

Blended Mobility on Entrepreneurship – Intensive Programme for ICT Students in the HEI Curriculum

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Abstract. *The main objective of the SmartSoc project was to create and implement an intensive interdisciplinary course in the field of ICT-based entrepreneurship considering the transnational and intercultural context. This project enforced ICT student teams to deal with economic, societal and environmental challenges defined by strategic documents 'Transforming our world: the 2030 Agenda for Sustainable Development' and 'Horizon Europe' programmes. It included an important message about smart specialisation strategies and their importance for regional development in the EU. The project results confirm the increasing economic and societal knowledge of the participants. They obtained them throughout out the development of start-up business plans based on selected entrepreneurial cases in line with essential sustainability aspects.*

Keywords. entrepreneurship, ICT, HEI curriculum, interdisciplinary

1 Introduction

The 'Education of Future ICT Experts Based on Smart Society Needs (SmartSoc)' project was developed by the consortium of twelve universities and one registered voluntary organisation from nine EU countries, coordinated by the University of Žilina, Slovakia. The main objective of the SmartSoc project was to enforce ICT student teams to deal with economic, societal and environmental challenges of current strategic documents of the UN and the EU when creating own business plans for virtual start-ups.

The advancement of HEI education in ICT encompasses different aspects such as learning methods, tools, business and social skills and work in the environment as closely as possible to a future workplace in high technology, i.e., in interdisciplinary international team. Therefore, the key issue of the project was the collaboration of students from different European universities on a common task (an entrepreneurial case) related to recognising needs of

society and providing a smart solution by using ICT. Specific entrepreneurial cases from Smart Society domain were elaborated following principles of project-based learning, student teamwork, blended mobility and intensive courses.

The SmartSoc project brought novelties regarding topics under consideration, i.e. ICT expertise related to smart society needs, with a special emphasis on entrepreneurship and skills related to evaluation of business perspectives and societal implications of the proposed solution, respecting relevant smart specialisation strategies defined in the EU at different geographical levels.

The project duration (three years) enabled the project consortium to organise three blended mobilities for about 100 students. The blended mobilities structure and content were adapted based on participants' surveys and unexpected situations caused by covid-19 and the war in Ukraine.

2 The needs analysis – preparation phase

When preparing the SmartSoc project, the project consortium relied on the results of the needs analysis. An online survey was conducted in February and March 2019. There were two questionnaires prepared for two different target groups - ICT companies and students of ICT oriented study programmes.

The first survey involved 28 IT companies focusing on software development. 70% were companies operating in Slovakia, further companies in the Czech Republic, Germany and Hungary. More than 53% of companies being stated had more than 250 employees. In the 25% of the companies involved in the survey, 50 to 249 employees were declared. 93% of companies answered they are interested in new education programmes aimed not only at improving ICT skills but also at basic business and personal skills. Based on the responses, it can be noted that when they are recruiting new employees, they attach great importance, in addition to IT skills, to the transfer of

skills and business skills. Other factors included digital skills, networking and language skills.

The second survey involved 329 students mainly from Slovakia (59%), Hungary (25%), following by students from France, Croatia, Ireland and Spain. All the respondents studied ICT focused study programme. Students were asked if they had any possibility to attend lessons, courses, or seminars where they could gain knowledge related to business, management or communication (Business and Social Skills). The most frequent answers were Economics courses (69%), as well as they had an opportunity to study courses such as Sociology (25%), Psychology and Rhetoric and E-learning possibilities, e.g. MIT, Coursera (20%). Most of the students stated their position in programming. Among the most important areas of the ICT skills, students mainly presented Topical knowledge, Analytical skills, and Awareness of new IT trends. Among the most important areas within Business Skills, they selected Project Management and Planning, Delegation and Time Management, Team Management, Communication and Negotiation skills. The differences within the priorities in the extent of bidding options were minimal, but networking was the least important according to students. The answer to the question ‘What are the most important areas within the Personal Skills?’ was mainly the problem solving, flexibility, responsibility, and motivation. Interpersonal skills were considered to be of the least importance. From all respondents more than half said they were interested in an educational exchange abroad, especially in the frame of the Erasmus+ programme.

3 SmartSoc Blended Mobilities

3.1 Basic concept

Blended learning (also known as hybrid learning) could be described as a study type that involves learning in a combination of modes, often used more specifically to refer to courses which use a combination of traditional face-to-face teaching workshops or seminars and distance learning techniques online (such as the internet, television, conference calls) (Erasmus+ Programme Guide, Version 1 2018, 25/10/2017). This is a definition published in the previous Erasmus+ programme (2014-2021). Blended learning was supported by the Key Action 2 activities in the frame of Strategic partnerships of HEI institutions.

The SmartSoc project goal was to develop basic (i.e. Maths, Science and Technology) knowledge and transversal (i.e. critical thinking, problem-solving, collaborative working in intercultural teams, management) skills of HEI students using innovative methods (i.e. teaching and learning based on case studies and intercultural collaboration) implemented through blended mobility and intensive course. A special focus in the project curricula was put on

technical, economic and legal aspects of entrepreneurial education.

The basic blended mobility idea of the SmartSoc project was to motivate the participants (students and teachers) to identify new ICT trends which emerged during the last years. Student teams supported by their supervisors (teachers) worked on the entrepreneurial cases together. These case studies took a twofold perspective on ICT and analysed not only innovations that happened within ICT, but as well as how ICT fostered innovations in other fields (e.g. ‘green energy’, ‘smart transport’, ‘inclusive society’, ‘smart specialisation strategy of the specific region’). The original plan was to develop 8 ICT-based entrepreneurial cases every year (2020, 2021, 2022), which will be solved by student teams during the blended mobility. Description and results of those entrepreneurial cases were used to create the first project’s intellectual output. This intellectual output was presented to a wider audience at the multiplier events in the last project months. The general learning outcome of blended mobilities was defined by the following words – ‘identify, understand and apply current ICT trends to become an entrepreneur’.

The preparation phase of each blended mobility started 6 months before its real start. Teachers from all participating organisations were invited to prepare and apply their entrepreneurial case proposals. It was realised approximately in the middle of October. The final list of the entrepreneurial cases used for the following blended mobility was announced in November. The call for students was opened approximately at the same time to receive enough applications before the winter holidays. The final list of student participants was known in January. It was used to create student teams and to announce their assignment to the entrepreneurial case in a few months.

The work in the student teams always started in the middle of February. Unfortunately, it was not possible to get the beginning of cooperation between students and teachers to start at the beginning of the second semester of the current academic year. However, this was possible with most partners. The blended mobility itself was adapted to the duration of one semester at the project coordinator, the University of Žilina. Two phases of blended mobility were planned for the 13-week semester - virtual and physical. The virtual part lasted 10 weeks and the physical part 2 weeks. There was one spare week to complete the tasks from the virtual part, if a student team needed it, between them. The blended mobility completion was planned for late May.

The virtual mobility involved working on a joint task - an entrepreneurial case. The student team was created so that it cannot include students from the same institution and country. Normally, group of 3 to 5 students worked in each student team. Each student team was provided with guidance by teachers (supervisors) in three areas - technical, business and societal.

3.2 Participants

The project consortium was created by 12 institutions as mentioned in the introduction (Figure 1 and Table 1).



Figure 1. SmartSoc project – participating countries

Table 1. SmartSoc partner institutions

Country	Institution
Slovakia	University of Žilina
Slovakia	Technical University of Košice
Bulgaria	Technical University of Sofia
Romania	University of Oradea
Hungary	University of Debrecen
Hungary	University of Győr
Croatia	University of Zagreb
Croatia	University of Osijek
Germany	EIAB institute
Finland	University of Jyväskylä
Finland	Seinajoki University of Applied Sciences
France	IMT Atlantique
Spain	Technical University of Valencia

The participation of three students and two teachers from each partner institution was planned for each blended mobility. Students and teachers were nominated through selected contact person. The numbers of participants differed in each year of the project. Thanks to the EIAB partner from Germany, it was possible to involve students from institutions that were not directly involved in the project consortium. In the last year of the project, students from Cameroon

and Albania were also invited to blended mobility, as well as students admitted to study mobility at the University of Žilina (including students from Taiwan and Kazakhstan).

There is an overview of number of students nominated for blended mobilities in table 2. Some students cancelled their participation during the virtual mobility. It shows how covid-19 and massive implementation of online teaching influenced motivation and workload of students at all participation institutions. There is an apparent influence of the workshop venue in all project years as well – Žilina (2020), Valencia (2021), Žilina (2022). The 2022 SmartSoc Workshop finally took place in Valencia because of war in Ukraine.

Table 2. Statistics of participants

	2020	2021	2022
Virtual mobility	35	51	36
Workshop	17	32	22

3.3 Entrepreneurial cases

An entrepreneurial case was the most important task formulation for the student teams. All assignments were prepared by teachers from the participating institutions. Some of them in cooperation with the industry partners. These are the examples of the solved SmartSoc entrepreneurial cases prepared for 2021:

- Smart Museums
- A Self-Driving Tractor Is Changing the Future of Food Business
- Safe, Effective, and Sustainable covid-19 Protection Operations in Congested Areas
- Smart Recycling in Latest Technologies
- Cyber Security
- Creation of Identification Methods and Tools to Distinguish between Original or Counterfeit Products
- Health on the Move
- Smart Package Solutions
- 5G Open Radio Access Networks in Event Management

There were nearly 30 entrepreneurial cases prepared and 23 out of them were used within the SmartSoc project.

3.4 Cooperation tools being used within blended mobility

The cooperation tools and platforms enabled effective cooperation of the student teams during virtual mobility. It was not expected to use any cooperation and communication platform during physical mobility (two weeks workshop).

For the first project year, before covid-19, it was decided to use Moodle LMS as the essential cooperation platform. All study materials were shared there with students and teachers. All teams were invited to decide about their own additional communication tool - a FB group, Messenger group, Skype, etc. This combination of cooperation tools and platforms was used only during the first project year (2020).

The blended mobilities were influenced by covid-19 during all three project years. Unfortunately, the first workshop, the physical part of the first blended mobility, could not be prepared according to the original plan. May 2020 was completely unsuitable for physical mobility, and the consortium then decided to move the workshop to September 2020, hoping that covid-19 would be defeated by that time. Finally, the workshop was held in an abbreviated version, for six days and only online. Since this event, Microsoft Teams has become the main communication platform of the project. Moodle LMS has begun to lose its importance, especially as a place to share teaching materials.

In 2021 and 2022, all student team collaboration moved to the Microsoft Teams application environment. In this environment, each team had their private channel with their own content and place to communicate with each other. The LMS Moodle environment was created in 2021, but it was no longer used by students at all. In 2022, all student teams used only the Microsoft Teams application. It was used during the second online workshop in May 2021 as well.

3.5 Blended mobility structure – learning and teaching materials

The content of the virtual part of the blended mobility was carefully prepared by the staff of the Department of Macro and Microeconomics of the project coordinator. A few tasks were prepared for the students. For the processing of each task, documents were prepared in the form of documents or links to videos publicly available on the Internet. Teachers assigned to lead student groups regularly consulted on all assignments so that students could understand and process them. This is what the content of virtual mobility in the first year looked like (Figure 2):

1. Kick-off meeting – Teamwork – How to create a successful team
2. The first version of a Business Model Canvas (BMC)
3. The first version of a Business Plan for a start-up
4. The second version of the BMC and the Business Plan
5. Pecha Kucha presentation
6. The final version of the BMC and the Business Plan

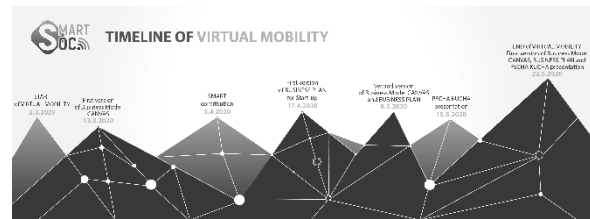


Figure 2. Virtual mobility timeline (2020)

The students always received feedback on each version of their BMC and business plan. The very last changes in the business plan were made by the student teams subsequently during the workshop. The workshop, originally planned as a physical meeting of students and teachers, contained mainly lectures focused on current topics of ICT and business in ICT. The lectures of the teachers of the partner institutions were supplemented by lectures by industry experts. A few excursions, even virtual ones, were organised.

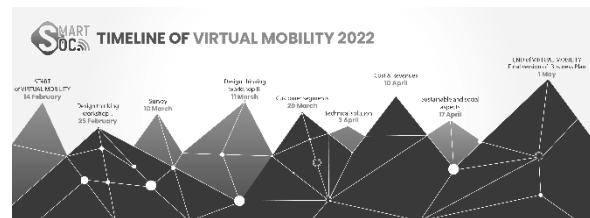


Figure 3: Virtual mobility timeline (2022)

The organisation and structure of virtual mobility were modified and improved based on surveys. Students and teachers used this possibility to give feedback to the project organisational team. The third version of virtual mobility content was the following (example of five weeks – for a timeline see Figure 3):

- Week 01 – Task 01: Agreement on weekly meetings / Task 02: What do you like? / Task 03: Find information about your entrepreneurial case, current solutions, trends
- Week 02 – Task 01: Weekly discussion / Task 02: Design Thinking workshop – Part I.
- Week 03 – Task 01: Weekly discussion / Task 02: Competition analysis / Task 03: Survey
- Week 04 – Task 01: Weekly discussion / Task 02: Team roles / Task 03: Design Thinking workshop – Part II.
- Week 05 – Task 01: Weekly discussion / Task 02: Definition of your product/service / Task 03: Customer segments, Persona and Value proposition

One of several activities was to propose and create a start-up name, acronym and logo. There are examples of student teams' logos in the Figure 4.



Figure 4: Start-up logos (2021)

4 Public access to the SmartSoc project results

The SmartSoc project was supported by the European Union in the frame of Erasmus+ KA2 programme. All learning and teaching materials and project intellectual outputs are accessible and visible for public use at different places. The project consortium uses several ways to multiply the project impact and to share the project life cycle, e.g.:

- Project web – <https://www.smartsoc.uniza.sk/>
- FB account – <https://www.facebook.com/smartsocproject>
- Moodle LMS – 2020 – <https://moodle.uniza.sk/public/course/index.php?categoryid=11>
- Moodle LMS – 2021 – <https://moodle.uniza.sk/public/course/index.php?categoryid=12>
- Moodle LMS – 2022 – <https://moodle.uniza.sk/public/course/index.php?categoryid=13>
- SmartSoc YouTube channel – <https://www.youtube.com/channel/UC0SsORwOMyxxjHgVMGmgG3A>

Above mentioned links allow to access the content and structure of all blended mobilities, including videos of lectures prepared for the project workshops and final presentations of student teams.

8 Future work

Blended intensive programmes (BIP) were introduced in the frame of new Erasmus+ programme period (2022-2029). Blended mobilities support was moved

from the KA2 action directly to the KA1 actions to be part of different options for individual mobilities of students and teachers.

The SmartSoc project consortium prepared a well-developed basis for the future cooperation in or out of the current consortium. The project results could be implemented in the new BIPs. Basic conditions to prepare and organise a BIP are quite similar but there are some differences. For example, it is not possible to cover the participation costs of students and teachers in the same event any longer. Only ‘learners’ costs are eligible. But there is an option of the individual KA1 teaching mobility combination.

Other challenges should be faced and solved to be able to ‘switch’ to the new way of organising blended mobilities in the frame of the Erasmus+ programme. They are related to the effective organisation of the virtual part of the BIP. Virtual mobility was very challenging when organising online team meetings for students and teachers from different institutions. Semester duration, own courses schedule, free time activities – all of these should be considered. There is possibly one solution that may be understood like very unrealistic – the creation of a joint course for all participating institutions with predefined time slots in the course schedules. This may avoid other time planning discords for students and teachers. There are some initiatives to enable students to participate in a mobility with duration of a semester – ‘mobility window’. The support of increasing internationalisation of higher education environment stated in the latest Higher Education Act of 2022 in Slovakia (bulletin SAIA, April 2022). It is time to think about a similar concept to enable the virtual part of BIPs.

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