Broad horizons of international cooperation to ensure sustainable and innovative learning

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Abstract

This article examines the evolving student and academic staff mobility trends and the impact of a new form of international cooperation on learning outcomes. European universities are increasingly using different forms of Erasmus+ mobilities types, which is facilitating a transformational shift towards short-term, mixed, and virtual mobility for European students, accompanied by the establishment of internationalisation standards and the development of initiatives in borderless learning joint planning of educational programs with partner institutions as well as implementation of pilot projects, testing and exchange of the most successful practices. The article discloses successful practices and experiences developed and gained through international cooperation, focusing on the results of the Erasmus+ blended intensive programme (BIP) projects implemented in 2023, which aimed to develop innovative teaching methods and update existing teaching materials. By highlighting the contributions of these projects, the article highlights the critical role that Erasmus+ BIP initiatives play in shaping the future of education through cross-border collaboration and knowledge sharing.

Keywords: innovative learning; blended intensive program; students' mobility; Erasmus+ program.

1. Introduction

In the evolving Erasmus+ program, universities are experiencing a transformative shift in student mobility. This shift includes short-term experiences, blended learning, and virtual mobility to promote internationalization and break traditional learning boundaries. Emphasizing short-term mobility, the program allows students to gain experience without compromising academics, fostering cultural exchange and diverse perspectives. Mixed mobility combines

physical and virtual components, creating a flexible learning environment that transcends geographical limitations. Virtual mobility is vital, enabling students to engage in educational activities without physical presence and fostering a global community of learners. The program goes beyond geographical studies, emphasizing internalization and integrating global perspectives into curricula. Collaboration with partner institutions enhances education quality, and sharing best practices contributes to continuous improvement. The Erasmus+ program signifies adaptability, inclusiveness, and a commitment to global education, shaping a future where borders are crossed, experiences are shared, and learning knows no boundaries.

1.1. Background

Erasmus+ Blended Intensive Programmes (BIP) hold unique opportunities for bringing the best of both worlds together: virtual teaching is preceded and/or followed by a short period of physical mobility, thus allowing for meaningful encounters between participants from at least three European universities or higher education schools (European Commission, 2021).

Organising BIP is straightforward, but what about improving the learning process and student engagement? How do you promote both engagement and learning? Engagement refers to how much attention, interest, and motivation students show, how much effort and time they invest and the persistence and resilience they demonstrate towards their goals (D'Mello, 2021).

Several decades of research into the cognitive science of learning have yielded principles of effective learning, e.g. (Bransford et al., 2000; Karpicke & Blunt, 2011), which can be implemented in learning technologies, such as Intelligent Tutoring Systems (ITSs).

Engagement describes different behaviours, diverse thoughts, perceptions, and attitudes. (Reshly & Christenson, 2011). Engagement has been a complex construct about diverse aspects of the educational process (e.g. completing homework tasks, feelings of belonging, getting a good time) and across time (e.g. momentary times of interest, stable dispositions).

In the 21st Century, higher education has witnessed a proliferation of transnational education arrangements. Critical education scholars have widely challenged the traditional teacher-centred approach, calling for more active student engagement and staff-student partnerships in teaching and learning (Peters & Mathias, 2018). Active student engagement in learning activities increases student attention, motivation, comprehension, critical thinking, and knowledge application abilities.

After all, it is essential questions arise - how to design effective online and in-person activities; how to assess student performance and provide feedback; how to support student diversity and inclusion; how to foster collaboration and community among students and instructors; how to evaluate the impact and quality of the program.

Maker-inspired learning activities positively impact students' STEM-related knowledge, problem-solving abilities, and skills (Papadimitropoulos, 2023).

2. Methodology

The structure of this study consists of a brief description of the projects carried out, indicating the goals and objectives set, and an analysis of the results achieved in the short and long term.

The general structure of a BIP project (Fig. 1) shows a project preparing the first and second stages and implementing the third and fourth stages.
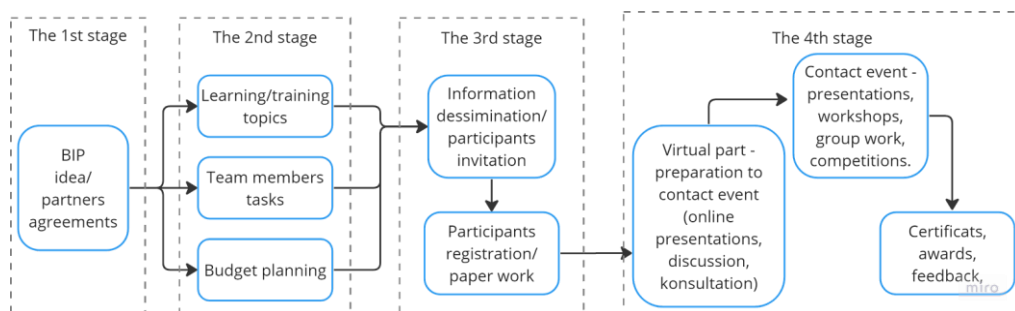
Figure 1. Stages of the BIP project preparation and implementation process. Source: Article authors.

2.1. Erasmus BIP for students - Fundamentals of Modelling and Engineering Graphics

The TTK University of Applied Sciences (TTK UAS) first ERASMUS+ BIP project (BIP001) for students was organised from 23.01 to 23.04.2023. The project aimed to improve innovative interactive learning material for modelling knowledge-getting and skills-applying (Ovtsarenko et al., 2023). Work on preparing for the projects began with an analysis of the educational material that was planned to be used within the project: the content of the educational material and compliance with the chosen topic of the project, viewing the dynamics of development and use of the content.

The MOOC Fundamentals of Modelling and Engineering Graphics (MOOC, 2023) topics included modelling using different CAD software, acquiring basic knowledge for reading technical documents, and presenting the created object. Twenty-seven students from RTU Latvia, VILNIUS TECH Lithuania, Kharkiv Technological "IT STEP" University Ukraine, and TTK UAS Estonia participated in the project (Tab. 1).

Table 1. BIP001 participants. Source: Article authors.

Organisation	Partici-pants	Major of Students'					
		Civil enginee-ring	Indust-rial technolo-gies	Compu-ter science	Manage-ment	Environmen-tal technology	Infor-mation Manage-ment
TTK UAS, Estonia	4	-	-	-	-	1	3
VILNIUS TECH, Lithuania	7	5	2	-	-	-	-
RTU, Latvia	12	12					
KhTU STEP, Ukraine	4	-	-	3	1	-	-
Total	27	17	2	3	1	1	3

As seen in the table, the project participants are students of different study programs and not all of them had experience in CAD software at the beginning of the project. To participate in the project, the most important thing was the student's desire to gain the skills, and no prior knowledge was required.

Following the Erasmus+ regulations, different events were planned - presentations, consultations, and teamwork remotely and in person. During remote activities, interactive learning materials of MOOC Fundamentals of Modelling and Engineering Graphics, the intellectual result of the Erasmus project Virtual technology for use in STEM (VirSTEM, 2023) were used, and four online consultations were held for students during four months.

The pace of distance learning for one month was optimal for students' independent work with MOOC learning materials, exercises, and tests. The learning process was not only studying e-course content but repeating for better mastery if it was needed. The students shared their feedback as reports on the TTK UAS Moodle (Fig. 2).
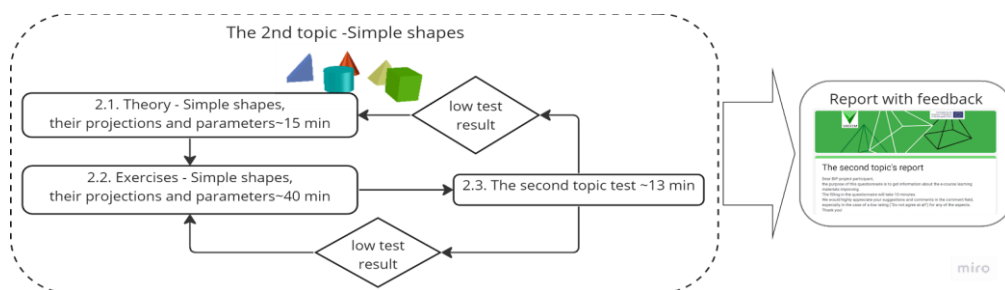

Figure 2. The students' independent work structure. Source: Article authors

The tutors prepared exciting materials and tasks on modelling with practical exercises using four different CAD software: SketchUp, FormIt, Revit, and ArchiCAD to ensure the development of necessary skills and competencies for modelling.

Throughout the event, the participants were divided into groups of 3 students from different countries to complete a practical task related to modelling a modern and comfortable living room for students. Collaboration was organised as a competition, positively impacting interest in the work's overall result and the student's involvement in the modelling process. Each team member was engaged in modelling a specific object. The last part of the competition task was a demonstration of a finished furnished room and a performance by each group member. Of course, the level of acquired knowledge of the students was different. Still, the experience gained in modelling and working in an international team positively affected the motivation for further education and the cooperation of future young specialists from different countries.

Fig. 3 shows the e-course learning material quality rating based on the students' feedback on a 5-point scale.

Rating of the e-course learning material quality on a 5-point scale (1-very low, 5-very high)
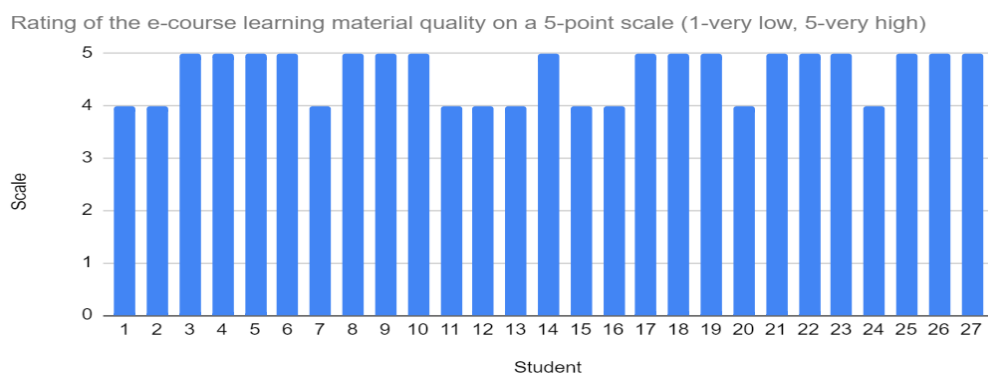
Figure 3. Students' feedback. Source: Article authors.

The participants of the BIP001 project feedback were very positive - an answer to the question "Please rate the e-course quality on a five-point scale (1 is very low, 5 is very high)" was 4 (10 students' assessment) and 5 points (17 students' assessment).

2.2. Erasmus BIP for teachers - Interactive Training – Who, What and How

TTK's first ERASMUS+ project, BIP for teachers (BIP002), was carried out on 1.11-8.12.2023. This project aimed to train academic staff to create interactive tools for students to work and test their knowledge independently and share training experiences for international collaboration. To perform planned activities related to developing interactive teaching materials, the project participants were offered sustainability topics like Eco-friendly, Zero-

Waste, Environmental Sustainability, and Green Building. Twenty-four teachers from 10 higher educational institutions in Italy, Latvia, Lithuania, Germany, Austria, Croatia, and Ukraine participated in the project. Most participants were teachers of STEM subjects - 16 educators out of 26, or 61.5% of all participants.

The first event was held remotely (11/22/2023) to clarify project activity details and in person (12/4-8/2023). During distance learning, participants became familiar with teamwork in the MIRO interactive environment and interactive tools on the e-course page on the TTK Moodle platform. International teams have worked on interactive test creation and developed skills for interactive tools focused on changing students' education goals, which are very effective because they allow students to use their initiative and creativity in independent work. Therefore, to create an interactive learning tool, the teacher needs to think through the topic and structure of the task and master the technology for creating educational material. Moreover, it can be part of the theoretical material in a game form, an exercise with tips, or questions to control the student's knowledge.

Throughout the BIP002 event, the participants were divided into teams of 3 from different countries to complete a hands-on assignment to create interactive learning materials and share their experiences and knowledge gained from the lectures. In addition, teamwork with colleagues from other organisations became an opportunity to exchange teaching experience and use interactive tools in their work with students. During the event, participants received valuable experience in creating interactive tools to engage students in learning, and their feedback demonstrated a high assessment of various interactive tools and how to use them to learn and achieve better results precious (Fig. 4).

7. How would You rate the BIP project ...

Answer options	Average
usefulness	90
effectiveness	92
the project team work	89
lessons	90
workshops	90
experience sharing by colleagues	89

Figure 4. The BIP002 project participants' feedback.. Source: Article authors.

Generally, the BIP002 project assessment is high following the participants' feedback - 89 to 92 points from 100. Moreover, the participants stressed that successful training during project activities ensures the development of knowledge related to modern, effective technological solutions for education.

3. Discussion and Future Work

The biggest challenge for teachers during the organisation of the first BIP project at TTK UAS was recruiting project participants. During the project's preparation period and the beginning of registration of participants from June to November 2023, information about the project was sent to 98 recipients, presentations were made, and flyers were distributed at the SEFI 2023 and ISL 2023 conferences. As a result, out of 34 potential registered participants, 23 teacher partner organisations completed documents for participation in the project, excluding participants from Estonia.

Based on the project results, new activities could be related to the project on how to improve teaching when students have disabilities or disorders like ADHD. This topic is highly relevant when teaching materials are prepared for students with disabilities and disorders. So future activities will answer questions like to what extent educational material should be prepared for students with special needs; is teaching material with preliminary adapted content suitable, or shall it be adopted during the education process? However, according to the article's authors, considering the possibility of using it when teaching students with special needs when preparing educational material would still be more far-sighted.

4. Conclusions

According to the European Commission program, Blended Intensive Programs (BIP) aim to open more opportunities for students and teachers to participate in Blended Mobility activities. Conducted BIP projects have confirmed the assumption that they can be part of university curricula, complement them or expand an existing program with additional functions in a blended learning mode. Considering the BIP projects' results aimed at students and teachers, the organizers and participants evaluate these events as highly relevant and necessary for developing their skills and competencies in digital, professional and international cooperation. Moreover, BIP projects create opportunities to gain knowledge and competencies in areas not directly related to the participants' specialities, which produces the chance to develop horizontal competencies. On the other hand, to gain a broader and more visible impact of the benefits of the BIP project, universities should encourage student and faculty participation in BIP projects and develop a system of incentives and benefits that will ensure more significant development of BIP projects.

This study demonstrates the positive impact of student participation on various aspects of the learning process, including attention, motivation, comprehension, critical thinking, and knowledge application abilities.

Teachers play a central role in creating an environment encouraging active student participation. Using various teaching methods, incorporating technology, and encouraging collaborative

learning are effective strategies for attracting student interest and maintaining active involvement. The relationship between active student engagement and positive learning outcomes is undeniable. By promoting a culture of active participation, teachers enable students to develop a deep understanding of the subject matter, improve critical thinking skills, apply their knowledge effectively throughout their lives, and be ready for the challenges of the 21st century.

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