PROJECT GENIUS: AN EXPERIENCE ON INNOVATIVE INTERDISCIPLINARY CONTEXTUAL EDUCATION USING GAMES DEVELOPMENT

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Abstract

The GENIUS (Innovative Interdisciplinary Contextual Education Using Games Development) project uses active learning methodologies to increase the level of soft-skills in higher education students. The soft-skills that this particular project aims to develop are some of the most commonly referred to in the literature as being relevant to higher education students. They are the ability to work in multicultural and interdisciplinary teams, the capacity to communicate to different audiences, critical thinking, creativity and entrepreneurship. These skills are relevant to students because they are the ones referred to as needed for their future employment, as stated in "The Future of Jobs Report 2018", from the World Economic Forum.

With this specific purpose in mind, five different higher education institutions, University of Lodz (Poland), Artesis-Plantijn University College Antwerp (Belgium), Centria University of Applied Sciences (Finland), Dundalk Institute of Technology (Ireland) and ISPGAYA Polytechnic Superior Institute (Portugal) were awarded a grant, under KA203 Erasmus+ Strategic Partnership, to document an approach for implementing an intensive mobility format that would enhance students’ soft-skills. The project, which started in November 2017, comprises a set of different activities. Students involved have virtual workshops to help them prepare for the work they have to do in each of three different ten-day mobilities. In these mobilities, the objective is for students to work in multicultural and interdisciplinary groups. The students are accompanied by professors/mentors from those same institutions, who, based on what they lecture in, also possess different areas of expertise. During their mobility, students are challenged to develop mobile apps for a specific pre-defined topic. With this methodology, we expect the participating students to develop the soft-skills referred to at the start, while also further developing their own technical skills that relate to the area there are studying.

To date, we have completed two of the three mobilities that are part of this project. In this article, we make a detailed description of the project, present its main objectives, the methodology used to implement it and to monitor it, the tools used to assess it and present the expected outcomes from it.

Keywords: Serious Games, Soft Competences, Active Learning.

1 INTRODUCTION

Besides the technical skills that students get from their undergraduate degrees, future jobs will require young people to have soft-skills. It is usually difficult to provide soft-skills within the normal classes of an undergraduate degree. Literature [1] has shown that these skills are currently under-examined in research and under-supplied through education. In an increasingly data-driven economy, the demand for “soft” social skills, like teamwork and communication, increase with greater demand for “hard” technical skills and tools. In fact, a variety of European studies [2], and considering also other recommendations [3], indicates that youth in Europe face challenges related to the low level of development of soft competences. These challenges include:

- ability to work in interdisciplinary and international project groups
- critical thinking, communication, self-direction and creativity
- innovative problem solving approach
- entrepreneurial spirit

From the skills mentioned above, entrepreneurship has been the first one to be assessed as being extremely relevant for youth. Many countries have invested substantially in entrepreneurship education.
Europe declared entrepreneurship as a key competence [4] and [5] and announced that fostering youth entrepreneurship is one of the objectives of the Europe 2020 strategy and its youth on the move flagship initiative [6]. Such recognition derives from the fact that entrepreneurship is a major contributor to global economic growth [7]. The findings show that entrepreneurs are perceived as learners who are focused on adopting new solutions. A tendency to start their own business is increased if a student has had prior assessment of entrepreneurial skills and capabilities while in college. Therefore, teaching entrepreneurial skills to students is becoming increasingly recognised as a necessary skill for them to thrive at a global level. Teaching of entrepreneurial skills is progressively being incorporated into the core syllabus that students take during their education. However, the other soft-skills are still not being integrated into student course work. It is very unusual for students to work in interdisciplinary groups while studying for their degree.

Expectations of the labour market require the adoption of new solutions for the provision of soft-skills education to young people. To foster creativity and soft skills, traditional educational models must make way for models that focus on the integration of students and the increase of student involvement. For some time now, research [8], [9] and [10] indicates that appropriate innovation is found in the shape of active learning. Active learning is an educational tool that realigns the focus from teacher-based delivery of content to learning activities performed by students. Active learning requires students to engage with course material in the search for meaning and understanding. Active learning encourages students to act responsible while they are working in teams, communicating and problem solving. Recent research, [11] and [12] indicates that only now are educational organizations fully embracing the change to active learning.

One of the methodologies to apply active learning is through the use of contextual games. In this type of game, some of the actions of the player need an interaction with the real environment. If developed by an interdisciplinary and intercultural team of students, the development of contextual games should improve the students’ soft-skills listed below:

- co-operation in achieving targets in a diversified group,
- communication skills needed to work in a diversified group,
- achieving objectives gradually by moving through different aspects of a problem as a team,
- decision making process at the operational, tactical and strategic levels,
- obtain a transparent system of evaluation and control of the educational process,
- presentation of achievements, proceedings and results.

As such, a project that will allow students to develop contextual games in an international and interdisciplinary environment should increase higher education students’ soft-skills. The project GENIUS is an attempt to achieve that. In the next chapter, the project GENIUS is explained. Afterwards, first results from its implementation are presented. Finally, conclusions are presented.

2 METHODOLOGY

The challenges for organizers, mentors and students include dealing with differences in socio-cultural reference systems, institutional cultures, degree programmes (management, tourism, computer science, etc.), national cultures, personalities and talents. It is a mentoring exercise in a context of appliance of innovative pedagogies, such as those involving contextual games, where mentors appear as facilitators throughout a process of development of soft skills, following normative indications of mentoring relationships in the European Union [13].

Each of the team members carries out a set of tasks in order to ensure that the team achieves its goal, which, in our case, is to build a mobile app. The important part of the project is not the mobile app. It is the means by which the students work together to develop the mobile app that is important. Each team of students is asked to develop a mobile app according to criteria of quality and utility that would be demanded by companies and the general public in the non-academic “real world”. In order to achieve this high standard of expectation, students have to demonstrate a detailed and current knowledge of the area in which they are currently studying. For example, business students will be required to put together a business plan. Teamwork and group dynamics are fundamental to the success of each team. Teamwork highlights the qualities and skills of students. Development of the mobile app requires a great deal of ongoing communication within each team.
The theme that the mobile apps will focus on can be suggested by companies or public entities that are partners to the project group or by the partner colleges themselves. The motivation within each team to complete their tasks is fundamental to the success of the project. The objectives are only achieved through a permanent and rigorous planning and organization of tasks. This gives rise to the flexibility and adaptability of team members. The intense pace of work only occurs if the students involved in teams use analytical thinking and achieve closeness in terms of inter-personal working relationships within their team. Finally, more than just carrying out tasks, the final result of the mobility is the personal development of the team members and organizers of the program, making this European experience a milestone in the individual journey of each participant.

The GENIUS project is aimed to be delivered to diversified groups of higher education students who are studying on a range of different undergraduate programmes. The project is tailored to groups of students of bachelor and master programmes. It allows for the creation of interdisciplinary teams to strengthen synergy and cooperation. It is important to note that the project will work no matter what the set of participating students is. To date, the GENIUS project has taken in students with the following different undergraduate backgrounds:

- IT students. They have brought technical knowledge in the field of mobile application development,
- Economics and business students. They have brought skills in management, assessment of project and innovation
- Tourism students. They have brought skills in innovative needs of modern tourism services (e.g. methods of promoting places and regions, gamification in recreation and tourism)
- Teacher and education students. They have brought skills in modern educational process, teaching methods and communication
- Art faculty students. They have brought skills in the areas of culture and art.

To date there have been two mobilities. Both mobilities lasted for ten full working days.

A typical working day starts at 09:00 and ends at 17:30, taking one hour for lunch. In reality, students on both mobilities committed substantial additional time in the evenings working with their teammates on their project.

It is a good idea to interspace work with social activities. As a minimum, one event should be planned for the first day and another at the end of the mobility. The starting social event lets the students get to know each other in a non-formal, relaxed atmosphere. The ending social event gives closure to the mobility and allows the students to share in their common achievement and friendships from the mobility.

Although there were minor differences between the schedules of the two mobilities, both followed the same general sequence of activities:

2.1 Preparation phase

During this phase, students who have been selected to participate in the mobility are advised to visit the project website. On this website, they can find a collection of specific learning content. For the second mobility, the website content was accompanied with webinars that took place before the start of the mobility.

2.2 Start Phase

During a short presentation, an external client introduced the topic that needs to be addressed. The teams were challenged to develop a gamified mobile app that would solve the problem.

The students were then instructed to organize themselves into teams. Teams were not allowed to have more one student from each participating institute.

The teams were instructed to brainstorm and prepare a pitch for the whole group. They were given about two hours to accomplish this task. During the pitch every team had about ten minutes to explain their initial app idea. It is very important that the first pitch is done right at the start of the project. This lets the students get a sense of the expectation of the mentors and external industrial partners. It also instills a sense of urgency in the students and gives them a mindset that they will be expected to work hard over the following days.
Mentors are then assigned to each team. A mentor is a lecturer who is involved in the project. The mentor’s role is to guide the team, ensuring that they do not stray too far from their goal. If a team gets stuck in the development, either technically, content wise or organizing their work, their mentor can step in with advice.

2.3 Working Phase

During the working phase all teams are working on their project. They are given a home base, usually a table with chairs in a working space, where they can work and from which they can venture out for different activities, such as collecting photographs or conducting marketing interviews.

All students need to be present at the home base first thing in the morning and immediately after lunch. A roll-call is conducted at each of these full-group meetings. The meetings allow mentors to speak to the entire group to present the day’s schedule, and for the mentors to allocate students to participate in different workshops. Some of these workshops are technical and discuss the technology to be used for the development of the application. Other workshops discuss matters such as team dynamics and leadership, project management, design thinking, gamification and performing presentations.

Teams meet with their mentor at least once a day. Meetings usually take place immediately after the full-group meetings.

As presenting is considered a great opportunity to reflect on one’s work and to receive comments and feedback, a lot of time goes into this group activity. Presentations enable teams to show off their progress. Presentations allow students and mentors to ask critical questions and presentations allow teams to learn best practice from each other. During the mobility, students are expected to participate in four presentation sessions. These are:

1. The pitch on the first day,
2. A pitch after three days to show progress of the team’s idea,
3. A pitch on day eight to show the almost complete product,
4. A pitch on the last day to show the final product.

The second and third presentations are hugely important. They act as milestones that help to keep the students to stay motivated and focused. They give the students the opportunity to compare their progress with the progress of the other teams. This tends to drive up the quality of the work of all participating students. These two presentations also give all of the mentors an opportunity to provide feedback to all of the teams.

Between the third and fourth presentation, teams focus on cleaning up their mobile app and their presentation skills. Students are advised that the final presentation will be done before an audience of external stakeholders, such as company representatives or city and host college dignitaries. Students are encouraged not to present their application concept as an academic assessment. Instead, students are encouraged to perform a product sale, during which they explain and demonstrate as if they are in an investment competition.

2.4 Ending Phase

The final presentation represents the end of the project. A party is held in the evening, where students can celebrate their collective achievements during the mobility.

3 RESULTS

At the moment, the project is still only halfway from completion. Therefore, the results achieved so far can only be slightly mentioned, because a full comprehension of the impact of this project on all those involved, but particularly on the students, can only be understood at the end.

At this point, two mobilities have already taken place. The first one happened in Pietersaari, Finland, in April 2018. The second one took place in Antwerp, Belgium, in March 2019. The number of students involved in both mobilities is shown in the table below:
Table 1. Student Numbers.

<table>
<thead>
<tr>
<th></th>
<th>Belgium</th>
<th>Finland</th>
<th>Ireland</th>
<th>Poland</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility one: Finland</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Mobility two: Belgium</td>
<td>2</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

The total number predicted was ten students per institution in each mobility. Therefore, one difficulty can be immediately reported. It is sometimes hard to involve students from the host organization in the project. As they are not travelling, they are not as motivated to participate. The Finnish partner was able to overcome this difficulty, but the Belgium partner could not.

The second directly observed result relates to the various students’ area of study, as shown in the table below:

Table 2. Students’ Area of Study.

<table>
<thead>
<tr>
<th></th>
<th>ICT</th>
<th>Management</th>
<th>Tourism</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility one: Finland</td>
<td>30</td>
<td>12</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mobility two: Belgium</td>
<td>26</td>
<td>7</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The majority of students come from information and communication technologies (ICT). This can be easily explained because all of the Polish and Irish students are from ICT departments. Our project has been adapted to suit the types of participating students in so far as we put a focus on the development of mobile apps. The methodology that we use can also be applied to be non-IT focused.

One other observable result, at this point in time, is related to the actual work done during the mobilities. In each mobility, a topic around which the mobile apps are developed is set. The topic is proposed by external organizations that are involved in a given mobility. In Finland, Oy RAIsoft, a corporation that provides a software solution for measuring functional performance and health status, as well as quality and effectiveness of care for senior citizens, was involved in the mobility. In Belgium, the City Hall was the external institution that cooperated with the mobility. The applications developed were intended to promote healthier life style for the citizens of Antwerp. Having an external partner involved in a mobility makes the students feel that their work is for the “real world”, as opposed to being just another piece of academic assessment. The students appear to be motivated by, and respond well to, this “real world” challenge.

The schedule of both mobilities included similar events. Mobilities start with a social event for students to meet and interact with each other, as well as with the professors/mentors involved. Mobilities include team-work, because students are integrated in multicultural and interdisciplinary teams. All teams consisted of five or six members in each of the mobilities. The purpose was to have one student from each institution in each group and students from different academic backgrounds.

Mobilities must include regular presentations of the work developed. Students are challenged to present their work-in-progress every few days to all those involved in the mobility. On occasion, company partners are also present. In these presentations, critical comments and remarks are widely accepted.

4 CONCLUSIONS

The aim of the GENIUS Project is to deliver a recipe that can be used by others to organise learning mobilities with the aim of increasing the soft-skills of participating higher education. To achieve this objective, we have the students work in multicultural and interdisciplinary groups, properly accompanied by mentors, focusing on different areas of expertise. Students are asked to develop a contextual game, thereby improving or developing the capacity to communicate to different audiences, critical thinking, creativity and entrepreneurship.

During the two mobilities, the GENIUS mentor team has worked together ever more efficient and this reminds us of the co-operation we try to encourage in the students. In a way, the project went full-circle on this. The characteristics we would like to enhance in the students have also grown strongly in the mentors. This in turn has made it possible to identify the main drivers and influencing factors of the learning process. This has led to the use of active learning to achieve the goals of the project.
For this project's two mobilities to date, many participating students are from an IT department. This has historical reasons, and is in itself the root of the project. These students particularly gain from developing their soft skills, since their education focuses mostly on technical topics.

After the first mobility, we realised that the preparation phase needs some further improvement. We need to find a way to get the students engaged more prior to the mobility, so that valuable time is not lost. To this end, for the second mobility, we introduced the concept of virtual workshops as a way to get students to become engaged prior to the start of the mobility.

Another problem we encountered is the difficulty of engaging the students of the hosting organisation. Internationalisation at home is obviously not perceived as real internationalisation and can fail to attract enough participants from the host. Maybe fitting this into the curriculum of the host could solve the problem.

An important output that is expected from the project is the possibility of replicating it, even by institutions not related at all with the ones that initially developed it. In order for that to be possible, a description of the necessary procedures in order to implement the project must be available. As such, the institutions involved in the project committed themselves to produce content that will be available for others to use. The content produced so far can be consulted online (http://geniugamedev.eu/teaching.php). However, this is still a work in progress and it still needs to be reformulated based on the feedback provided by the students that participate in each mobility.

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REFERENCES


