CULTURE MATTERS WHEN LEARNING: AN INTERNATIONALIZATION AT HOME PROJECT IN A COMPUTER ENGINEERING PROGRAM

María Luisa Sierra-Huedo, Francisca Pérez, África Domingo, Violeta Monasterio

Universidad San Jorge (SPAIN)

Abstract

With the aim of improving the international and intercultural competence of undergraduate students, an Internationalization at Home (IaH) project was developed in the degrees of Computer Engineering, and Design and Development of Videogames at Universidad San Jorge (USJ). The IaH experience involved third-year Spanish students, Erasmus incoming students from Switzerland, and visiting students from Lillebaelt Professional Academy, Denmark. A two-week academic program was designed from two core subjects in the Computing curriculum. In addition, a social program was designed as a complement to include visits to local companies and social activities.

During the program, the researchers developed an intervention in intercultural learning using, among others, the Learning Style Survey from Maximizing Study Abroad, a questionnaire about Culture Learning strategies, course evaluations specifically designed for this intervention, and the students’ academic results. The main outcomes showed that students’ academic results were excellent as well as their course evaluations. The participants’ results in the questionnaires allowed the researchers to analyse the preferences or abilities of the students in order to adapt the learning activities to their specific characteristics. Also, all the gathered information helped researchers to analyse the sequencing of the project activities and to propose improvements for future IaH projects aimed to promote the development of the students’ intercultural competence.

Keywords: Internationalization, exchange programmes, intercultural education.

1 INTRODUCTION

Jacques Delors [4] affirmed that 21st century students should be educated taking into account what he called the main challenges of education, being those technological, environmental (climate change and lack of access to natural resources), and intercultural. Internationalization of higher education focuses on educating global citizens who will be able to face these challenges. Thus, it is crucial that future graduates become interculturally competent, and such goal cannot simply be achieved with study abroad programs [2] [3] [10] [11] [12]. The acquisition and development of intercultural competence is indeed a major desired outcome for university graduate students [5] [6] [8] [9] [14], and its development is seen as a key factor for college graduates to be successful in their working environments nowadays. The European Higher Education Area (EHEA) as well as the Erasmus+ program claim in their objectives to promote this competence. With this objective in mind, and as part of the Internationalization at Home (IAH) strategy of Universidad San Jorge (USJ), a short-mobility program was established.

Universidad San Jorge, a Spanish private university founded in 2005, is located in Zaragoza, capital of Aragon, an Autonomous Community located between Catalonia, Navarre, The Basque Country and Madrid. The University offers 15 Bachelor’s Degrees, 10 Master’s Degrees and 3 PhD Programmes. Universidad San Jorge was created at the threshold of the implementation of the Bologna Process. It is a young dynamic university with currently 2,000 students. Universidad San Jorge was one of the first Spanish universities implementing the Bologna Process and internationalization has been one of its priorities since the beginning. The degree in Computer Engineering was established in 2008 and the degree in Design and Development of Videogames was established three years ago. Both of them are 240 ECTS degree programs oriented at having our students the competences required to join all types of professional sectors that employ new information technologies and communication. English is the language of instruction in the 3rd and 4th year for both programs.

Lillebaelt Academy is a business academy founded in 2009 in the Region of Southern Denmark and offers 30 higher educational programmes, 6 Academy Professional Programmes and 1 Professional Bachelor Programme totally taught in English. The academy has 3,300 students and it has campuses...
in both Odense and Vejle. Academy Professional Programme in Computer Science was established in 2014, it is a 150 ECTS programme taught in English and it is oriented at developing competences required to develop information and technology systems.

As a part of the process of internationalization of USJ, and with the aim of promoting the development international and intercultural competence in our students, a two-week mobility program was carried out with participants from USJ (both local and Erasmus incoming students) and from Lillebaelt Academy. The program, called International Module, is described in Section 2, while Section 3 describes the intervention in intercultural learning that was carried out during the International Module.

2 INTERNATIONAL MODULE

2.1 Participants

Students from Lillebaelt Professional Academy in Odense, Denmark enrolling in Academy Professional Programme in Computer Science, and students from the degrees in Computer Engineering and in Design and Development of Videogames from Universidad San Jorge in Zaragoza, Spain, participated in the International Module.

The experience involved 14 third-year Spanish students, 2 Erasmus students from Switzerland who spent in the USJ one semester, and 9 international students from Lillebaelt Professional Academy who were in their third semester at their home institution. As Figure 1 illustrates, the country of citizenship of the group was 56% local students from Spain, 36% visitors from Denmark and 8% Erasmus from Switzerland.

The age of Spanish and Erasmus students was between 20 and 25 years. Danish students were between 22 and 26 years old. Thus the sample was very homogenous in age, and totally Western European.

One important characteristic of this group is that more than the 90% of the students were male. Only two participants were female, one from Spain and one Erasmus student from Switzerland.

2.2 Academic Program

The academic program was designed from two subjects taught in English: Software Engineering and Human-Computer Interaction. The program included 28 hours of classroom activities and 12 hours of autonomous work in groups, in which students related and integrated contents of both subjects. Both Human Computer Interaction and Software Engineering subjects run in parallel through two full weeks for USJ and Lillebaelt students together.

The Human Computer Interaction part introduced basic knowledge for understanding users, designing systems and interactions that are effective, efficient and satisfying to use, and evaluating the usability of these systems. At the end of the first week the students must perform a comparative analysis on the usability of two websites following the guidelines learnt during the lectures. During the second week the students analysed different interface evaluation techniques, early prototyping of interfaces and user feedback, in order to apply this concepts to their project: students had to create a low-fi prototype for their mobile application and design the navigation.
The Software Engineering part started by looking at development lifecycle models, and then introduced agile development. In the second week, participants studied and applied the eXtreme Programming (XP) software methodology for planning and developing the different tasks of the final group project. In particular, the students were provided with a list of desired features for a mobile app and had to do the tasks to apply XP programming (i.e., a planning with releases and user stories).

The expected learning outcomes for the module were defined as follows:

- To appreciate the wider engineering context that forms the background to developing complex, evolving interactive systems.
- To demonstrate knowledge of user-centred design and apply a user-centred design process in their projects.
- To effectively plan and execute the initial phases of development lifecycle models.
- To employ group working skills, in an intercultural and diverse group, including general organization, planning and time management and inter-group negotiation.
- To present one’s work effectively.

In order to achieve the learning outcomes, students had to undertake a substantial group project, working in groups that were made up of local students and visitors, through all the topics by planning the initial phases of the development of a mobile app. Clear and specific guidelines were given during lectures, and during unsupervised sessions students were expected to organize themselves and their work in order to complete the assignments relating and integrating contents of both subjects.

As a part of the final project, each group performed a 15-minute exposition which included all the requirements specified in the work, as well as descriptions and information about the tasks that each member of the group has undertaken. The score could vary among group members based on their individual contribution. Also, a co-evaluation activity was included in the presentations session. Each group made an assessment of the other groups’ work.

2.3 Sociocultural Program

The first Sunday that Lillebaelt students were in Zaragoza, members of the USJ International Relations Unit welcomed the students with a walk through the historic centre of the city and a visit to the Cathedral-Basilica of Our Lady of the Pillar.

The last Friday of the first week was also reserved for sociocultural activities. In the morning, Lillebaelt students, Erasmus and first year students form the degrees in Computer Engineering and in Design and Development of Videogames from USJ visited Walqa, a technological park in Huesca, a nearby city. There, the students visited several relevant local companies in the sectors of Information Technologies (Telefónica, Frogtek or the CDTIC Audio-visual), biotechnology (Podactiva) and renewable energy (FHa, The Foundation for the Development of New Hydrogen Technologies in Aragon). English was the language used in the presentations and discussions during the visit.

In the afternoon, a board game tournament was held. The activity was open to anyone interested and was carried out in English. Participants of the International Module, students of other courses, teachers and personnel outside the university enrolled to the activity. Before the tournament started, a local volunteer student made a presentation in English of the rules of the game to be used (entitled Settlers of Catan) and also the rules of the tournament. The top four participants won a prize.

Besides, the module participants were invited to participate in sociocultural activities with other USJ students, such as a meeting at the centre of the city for going out to eat tapas in a different area of the city or a ‘Cultural day’ on Saturday composed of a guided tour Aljaferia Palace, a Walk to Expo Site and a visit to the Aquarium.

3 INTERCULTURAL LEARNING INTERVENTION

The surveys used in this research project were part of a research project developed at the University of Minnesota, Maximizing Study Abroad [1]. This project aimed to develop learning tools for international educators and students studying abroad. Most of the students who study abroad do not get any training in one of the most important aspects to develop intercultural competence that it reflects about their own learning, thus learning how to learn and reflecting about it. Different learning style preferences help us understand and organize our own learning, we all can learn and improve our
learning styles by understanding our strengths and weaknesses [11]. The Learning Style Survey helps students to deepen their understanding comparing eleven different learning styles; the Culture-Learning Strategies Inventory is useful for discovering more about oneself as culture learner and for facilitating the adaptation to a new culture with new strategies.

The Learning Style Survey analyses eleven learning styles and it contains between four and twenty items for each different learning style. For example, the learning style “How I receive information” contains items such as “I ignore details that do not seem relevant”. For each item, students circle the response that better represents their approach using the five-point Likert scale that Table 1 shows:

<table>
<thead>
<tr>
<th></th>
<th>Scale learning Style Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Never</td>
</tr>
<tr>
<td>1</td>
<td>Rarely</td>
</tr>
<tr>
<td>2</td>
<td>Sometimes</td>
</tr>
<tr>
<td>3</td>
<td>Often</td>
</tr>
<tr>
<td>4</td>
<td>Always</td>
</tr>
</tbody>
</table>

To compare the students’ results in each item, we considered the mean of the items related with each learning style. The results of one student for each different learning style are between 0 and 4 following his/her preferences. The mean and standard deviation were calculated to measure the students preferred learning styles.

The questionnaire about Culture Learning Strategies reviews fifty-one different strategies grouped into nine strategies types. An example of strategy can be “I look at similarities as well as differences among people of different backgrounds”. Students check the option that better describes their use of each strategy, using the four-point Likert scale that Table 2 shows:

<table>
<thead>
<tr>
<th></th>
<th>Scale Culture Learning Strategies questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>This strategy doesn’t fit for me</td>
</tr>
<tr>
<td>1</td>
<td>I’ve never used this strategy but am interested in it</td>
</tr>
<tr>
<td>2</td>
<td>I have tried this strategy and would use it again</td>
</tr>
<tr>
<td>3</td>
<td>I use this strategy and like it</td>
</tr>
</tbody>
</table>

The mean and standard deviation of each item are calculated to measure the students preferred strategies that they usually use to adapt to other culture. As we did with the Learning Style Survey, we have considered the mean of the items related with each group of strategies in order to make a general description of the group.

In order to evaluate the impact of the experience and the degree of satisfaction on the participants, an evaluation survey was carried out at the end of the module to the local and visiting students.

4 RESULTS

A variety of results were collected from the different surveys. This section summarizes those results that are more linked to culture and intercultural learning interventions. First, the results of the Culture-learning strategy are presented, second the Learning styles surveys and then students’ course evaluations and satisfaction levels.

4.1 Culture-learning Strategies

As shown in Figure 2, the students who used the widest range of strategies were the Swiss students, and those who used the narrowest range were the Danish ones. Strategies that deal with different communication styles, strategies for communicating with people from another culture, and strategies for making judgments about another culture were the most used by Spanish students.
Swiss students were the ones who used the most strategies before the exchange and mostly used strategies to facilitate non-verbal communication, which were the strategies less valued by Danish and Spanish students (Strategies to understand nonverbal communication in another culture). The strategies most used by the whole group were ‘Do not assume that everyone from the same culture is the same’, ‘Respect the way people from other cultures express their emotions’ and ‘Refrain from disagreeing right away so that I have a chance to listen to what others are trying to communicate’.

The type of strategies least related to the students was those to be carried out when the exchange ends (‘Strategies to use when I return home’) or in their habitual residence, being especially low among the Danish students (0.9 points out of 3). In this sense, the strategies least used by the group were ‘Keep a journal or a diary about my experiences’, ‘Be Volunteer for an international organization or work with international students’ or ‘Participate in activities sponsored by study abroad and international groups back home’. Also, ‘Use a variety of coping strategies when I feel I have Culture shock overload’ was a little used strategy.

Based on these results, the clear differences observed between each group of students could be interpreted. Swiss students who were studying in Spain for a whole semester showed greater concern in how cultural differences affect their learning, and they seemed more aware of the importance of culture. They made a greater effort to relate to Spanish students and professors. The strategies most used by the Swiss students have to do with non-verbal communication, which indicates again that they have been studying in Spain longer than the Danish students. We would like to highlight how the whole group paid special attention to diversity in general within people from their same culture or from other cultures. They also thought that is very important how you communicate with people from other cultures, which is indeed a first step in the development of their intercultural competence.

Students thought that the least important culture strategies are those related to volunteering and belonging to an international NGO. We think that these answers might be connected not only with the Learning Styles survey presented in next section (they are mostly introverted), but also with the fact that for most of them this was their first mobility experience, as their study area is a field that does not tend to participate in study abroad programs. This is one reason why this Internationalization at Home project was created, to promote and encourage intercultural learning and contact among international and local students. This is indeed a challenge for STEM fields such as engineering and technology [13].

4.2 Learning Styles

The characteristic more relevant we can conclude from the results of the Learning Style Survey is that the entire group came up more introverted than extroverted (see Figure 3) and reflective than impulsive in learning situations.
Extroverted people tend to enjoy social interactive learning activities, while introverts prefer to do more independent tasks and projects. Even though the group ranked high in being introverts, emphasis was put into making students work in group projects because it is considered one of the most important competences to be developed for an IT engineer. Thus, the setup of this project was indeed a challenge for the students and a stressful situation.

Related with open or closure-oriented styles, the whole group showed a preference of 2 points in open learning styles, but differences in the preference of more closure-oriented styles were detected by groups of origin. The biggest difference was found when comparing the results of Spanish and Danish students (as Figure 4 shows). The open-oriented style learner likes to discover information in a natural way without any concern of deadlines and rules. The main difference among Danish and Spanish students was that the first ones were on their third semester of a two-and-a-half year professional program (non-degree seeker) while the Spanish students were on their 5th semester of a four-year degree-program. This could be linked to their motivations and level of instruction. This is also linked with Hofstede cultural dimensions study in where the results show that Spain ranks very high in uncertainty avoidance, which means that Spaniards need to have rules for everything trying to control situations and they look for security in life. Denmark ranks very low in uncertainty avoidance [7].

On average, the group showed some preference for general styles of receiving information over the particular or detailed style. The preference between one style or another between Spanish and Danish was not very high. Danish students showed a clear preference for global styles over particular ones. Therefore, they enjoyed getting a hint of the main idea and develop it from there.

Erasmus students were inductive and dependent on the field of study or the context. They were considered reflective students. They also showed preferences in memorization style, showing greater preference for the 'leveler' style (grouping concepts by similarity and eliminating differences) against 'Sharpener' (distinguishing objects by their differences), and they were more dependent. The students from Lillebaelt Academy were mostly inductive, field independent and synthesizing. Local USJ students were more deductive than inductive, synthesizing and field independent. Local USJ students preferred closure-oriented learning strategies than open ones.
4.3 Academic Results and Participant Satisfaction

The academic results were very satisfactory. From the academic point of view, 100% of students passed the evaluation. In general, all participants showed a high degree of participation and involvement in academic activities. All the students were able to communicate and collaborate effectively in an intercultural environment to realize and defend a group project using English as a vehicle language of instruction and learning.

From the social point of view, students emphasized that the experience helped them to develop their communication and coordination skills in a group with intercultural and international differences. However, not all Danish students participated actively in non-compulsory socio-cultural activities such as cultural visits or board games. On the other hand, very few students of the local group or Erasmus shared activities with the group of Danish students outside the classroom.

The students’ evaluation survey revealed:

- More than 80% of the local students valued the experience as positive and no one valued it as negative.
- Local students highlighted as positive aspects of the activity: to work with different people from other countries, to work using another language and work in groups, the good work environment and the possibility of establishing working relationships, the explanations in class, the support and orientations from the teachers, the balanced workload between the two subjects in the module, and the deadlines.
- Almost all local students considered the integration of the International Module schedule with others activities from other subjects of their academic program as a negative aspect. They did not have enough time to interact with visiting students, and the module stressed the workload of the semester.
- Visiting students rated the global experience with a 7.6 out of 10: 8.1 out of 10 for the planning, 7.2 for the activities, and 7.2 for the results. Their satisfaction with their stay in Zaragoza was of 8.3 out of 10.
- Visiting students highlighted the number of participants and the timetable of the activities as positive aspects of the module. They valued below 7 points out of 10 that the academic activities developed during the module had allowed them to develop their knowledge and skills in their professional area and the satisfaction with the academic course results.

5 DISCUSSION AND CONCLUSIONS

In order to promote quality of any internationalization process, more study abroad programs are needed. Internationalization at Home is a response to that, focusing on the quality and in those students who might never have the chance to study abroad. Among all the elements that are part of any IaH program, an internationalized curriculum is key in order to promote the development of intercultural competence among our students. This project is a clear example of that, introducing an intercultural learning intervention during a mobility program, helping students to reflect about their learning and how culture plays such an important role in our teaching and learning process. Thus, an important conclusion of our experience is that in mobility experiences, just teaching in English are not enough to maximize the intercultural learning of our students. A specific methodology is needed as well as special cultural interventions that help creating awareness in our students. The lecturer’s motivation and careful planning of the work, as well as a multidisciplinary approach, are key in order to promote and develop successful IaH projects.

Improvements of the International Module are indeed needed. First, we consider that the methodology and activities in the academic program are adequate for the program objectives and students’ profile. However, Spanish students need to keep up not only with the International Module activities, but also with the rest of their regular coursework, which is indeed an extra workload for them. Therefore, a better integration between the International Module at USJ with the rest of the activities developed in the USJ students’ courses of their academic program is needed. This will help to maximize their time together (local and international students). Also, some of the activities could be modified so that students can spend more time together, as the participants have pointed out in their evaluations.

Second, during the cultural learning intervention activities we noticed that Spanish students reflected about the importance of culture in their learning and in their professional future. They considered these
activities as very important for their educational training. Reflection and debate were encouraged before, during and after the program, which we think affected how they perceived its importance. However, more cultural learning activities in the classroom would help students to connect socially and culturally with each other, promoting contact and understanding among the different cultures involved in the classroom. Personal and social interactions are key for the development of the global, intercultural and international competences.

Third, the International Module should be more holistically integrated with other programs of the school. This would mean a more top-down internationalization strategy, since this program is clearly a bottom-up internationalization initiative.

Any internationalization process cannot be successful unless it is considered from a system’s perspective. In other words, internationalization projects included in schools and/or faculties cannot work in silos. Collaboration across campuses is essential for the success, institutionalization and continuity of any internationalization effort. The project presented here is a clear example of one kind of many different internationalization processes that higher education institutions planned and worked on. Our students deserve the best education we can give them, which nowadays should be an internationalized one. IaH promotes access to that quality of education to students that otherwise would not have access to study abroad and/or intercultural experiences. We can positively conclude that our accomplishment with this IaH project is the students’ reflection about the importance of the internationalization of their education. We hope this is indeed the beginning of their intercultural learning process, just their first step of a long journey.

ACKNOWLEDGEMENTS

This work was funded by Universidad San Jorge through the project “Internacionalización como innovación docente en Informática y Videojuegos” from the program “I Convocatoria de ayudas para proyectos de innovación docente”.

REFERENCES


