

SUPPORTING TRANSFORMATIVE LEARNING FOR SUSTAINABILITY THROUGH BLENDED INTENSIVE PROGRAMME

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Abstract

Blended Intensive Programmes (BIPs) are a recent innovation in European higher education, combining online learning with a short period of physical mobility. Previous research indicates that well-designed short-term intensive formats can support high levels of engagement, interactivity, and constructive learning. This study examines a BIP course titled *STEAMing Food Against Wicked Environmental Problems*, organised at Tallinn University, Estonia, for international teacher education students. The course explored how STEAM pedagogy can be integrated with Home Economics, particularly food education, through practical, real-life activities addressing environmental challenges in various learning environments. Integrating Home Economics with STEAM pedagogy requires diverse learning environments and collaboration, aligning with principles of transformative learning. Transformative learning (TL) involves questioning and reshaping existing assumptions to broaden frames of reference and address complex societal and environmental challenges. This paper examines whether participants' (n = 13) experiences indicate that the BIP functioned as a TL environment. This study combined questionnaire data and documented group reflections to examine students' learning experiences in a BIP. The results show that participants reported learning across pedagogical, sustainability-related, practical, collaborative, intercultural, and professional domains, with particular emphasis on integrating STEAM and Home Economics and applying sustainability-related learning in everyday and teaching practices. The findings indicate that the BIP format supported key elements of TL, including reflection and perspective broadening. Despite challenges related to language and course intensity, the results suggest that short-term BIPs can foster meaningful learning in teacher education.

Keywords: *Blended intensive programmes, transformative learning, sustainability education, home economics, STEAM.*

1. Introduction

Blended Intensive Programmes (BIPs) are a recent innovation in European higher education, introduced within the Erasmus+ framework (2021–2027). They are short, intensive courses that combine online learning with a brief period of physical mobility and rely on innovative teaching and learning approaches (Gaebel et al., 2025). By integrating short-term physical mobility with collaborative virtual learning, BIPs aim to offer interdisciplinary and international learning experiences (Lavanga, 2024). Research (Chiang, 2020; Lavanga, 2024) on intensive and short-term international learning formats suggests that even brief mobility experiences can support high levels of student engagement, interactivity, and constructive learning. Studies (Walters, Charles, & Bingham, 2016) provide evidence of positive outcomes in student learning, personal and professional development, and students' understanding of themselves as global citizens, particularly in professionally oriented degree programmes. More broadly, international mobility in higher education has been associated with personal growth, the development of intercultural competencies, and increased tolerance and acceptance of diverse values and cultures. By students, these are widely perceived as a valuable and enriching learning experience (Nada & Legutko, 2022). Although empirical research on BIPs is still limited, available studies indicate that these programmes can have a positive impact on students by supporting the development of social and intercultural skills and fostering collaboration and teamwork in multicultural learning environments (Lavanga, 2024), thereby creating opportunities to address sustainability-related learning through transformative learning processes.

Transformative Learning (TL) provides a relevant framework for understanding learning in short-term international exchange contexts such as BIPs. Introduced by Mezirow (1991), TL emphasises reflection, active learning, and engagement with unfamiliar situations as conditions for revising existing perspectives. Later work describes TL as a process of questioning deeply held assumptions and broadening frames of reference in relation to societal and environmental challenges (Singer-Brodowski, 2025). TL is both an individual and social process, unfolding through dialogue and shared experiences rather than as a linear event (Hoggan, 2016; Singer-Brodowski, 2025). Research on international mobility indicates that short-term exchange programmes can support transformative outcomes comparable to longer formats (Strange & Gibson, 2017), with exchange experiences contributing to personal growth and the development of new reference frameworks and the adoption of an international mindset, which may later influence personal decisions and future aspirations (Nada & Legutko, 2022).

Changes in sustainability-related understanding and teaching practices are closely connected to experiential learning and reflective engagement, as perspective change is unlikely to result from theoretical instruction alone (Mezirow, 1991; Wals, 2014). In response, we designed the BIP course *STEAMing food against wicked environmental problems* for international teacher education students. The course introduced STEAM pedagogy and examined how Home Economics, particularly food education, can complement STEAM through practical, real-life activities. Also recognizing that integrating Home Economics with STEAM pedagogy necessitates diverse learning environments and collaboration (Paas et al., 2025). The programme combined online pre- and post-activities with a five-day on-site experience in Tallinn, engaging participants in hands-on learning, reflection from both learner and teacher perspectives, and the collaborative development of learning tasks with expert support.

Mezirow (1997) pointed out that, for TL to occur, students should be given opportunities to reflect on the assumptions they hold about learning materials and learning in general. Learning is deeply contextual (Collins & Greeno, 2011); thus, learning in diverse, authentic settings offers ample opportunities for new perspectives and meaningful reflection. On one hand, learning during field trips enhances knowledge, learning skills, and learning motivation (Dewitt & Storksdieck, 2008), equips students with their communities' learning resources, and supports life-long learning (Uppin & Timoštšuk, 2024). On the other hand, field trips are beneficial for teachers too: they support professional development and enable teachers to network with other educators (Uppin et al., 2023). This is why environmental challenges were also addressed through workshops and learning tasks situated in out-of-classroom learning environments throughout this BIP. Different learning spaces inside the university campus, such as the chemistry lab and the Science Kitchen, were visited, and equipment traditionally used in physics courses was used to encourage integration between Home Economics and STEAM subjects. Field trips to a forest, a shop, and a marketplace were organised, aiming to introduce local food culture and foraging. We believed that the diverse learning situations and environments experienced during the course would contribute to TL and encourage more sustainable actions, both at the individual level and in teachers' professional practice.

In this article, we present the findings for two research questions: (1) What aspects of learning do students report gaining through participation in the BIP course? and (2) Does transformative learning occur during a developed BIP program?

2. Method

This study draws on data collected from exchange students participating in a 2025 BIP course at Tallinn University, Estonia. The participants comprised thirteen Master's-level teacher education students with a background in Home Economics, representing four European universities.

Data collection employed a mixed-methods approach, combining qualitative and descriptive quantitative elements. Feedback was gathered using two primary methods. First, an oral group discussions were conducted, one at the end of the exchange week (F1) and another during the final online meeting (F2). Key reflections were documented by the first author in a structured memo, while another lecturer discussed with participants.

Second, written feedback was collected through an online questionnaire administered two weeks after the exchange as part of participants' self-evaluation (Q). The questionnaire included both Likert-scale statements and open-ended reflection questions. The five-point Likert scale ranged from 5 (strongly agree) to 1 (strongly disagree). Given the small number of participants, Likert-scale data were used descriptively to illustrate general tendencies in participants' responses rather than for statistical inference. All responses are reported at an aggregate level, with no data linked to individual participants.

Qualitative data from the open-ended questionnaire responses and researcher memos were analysed using thematic analysis, following the approach outlined by Braun and Clarke (2021). This process involved identifying recurring themes and patterns across the combined datasets (Q, F1, F2), allowing for a comprehensive examination of participants' reported learning experiences and reflections.

3. Results

The results are combining the three data sets in responding to the research questions. Together, these sources provide insight into the learning aspects reported by students and into experiences that align with elements commonly associated with TL.

Students reported multiple and interconnected learning outcomes related to pedagogy, sustainability, collaboration, intercultural exchange, and professional development. A central learning aspect reported by students was gaining an understanding of how STEAM pedagogy can be integrated into Home Economics. Participants described learning new ways to connect Home Economics topics with scientific and interdisciplinary perspectives, often highlighting this integration as broadening their view of the subject. For example, students stated “I learned different ways to implement STEAM in a lesson” (Q) and “What I have learned above all is how clearly there is a connection between Home Economics and STEAM” (Q). Others emphasised the flexibility and scope of this integration, noting that “There are various ways you can include STEAM into Home Economics teaching - sky is the limit” (Q). Similar reflections were evident after the exchange period, where students described learning “how to integrate STEAM and Home Economics, ... , how to relate them (Home Economics topics) with other subjects” (F2).

Also, quantitative statements in the questionnaire reflect the same tendency. Five of the respondents strongly agreed, five agreed, and three rather agreed that this BIP extended their understanding of Home Economics education (the average 4,1). When reflecting on their knowledge about STEAM aspects, the average was 4,5, meaning that nine students strongly agreed and three agreed that the course extended their understanding. One respondent disagreed with latter statement. Overwhelmingly, eleven participants strongly agreed that the course had given them new ideas for integrating STEAM and Home Economics (average 4,8). Whereas the rest of the two students either agreed or strongly agreed with this statement.

Sustainability emerged as a prominent and recurring learning aspect, particularly in relation to food waste. Students reported increased awareness of sustainability issues and described learning practical ways to reduce and reuse food waste. Questionnaire responses highlighted both conceptual understanding and practical relevance, for example, “I learned a lot about how important it is to use food waste” (Q) and “The importance of how to decrease food waste” (Q). Several responses linked sustainability learning to everyday practices, such as “The way we emphasized sustainability in different areas inspired me to have it in the back of my mind when doing things like cooking, shopping, planning” (Q). In later reflections, students described concrete applications of this learning, including “I started cooking from things that have been in my cupboard for some time” (F2) and “Worked as a substitute (Home Economics) teacher in school. Topic was food waste... I managed to use the knowledge I gained from Tallinn” (F2). These examples illustrate how sustainability-related learning extended beyond the course context into daily life and professional practice. The statement evaluation shows a similar tendency. All students agree that the BIP course extended their understanding of sustainability in the Home Economics context (the average 4,2).

Another frequently reported learning aspect is related to practical, hands-on, and inquiry-based approaches. Students emphasised learning how knowledge can be connected to physical activities and practical tasks, describing this as supporting deeper learning. One participant noted learning “how ... (to) add the knowledge into physical doing and make the learning more deep” (Q), while another highlighted gaining “practical skills and ideas for hands-on learning activities that I can adapt for future teaching” (Q). Inquiry-based learning was also explicitly mentioned, for instance, “New teaching tools and how to work with the students, for example, inquiry-based learning” (Q). In the final reflections, students referred to specific content areas experienced through hands-on learning, such as “pH topic was new to me” or generally “STEAM approach - really getting into the science” (F2).

Collaborative learning and group work formed another key pattern across the data. Students described learning through collaboration during the design and development of learning activities and highlighted teamwork as an important professional skill. Questionnaire responses included statements such as “how we have to work together to make a lesson in work life” (Q) and “I learned the value of collaborative planning and how group work can improve creativity and problem-solving when designing educational activities” (Q). The importance of collaboration was further reinforced in reflections from the physical exchange, where students expressed appreciation for group-based work, for example, “Really liked the development of learning activities in the group” (F1).

Intercultural and international learning was consistently reported across all datasets. Students described learning about other cultures, education systems, and approaches to Home Economics in different countries. These experiences were often characterised as enriching and perspective-broadening. Questionnaire responses included “I learned several ways to include STEAM in Home Economics and why it matters. I also got a better understanding of how different cultures can shape and highlight various aspects of the subject” (Q). During the physical exchange, students reflected “What I learned: Home Economics in

different countries” and “I learned a lot of new things, not just about STEAM, but generally, about other cultures and people” (F1). In the final reflections, this theme continued, with students stating, “It is so enriching to meet people from other cultures, to learn how some things are so similar and some are different” (F2).

Students also reported learning related to professional and personal development. These reflections included reconsideration of teaching practices, creativity in lesson design, interdisciplinary collaboration, and the broader role of Home Economics education. Some students noted “You can be very creative with teaching, but it needs time and planning” (Q), while others emphasised professional meaning-making, such as “Through STEAM we have the opportunity to show the value of the Home Economics subject” (F2). Reflections also extended to teaching beyond traditional school contexts, as expressed in “You are not a school teacher only, think also of grown-ups. Life-long learning. Facilitating their learning also” (F2).

In relation to experiences aligned with TL, students reported perspective broadening, reflection on personal practices, and reconsideration of professional roles. These reflections appeared across datasets and often connected pedagogical, sustainability-related, and intercultural learning. Students described broadened views on the subject, for example, “It was great to meet other people and go into a completely newly designed project as it broadened my views about Home Economics” (Q) and “how different are the cultures and what is the future of Home Economics” (F2). Reflection on everyday behaviour was particularly visible in sustainability-related practices, such as food use and consumption. For example, “I started cooking from things that have been in my cupboard for some time” (F2) and “I brought a first thing from the thrift store, and I hope I will continue this.” (F2)

At the same time, the data also revealed challenges that shaped the learning experience. Reflections recorded during the physical exchange highlighted language-related difficulties, intensive scheduling, and cognitive load, for example, “Understanding the instructions in English is hard” and “More breaks during the day - smaller, to rest from the foreign language. It is tiring” (F1). Students also noted challenges related to preparation and timing, such as “The thinking process of designing the activity could already start earlier” (F1).

4. Discussion and conclusion

The results show that students reported learning across pedagogical, sustainability-related, practical, collaborative, intercultural, and professional domains. In addition, their reflections indicate experiences aligned with key elements of TL, including perspective broadening, reflection on personal and professional practices, and learning through social interaction, occurring during and extending beyond the BIP course experience.

The findings suggest that the developed BIP programme *STEAMing food against wicked environmental problems* created learning conditions aligned with key elements of TL, such as reflection, engagement with unfamiliar contexts, and perspective broadening (Mezirow, 1991). Students’ reflections on sustainability, teaching practices, and everyday behaviours resonate with previous research showing that short-term international programmes can support meaningful learning and personal development, even without extended mobility periods (Strange & Gibson, 2017). The importance of intercultural interaction and collaborative learning observed in this study reflects findings on the value of international mobility for developing intercultural competences (Nada & Legutko, 2022) and corresponds with descriptions of TL as a socially embedded process unfolding through dialogue and shared experiences (Singer-Brodowski, 2025).

At the same time, reported challenges—including language demands, intensive scheduling, limited preparation time, and cognitive fatigue—may have constrained deeper and more sustained reflection, supporting the view that TL develops through ongoing, non-linear processes rather than as a single event (Hoggan, 2016). Despite these challenges, the results indicate that BIPs can provide conditions that support TL processes within short-term, blended international learning formats.

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