In his survey, also it was analysed how good was this cooperation, in the opinion of the students, 52% of them have affirmed that the cooperation was "good" and "very good". This information shows the importance of the team works to the success of any Virtual Mobility experience.

It also shows that our care about designing solutions to improve courses has positive effects for some barriers:

- Methodology to teach in a VM environment
- To teach academic items
- Insufficient information on curricula
- Students' unrealistic expectations

    At the same time, students were asked for the difficulties in the cooperation due to insufficient level of English and the most of students answered that there no were difficulties in relation to insufficient English language skills of the schoolmates. These results show that our effort to design solutions related to language command on teachers and students, has had positive effects on the project. The following barriers has been eased:

- Command of the official language in the VM experience

    Regarding the importance of the methods of learning, and the collaboration and communication tools; the tools most highly valued as a "very important" were the following; videoconferencing, real time tools like chat or Skype and the review the lecture records, in the Figure 3, it can be seen how students have appreciated these issues.
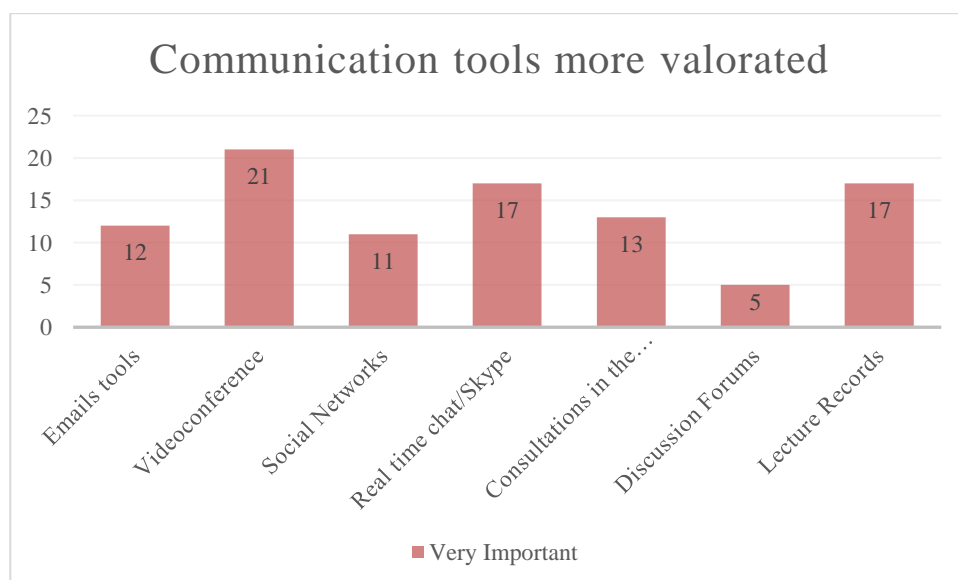

Figure 3. Communication tools most valorated

Furthermore, 91% of the students have manifested that the communication and collaboration tools provided were enough for developed the assignments, Figure 4 shows these results.

Figure 4. Communication and collaborative tools used.

All the previous results that the solutions selected for some barriers has been positive effects on the project. These barriers are:

- Insufficient technological experience to dial with the necessary ICT tools
- Methodology to teach in a VM environment
- To teach academic items
- Students' unrealistic expectations
- Problems to use technological tools
- Quality

The most used methods to organize the learning, according to the students, have been the following; information presentation, individual work and guidance, and the less used have been modelling or imitation and experimentation, Figure 5 shows these results.
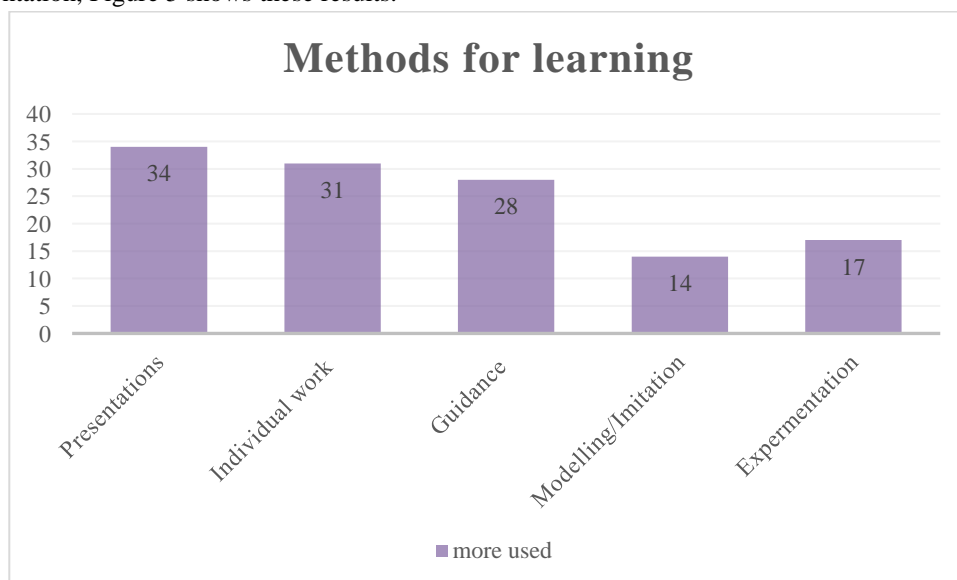
Figure 5. Methods most and less used for learning.

These results are clearly related to the learning processes; they show perception of the students about the methods mostly used by teachers to teach in an VM environment. Because of they all are stated in the standard curricula definition of the course, it is an element that eased the following barriers:

- Methodology to teach in a VM environment
- To teach academic items
- Insufficient information on curricula

In the Figure 6, the main virtual mobility competences acquired by the students, are shown. This figure shows the VM competences that student selected as "Strongly/Well developed". According to these results, intercultural competence was one of the less developed by the students, while the knowledge related to the studied subject was the most acquired.
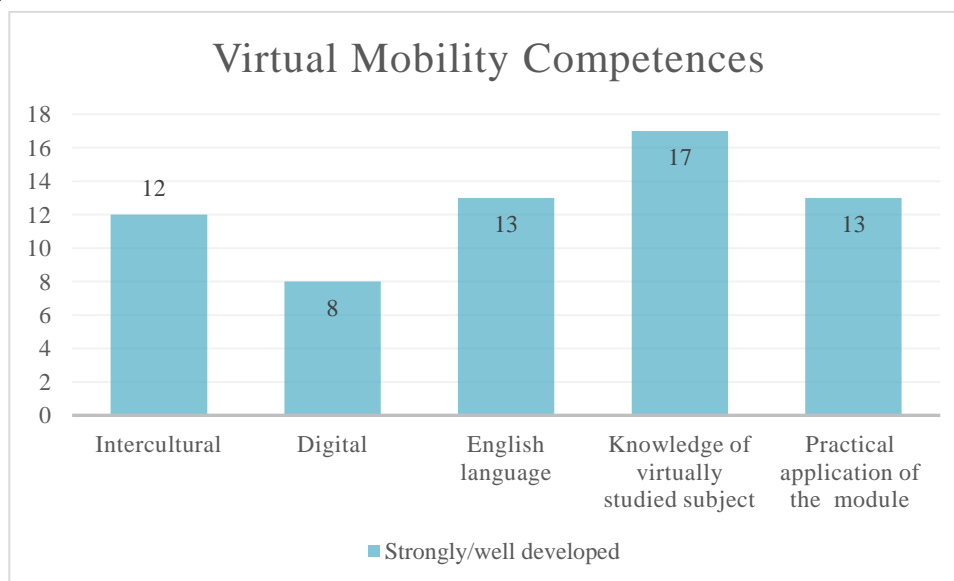

Figure 6. Virtual Mobility Competences more acquired by students.

The previous figure shows the main aspects of the VM experience. It shows that most of the objectives are well achieved, but others—like the intercultural competencies, need to be improved. In any case, this figure demonstrate that many barriers are well solved or eased, for example:

- Insufficient technological experience to dial with the necessary ICT tools
- Command of the official language in the VM experience
- Methodology to teach in a VM environment
- To teach academic items
- Students' unrealistic expectations
- Problems to use technological tools
- Quality
  While others need better solutions, for example:
- Aspects related to cultural identity
- To teach sociocultural items
  At this case, the main problem no solved were:
- Disagreement between partners in the way of designing sociocultural contents. Any partners do not consider important this aspect of the project and they do not agree in the quality and scope of the sociocultural contents.
- Disagreement of some partners in how to assess this cultural knowledge.
- Disagreement in considering the sociocultural aspects as the difference between VM and an experience of distance learning.

The previous results are a mixture of all the students' opinion in the different HEIs, so it is impossible to determine which partners have made a better work.

For some partners, one prominent issue to be considered during this project was the students´ participation in socio-cultural contents. Related to this issue, this survey shows that 60 % of the students have attended regularly following the socio-cultural activities developed whereas 26% of participants have not followed them and a 14% answered "I don´t Know".

Previous results show how important was the sociocultural contents from the point of view of the UbiCamp project. Even though there were no satisfactory agreement on the way to build this part of the project, the common sense and the obligation of building a sociocultural campus, shows satisfactory results that eased the following barriers:

- To teach sociocultural items
- Mobility assessment
- Quality

- Aspects related to cultural identity

The "Mobility assessment" barrier is the worst one solved by the UbiCamp project. Perhaps other project in the future can dial with this aspect of VM and the get better solutions and results.

6.1.2. Teachers' Point of View

With respect to the results of the surveys to the teachers, the total number of responses has been 11, and only 6 of them had already taught a course with a distance learning methodology.

For designing and preparing the modules, and to adapt them to a virtual methodology, teachers have stressed that it is necessary to have didactical and technological support as well as using multimedia applications, training support and tutoring support.

The main difficulties encountered in the design of the modules according to the teachers were two:

1. To include socio-cultural activities into the course learning outcomes
2. To adapt the course structure to the VM requirements by UbiCamp

In the Figure , methods of learning organization most commonly used by the teachers in the design of the modules are showed, this figure can be compared with the students' (Figure 5), both have pointed that the most used methods were information presentation, individual work and guidance; teachers also have added the group work.
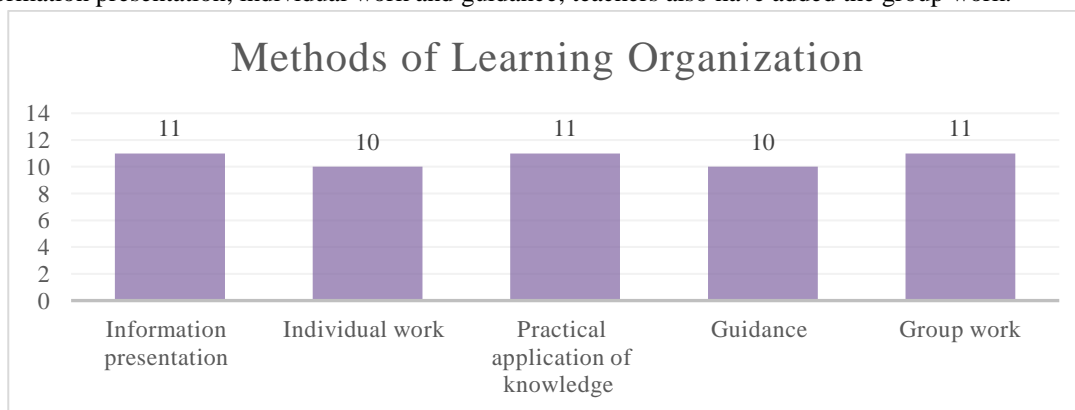

Figure 7. Methods of Learning Organization.

This result shows the perception between teacher and students about learning methods differs slightly. This lack of perception has to be improved by improving the "Standard curricula definition" and perhaps the "Technological teachers' training" solutions. In any case this result justifies or eases the following barriers:

- Methodology to teach in a VM environment
- To teach academic items
- Insufficient information on curricula

Most important communication methods valued by teachers were email, videoconferencing, real time tools like chat or Skype, UbiCamp Web portal and consultations in the LMS, in the Figure , can be seen how teachers have valued these issues.
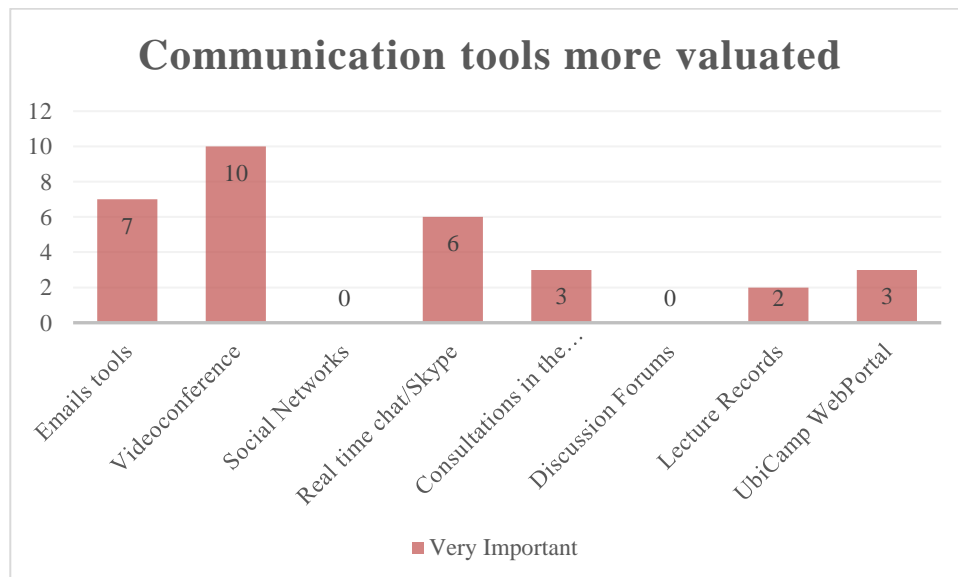
Communication tools more valuated

Figure 8. Importance of the Communication Tools by Teachers

Regarding the cooperation and collaborative work, teachers have confirmed that they have organized cooperation assignments and students work cooperatively without problems.

These results ease the following barriers:

- Insufficient technological experience to dial with the necessary ICT tools
- Methodology to teach in a VM environment
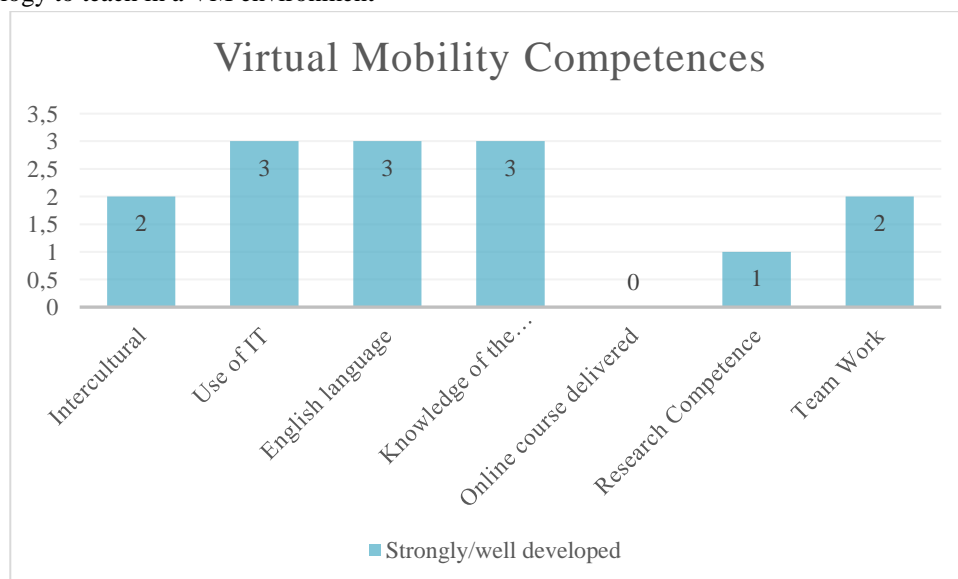
Virtual Mobility Competences

Figure 9. Virtual Mobility Competences more acquired by teachers.

Teachers were also surveyed about the virtual mobility competences acquired by them. In Figure 9, the virtual mobility competencies are shown. The English language, the use of the ITCs and the intercultural knowledge were the more developed competences in teachers' opinion.

This result clearly solves or eases problems related to the following barriers:

- Insufficient technological experience to dial with the necessary ICT tools
- Command of the official language in the VM experience
- Methodology to teach in a VM environment
- To teach academic items

On the other hand, teachers have specified that they also have acquired administrative competences about Erasmus interchanges.

6.2. Results of the Pilot project

The list of students accepted in Pilot were 72, however, not of all them started the interchange and some of them took more than one module simultaneously.

From the sociocultural perspective, attending at the students hosted in the University of Oviedo, only 3 of the 25 students received have undertaken activities of monitoring and evaluation with success. The rest of participating institutions, the results have been similar; all teachers involved have manifested the disinterest of the students to visit the sociocultural content of each of the countries. This disinterest has a simple explanation: students are not interested in expending much time in acquiring knowledge not compulsory to obtain the VM recognition, so, this is an aspect to improve in future experiences to differentiate VM and distance learning.

From the administrative point of view, the main problems manifested by all participating institutions have been: (1) especially delays at the time of signing the learning agreements, (2) the starting of the pilot and, in any cases, (3) the operations during the time of enrolling the students in the corresponding courses. A possible solution in future VM experiences, is to treat VM students with priority, because they have no other contact with the host institution than the electronic one, so, while they are not enrolled and with full access to the resources of the host institution they do not feel as participating in a mobility process.

Finally, even though there is no survey about the academic recognition, a positive aspect was got, most of the participants have passed the modules, all of them have validated their credits which have been properly integrated in their academic records. The solution—procedures—proposed for UBICamp, was used in subsequent projects. This way, the following barriers was solved or eased by UBICamp:

- Problems with credit recognition
- Academic recognition
- Coordination
- Length of the VM projects

7. Conclusions and Implications

UbiCamp was designed to solve the main barriers identified in previous projects. These barriers were identified by team of the University of Oviedo and the project was proposed bearing them in mind.

To solve these barriers, a framework was designed which divided the problems in different dimensions. For each of these dimension, a set of solutions was designed.

After the experience, several data were captured to assess the adequacy of the proposed solutions. After the assessment, interesting results were met for future experiences, some positive and some negative.

The barriers "Insufficient technological experience to dial with the necessary ICT tools", "Command of the official language in the VM experience" and "Problems to use technological tools", were solved by mean of training courses for students and teachers and they have been positively assessed for both.

The barriers "Methodology to teach in a VM environment" and "To teach academic items" have been solved by means of training on distance learning solutions (LMS, Videoconference, etc.) and by means of the definition of a standard of course curricula. This way, teachers were more comfortable adapting their courses to the VM environment and students were more confident in the academic objectives, easing the problems related to the "Students' unrealistic expectations" and "Insufficient information on curricula" barrier.

With respect to the legal and coordination aspects, like credits recognition, institution coordination, etc. the framework has been designed to solve all these aspects simulating a physical Erasmus mobility, but adapting the institutional and learning agreements to the VM model. Thanks to this solution, ECTS could be recognized and students were sure of the recognition during all the process. These solved a set of barriers related to legal and academic aspects, like "Legal framework", "Academic recognition", Problems with credit recognition", "Students' unrealistic expectations", "Coordination" and "Quality"—of legal aspects. This is, at end, the best result of all the UbiCamp project.

Finally, with respect to the sociocultural interchange, even though this was the most prominent aspect of the UbiCamp, the disagreement between partners in obtain a unified model made impossible to get a standard for assessment, so UbiCamp gets only partial success in this question. Barriers as "To teach sociocultural items" and "Aspects related to cultural identity" have been solved in a separate way for the different partners, all of them acceptable. But it was impossible to solve the "Mobility assessment" barrier in a unified manner to get the recognition of the different institutions and to put this information in the students' curricula.

In any case, partner's efforts result in a lot of positive procedures and solutions that can be used as good practices in future projects of VM.

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