

# BLENDING INTENSIVE PROGRAMME FOR ENHANCING KNOWLEDGE AND SKILLS TOWARDS THE USE OF ARTIFICIAL INTELLIGENCE BY PHYSIOTHERAPY STUDENTS

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## Abstract

**Introduction:** Blended Intensive Programs (BIP) combine short-term mobility with online collaboration in higher education. These programs enable students from Higher Education Institutions (HEI) to engage in interdisciplinary learning. This study explores the self-reported impact of a BIP focused on Artificial Intelligence (AI) and its applications in self-productivity, education, research, and clinical practice. The programme aimed to provide students with opportunities to experience how AI can improve workflow efficiency and communication, support learning, facilitate research, and contribute to clinical practice.

**Methodology:** A consortium of nine institutions across seven countries organised a BIP from January 27 to February 21, 2025. The programme involved 15 teachers and 30 students, including two online sessions and an in-person week. The programme covered the concept, history, and trends of AI, along with its applications in learning, research, and clinical practice. Topics include AI as a personal coach, learning assistant, creative partner, research aid, and clinical companion. The programme also addressed opportunities, challenges, and ethical considerations in physiotherapy education and practice. Student feedback on their experiences and learning outcomes was collected through an online questionnaire with a Likert scale and open-ended questions.

**Results:** Out of 30 participants, 28 responded to the survey. The majority reported an increased understanding of AI and its ethical considerations. Many found the programme beneficial in developing their knowledge and skills in applying AI to personal productivity, learning, research, and clinical practice. Topics such as AI as a personal coach, learning assistant, creative partner, research aid, and clinical companion were positively received. Regarding programme structure and support, most respondents felt well-informed about its organisation and content. Access to relevant documents was generally well-rated, and teacher support during lectures, workshops, and student presentations was viewed positively. In terms of overall quality, 23 participants rated the programme as Very Good, and 4 as Good. Additionally, 24 respondents Strongly Agreed that they would recommend the programme to other students, 3 Agreed.

**Conclusions:** The survey data suggests that the BIP may have contributed to students' overall understanding of Artificial Intelligence and its applications in learning, research, and clinical practice. The programme structure, combining online sessions with in-person activities, received generally positive feedback. Participants highlighted the relevance of AI in various contexts, particularly in productivity, education, and professional development. The findings indicate the potential benefits of incorporating BIPs into healthcare education to foster interdisciplinary collaboration and innovation in AI. However, the study's limitations, including the small sample size and reliance on self-reported data, should be considered when interpreting the results. Future research could explore the long-term impact of such programmes on students' professional paths and contributions to AI-driven initiatives. Studies with larger sample sizes and objective learning outcome assessments could provide a more comprehensive evaluation of BIPs in education and inform their further development.

Keywords: Blended Intensive Programs, Artificial Intelligence, Internationalisation.

## 1 INTRODUCTION

The rapid integration of Artificial Intelligence (AI) in the health sector is transforming how physiotherapists learn, make decisions, and provide care. Recent studies anticipate that AI-enabled tools—such as adaptive learning platforms, large language models, predictive analytics, and virtual coaching—will soon be incorporated at every stage of the physiotherapy workflow. This includes tasks like taking patient histories, clinical reasoning, outcome monitoring, and redesigning services. To take advantage of these opportunities responsibly, graduates from higher education institutions (HEIs) need to have a solid understanding of AI concepts, an awareness of related ethical and regulatory discussions, and practical experience in working with intelligent systems [1],[2].

Blended Intensive Program (BIPs) were introduced in the 2021–2027 Erasmus+ framework specifically to develop such advanced competencies. BIPs combine a mandatory virtual phase, which promotes sustained collaborative online learning, with a brief period of physical mobility. This approach increases access for students who cannot commit to long-term exchanges and encourages pedagogical innovation across national borders. Each BIP is designed by at least three HEIs from different countries and is expected to offer a challenge-based, interdisciplinary curriculum. Early evaluations indicate the model's potential to enhance digital skills, intercultural understanding, and academic networks, however, empirical evidence regarding its effectiveness in the health professions, especially in physiotherapy, remains limited [3],[4],[5].

In this context, nine European HEIs collaborated to deliver the “Blended Intensive Program for Enhancing Knowledge and Skills towards the Use of Artificial Intelligence by Physiotherapy Students” from January 27 to February 21, 2025. Thirty undergraduate physiotherapy students and fifteen faculty members participated in two preparatory online sessions followed by an intensive face-to-face week. During this week, learners explored AI's role as a personal productivity coach, learning assistant, creative partner, research aid, and clinical companion. The consortium aimed not only to showcase state-of-the-art applications but also to create a safe space where students could evaluate algorithmic decision-making critically, discuss professional accountability, and prototype AI-enhanced workflows relevant to contemporary physiotherapy practice.

This study examines participants' self-reported perceptions of knowledge gained, skills acquired, and changes in attitudes resulting from this AI-focused BIP. By analysing our findings within the frameworks of digital transformation and internationalization, we aim to: (i) highlight the educational benefits of short-term, blended mobility for future physiotherapists; (ii) identify design principles that optimize learning about rapidly evolving technologies; and (iii) provide evidence to guide policy decisions regarding the broader implementation of BIPs in healthcare curricula. In doing so, we respond to recent calls from professional bodies and researchers for rigorous, context-specific evaluations of AI capacity-building initiatives in allied health sciences.

## 2 METHODOLOGY

The BIP was implemented at the beginning of 2025, running from January 27 to February 21, and involved nine European institutions. The programme aimed to enhance participants' understanding of Artificial Intelligence (AI) capabilities and relevance in education, research, and clinical practice within healthcare professions. It provided a comprehensive overview of AI technologies, their potential applications in educational and clinical settings, and facilitated discussions on strategies for optimizing learning experiences, research outcomes, and clinical interactions.

The BIP was structured to run over a month and involved 15 teachers and 30 physiotherapy students. It was divided into two distinct phases: online sessions and an in-person week. The programme's design enabled both virtual and in-person engagement, creating a platform for exploring various generative AI technologies and promoting collaboration among participants. The first phase of the programme consisted of two online sessions facilitated by one of the partner institutions. These initial sessions introduced participants to the concept, history, and trends of artificial intelligence, along with its applications in learning, research, and clinical practice. This phase aimed to provide a foundational understanding of AI in these contexts. The second phase of the programme was conducted in person over one week. Each day was dedicated to a different topic, including AI as a personal coach, learning assistant, creative partner, research aid, and clinical companion. The programme also addressed the opportunities, challenges, and ethical considerations of integrating AI into physiotherapy education and practice. During this week, students were organized into multinational groups and tasked with developing a proposal to tackle specific practical challenges related to AI, education, and health, using the Double Diamond Model (Discover, Define, Develop, Deliver) [6]. This phase emphasized collaboration and problem-solving, allowing students to apply theoretical knowledge to practical implementations of generative AI. The week concluded with group presentations, in which participants proposed innovative and future applications of AI. The final presentations lasted 10–15 minutes and began with a description of the chosen challenge, followed by a brief explanation of the project's objectives, supported by relevant evidence and ethical considerations. Students described their idea generation process, introduced their selected AI-based solution, and showcased a prototype or concept demonstration. They explained how the solution benefits users, discussed potential real-world applications, and outlined future improvements. Additionally, they shared key learnings from the process and provided final reflections on the project.

After completing the programme, each student submitted an individual reflection on their experience exploring and proposing the use of generative AI in physiotherapy. This task encouraged personal reflection on the integration of this technology into practice. Students considered their thought process in selecting their topics, the insights they gained, their approach to developing innovative solutions, and how a multidisciplinary perspective enhanced their proposals. They also reflected on how this experience would influence their future professional practice.

The methodology adopted for the BIP provided a structured learning experience that enhanced participants' understanding of digital health technologies and their applications in healthcare. By combining online sessions, in-person collaboration, and reflective practice, the programme facilitated the application of multidisciplinary approaches to real-world challenges in AI integration. To gather both quantitative and qualitative data regarding students' experiences, an online questionnaire was distributed to all participants. The quantitative component included Likert-scale questions to assess perceptions of the programme's content, structure, support, and collaborative elements. The qualitative component featured open-ended questions, allowing participants to provide detailed feedback on their learning outcomes and overall experiences.

### **3 RESULTS**

We received 28 survey responses out of a total of 30 student participants, resulting in a response rate of approximately 93.33%. Concerning the student feedback about the Blended Intensive Programme's content and activities (Figure 1), across the learning outcome statements, between 96% and 100% of the 28 respondents selected either "Agree" or "Strongly Agree," with the latter category accounting for just over half of all responses for each item. The highest mean score, 4.82 on a five-point Likert scale, was reported for understanding artificial intelligence and its ethical implications. Items related to personal learning, research, and clinical practice followed closely, with mean scores of approximately 4.7. Statements concerning cultural awareness, lecture quality, and practical activities produced slightly lower mean scores, around 4.5, and included the only neutral or disagree responses observed. No respondents chose "Strongly Disagree" for any statement. Overall, the data indicate consistently positive self-assessments across all reported learning outcomes, with relatively little variation among the items.

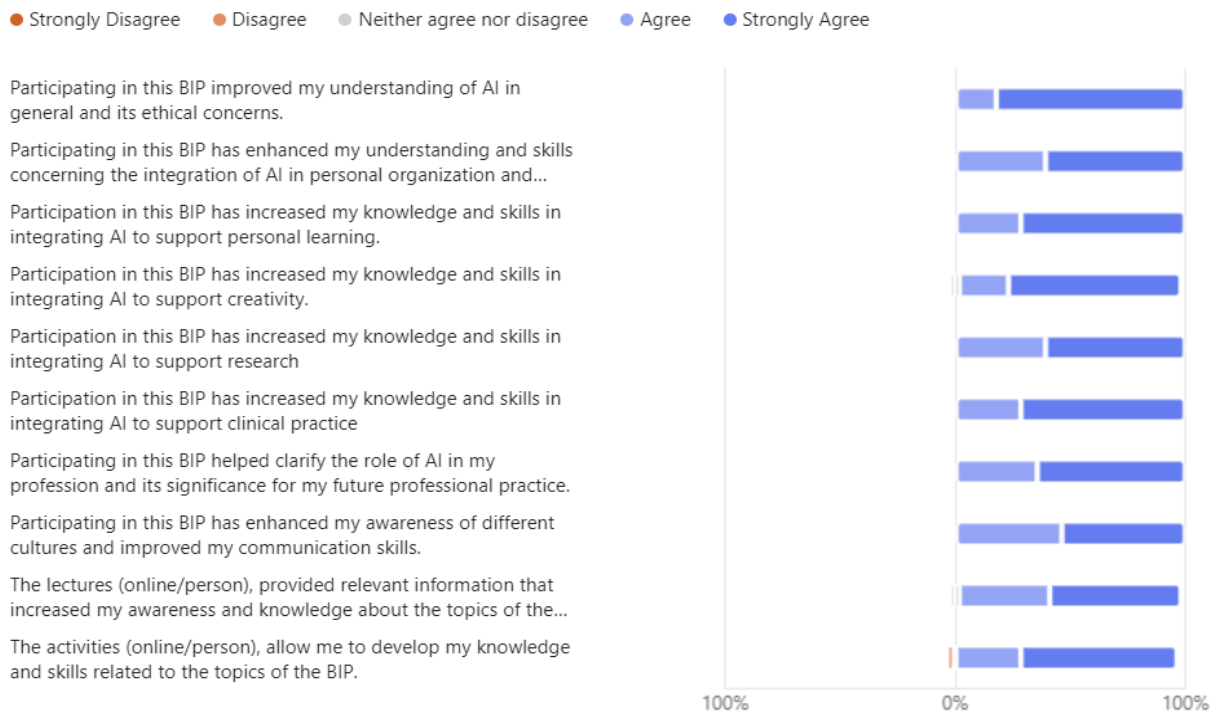


Figure 1. Student feedback about the Blended Intensive Programme's content and activities

Regarding the student feedback about the BIP support and collaboration (Figure 2), responses show consistently positive perceptions of the programme's preparation and support. All four statements received a very high level of agreement, with three reaching unanimous positive endorsement (100% "Agree" or "Strongly Agree"). The remaining statement—regarding access to documents in the online drive—had 93% agreement, along with two neutral responses. Mean scores varied from 4.57 to 4.79 on a five-point scale, with the highest score related to the perceived support provided by lecturers during synchronous sessions. No respondents selected "Disagree" or "Strongly Disagree" for any aspect, indicating that students found the preparation and facilitation broadly satisfactory. There is only minor room for improvement regarding the accessibility of programme materials.

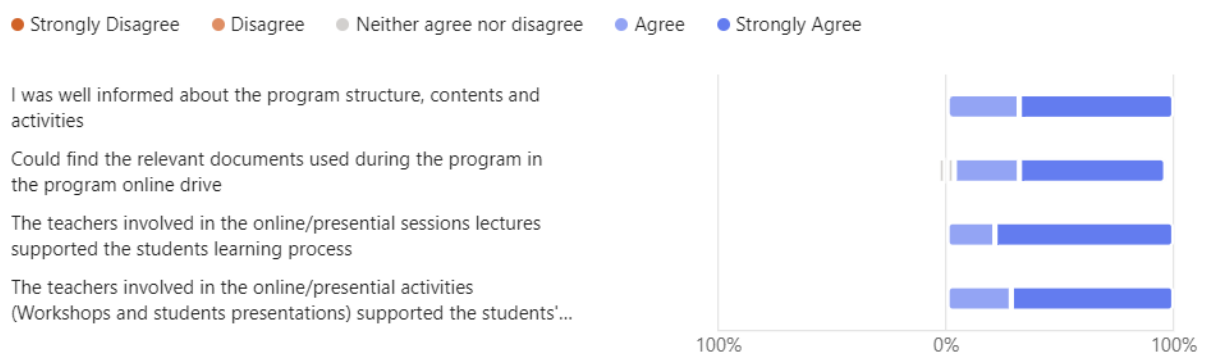


Figure 2. Student feedback about the Blended Intensive Programme's support and collaboration

Most students provided positive feedback regarding the quality of the BIP (Figure 3). Specifically, 82% of respondents rated it as "Very Good," and an additional 14% selected "Good." Only one participant (4%) rated the programme as "Very Poor," while no individuals chose the "Fair" or "Poor" categories. The average rating was 4.71 on a five-point scale, with the median also being "Very Good." These results indicate generally favourable perceptions of the programme, with only one outlier expressing significant dissatisfaction.



Figure 3. Student feedback about the quality of this Blended Intensive Programme in general

Finally, most respondents showed a strong willingness to recommend the BIP (Figure 4). Specifically, 86% selected “Strongly Agree,” while an additional 11% chose “Agree.” Only one student (4%) indicated “Strongly Disagree,” and no neutral or intermediate negative responses were recorded. The average rating was 4.75 on a five-point scale, with a median response of “Strongly Agree.” This indicates a generally positive view of the programme, with nearly unanimous recommendations, aside from a single opposing opinion.



Figure 4. Student recommendation of the Blended Intensive Programme

## 4 CONCLUSIONS

This evaluation of a multinational Blended Intensive Program focused on Artificial Intelligence (AI) for physiotherapy students demonstrates that the initiative successfully enhanced participants' self-reported knowledge and confidence in applying AI across learning, research, and clinical practice. With a response rate of 93.3% (28 out of 30 students), the findings indicate uniformly high levels of agreement (96–100%) with all learning outcome statements. Perceptions of programme organization and support were also favourable, with three out of four support-related statements receiving unanimous endorsement and none eliciting disagreement. The only area identified for improvement was access to online materials ( $M = 4.57$ ). Overall quality ratings were predominantly “Very Good” (82%), with an additional 14% rating it as “Good.” Willingness to recommend the BIP was almost universal (97% agreement), highlighting its perceived value and transferability to peer cohorts. These outcomes support the potential of short, blended mobility schemes to accelerate interdisciplinary competence in emerging technologies within healthcare education. By combining synchronous online teaching with an intensive face-to-face week, the BIP created a collaborative, international learning environment that fostered both technical understanding and professional development.

However, interpretations should remain cautious due to the modest sample size, the single cohort involved, and reliance on self-reported data, all of which are susceptible to response and social desirability biases. The absence of objective measures of competence or longer-term follow-up limits inferences about sustained behavioural change or impacts on subsequent clinical or research activities. Future research should aim for replication with larger, multi-institutional cohorts and include control or comparison groups, while also incorporating objective assessments of AI competence and application. Longitudinal tracking of graduates could determine whether early exposure to AI leads to measurable contributions in AI-driven physiotherapy practice, research outputs, or innovation. By addressing these areas, future studies can create a more nuanced and generalizable evidence base to guide the

integration of AI-focused BIPs into healthcare curricula and maximize their potential for fostering interdisciplinary collaboration and innovation.

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## REFERENCES

- [1] G. Nambi, M. Alghadier, S. H. P. Mohamed, O. R. Aldhafian, N. A. Alshahrani and A.-J. Albarakati, "Clinical usefulness of artificial intelligence in physiotherapy – a practice-based review," *SBV Journal of Basic, Clinical and Applied Health Science*, vol. 7, no. 4, pp. 184–188, Dec. 2024.
- [2] M. Alsobhi, F. Khan, M. F. Chevidikunnan, R. Basuodan, L. Shawli and Z. Neamatallah, "Physical therapists' knowledge and attitudes regarding artificial intelligence applications in health care and rehabilitation: cross-sectional study," *Journal of Medical Internet Research*, vol. 24, no. 10, art. e39565, 2022.
- [3] European Commission, *Erasmus+ Programme Guide 2024*, Nov. 2023. [Online]. Available: <https://erasmus-plus.ec.europa.eu/>. (Accessed: 4 May 2025).
- [4] European Commission, "Blended Intensive Programmes in KA131 higher education projects," 2024. [Online]. Available: <https://wikis.ec.europa.eu/>. (Accessed: 4 May 2025).
- [5] OeAD – Austria's Agency for Education and Internationalisation, *Erasmus+ Blended Intensive Programmes Toolkit*, 2024. [Online]. Available: <https://erasmusplus.oead.at/>. (Accessed: 4 May 2025).
- [6] M. Kochanowska and W. R. Gagliardi, with reference to J. Ball, "The Double Diamond Model: In Pursuit of Simplicity and Flexibility," in *Perspectives on Design II*, D. Raposo, J. Neves, and J. Silva, Eds., Springer Series in Design and Innovation, vol. 16. Cham: Springer, 2022. [Online]. Available: [https://doi.org/10.1007/978-3-030-79879-6\\_2](https://doi.org/10.1007/978-3-030-79879-6_2)