Article

A Learning Design Framework for International Blended and Virtual Activities in Higher Education

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Abstract

Blended and virtual learning have become an integral part in international higher education, especially in the wake of the COVID-19 pandemic and the European Union's Digital Education Action Plan. These modalities have enabled more inclusive, flexible, and sustainable forms of international collaboration, such as Collaborative Online International Learning (COIL) and Blended Intensive Programs (BIPs), reshaping the landscape of global academic mobility. This paper introduces the INVITE Learning Design Framework (LDF), developed to support higher education instructors in designing high-quality, internationalized blended and virtual learning experiences. The framework addresses the growing need for structured, theory-informed approaches to course design that foster student engagement, intercultural competence, and motivation in non-face-to-face settings. The INVITE LDF was developed through a rigorous scoping review of existing models and frameworks, complemented by needs-identification analysis and desk research. It integrates Self-Determination Theory, Active Learning principles, and the ADDIE instructional design model to provide a comprehensive, adaptable structure for course development. The framework was successfully implemented in a large-scale online training module for over 1000 educators across Europe. Results indicate that the INVITE LDF enhances educators' ability to create engaging, inclusive, and pedagogically sound international learning environments. Its application supports institutional goals of internationalization by making global learning experiences more accessible and scalable. The findings suggest that the INVITE LDF can serve as a valuable tool for higher education institutions worldwide, offering a replicable model for fostering intercultural collaboration and innovation in digital education. This contributes to the broader transformation of international higher education, promoting equity, sustainability, and global citizenship through digital pedagogies.

Keywords: education; blended learning; virtual learning; internationalisation; learning design framework

1. Introduction

Blended and virtual learning activities have become increasingly prevalent during the COVID-19 pandemic, but also in the post-Covid European setting [1]. In the past years,

the pandemic forced Higher Education Institutions (HEI) to close their physical doors, which pushed educators to have to pivot to online teaching methods to ensure students can continually attend their education, in a way which was unfamiliar for many teachers and students alike. Although the unprecedented shift to Blended and Virtual learning has been challenging for both HEI's teaching staff and students, it has also opened up new possibilities and established existing ones as suitable, even beneficial for learning [2]. With the use of digital tools and platforms, teachers can create more engaging and interactive lessons that respond to different learning styles and internationalisation [3].

Internationalisation, the process of integrating a global dimension into higher education [4], has become a key priority for institutions worldwide [5]. This is driven by factors like globalisation and the demand for international talent. For institutions, benefits include enhanced teaching quality and reputation, while students gain intercultural skills and improved job prospects. However, challenges include potential high costs and language barriers for students and the need for institutions to adapt teaching methods for diverse learners. Despite hurdles, internationalisation is essential for competitiveness and helps promote global citizenship. Blended and virtual learning modalities make these international experiences more affordable and sustainable [6], though this introduces new technological and language-based challenges to ensuring equal opportunity.

Despite their growing adoption, virtual and blended learning environments continue to present significant challenges for both students and educators. Research highlights persistent issues such as reduced student engagement, digital fatigue, and difficulties in maintaining motivation and focus in online settings [2,7]. Educators often face barriers related to digital competence, instructional design for online modalities, and the need to adapt pedagogical strategies to diverse learner needs [8]. Moreover, disparities in access to reliable internet and digital devices exacerbate educational inequalities, particularly for students from underrepresented or economically disadvantaged backgrounds [9]. These challenges underscore the importance of structured, theory-informed frameworks that can guide the design of inclusive, engaging, and effective virtual and blended learning experiences. Despite their limitations, blended and virtual modalities can support learning in HEI and promote internationalisation. These activities have become an integral part of the European education system, especially with support from the second Digital Education Action Plan of the European Union [10]. This shift has created opportunities for innovative international experiences [11,12] like short, intensive Blended Intensive Programmes (BIP) and Collaborative Online International Learning (COIL), an online co-teaching experience between institutions in different locations [13].

The European Erasmus+ Project "Developing Competences and Innovative Designs for International Virtual and Blended Modalities" (INVITE) [14] joins experts from Denmark (Aalborg University), France (Columbus Partners), Greece (Hellenic Mediterranean University), and Italy (University of Turin). INVITE has the purpose of contributing to the development of meaningful Higher Education (HE) experiences for both teachers and students connected to virtual and blended learning activities of international collaboration in the context of The Digital Education Action Plan (2021–2027), by providing educators with competences to design such activities. The project considered the key challenges faced by students and teaching staff to develop its Learning Design Framework (LDF). Developing a framework to design international blended and virtual activities is helpful to:

- Improve the quality of teaching and learning, since it can help teachers to plan and deliver more effective instruction and help students to learn more effectively [15].
- Make teaching and learning more accessible, by helping us to design learning experiences that are accessible to all students, regardless of their background or learning style [16].

- Promote equity and inclusion by creating learning environments that are welcoming and inclusive for all students [17].
- Support innovation and experimentation, because a well-designed framework can provide a foundation for teachers to experiment with new teaching and learning methods [15].
- Facilitate collaboration and sharing, as it can help teachers to collaborate and share ideas about teaching and learning [18].

In this context, this paper presents and discusses the design and development of the INVITE Learning Design Framework (LDF), its theoretical foundations, benefits, limits, and applications. This study is necessary because while the pandemic accelerated the adoption of blended and virtual learning, a lack of systematic application and review of these modalities in higher education persists. Existing learning design frameworks have been valuable in addressing the challenges of digital education but are not specifically tailored for the unique complexities of collaborative, international, and intercultural learning scenarios. Therefore, a gap exists for a dedicated framework that not only provides a structured approach to course design but also integrates key psychological and pedagogical principles to enhance student motivation and active engagement in these specific contexts. This research addresses that gap by proposing the INVITE LDF, a framework designed to guide educators in creating high-quality, internationalized virtual and blended learning experiences that are both effective and inclusive.

This paper is organized as follows: Section 2 provides the theoretical foundations. Section 3 describes the methodology employed for developing the LDF, while Section 4 introduces the background and the theories by which the LDF was developed. The INVITE Learning Design Framework is presented in Section 5. Section 6 is focusing on the benefits of INVITE LDF, while Section 7 discusses the methodology for evaluating the success of the INVITE framework which requires assessing various dimensions of the learning experience. Then, Section 8 illustrates a practical application of the LDF, focusing on how it can be implemented in real-world contexts. Finally, the conclusions (Section 9) and future work (Section 10) discuss the limitations and further development of the study.

2. Theoretical Foundations

To establish a clear foundation for the proposed framework, this section presents the core concepts of blended and virtual learning. Although these modalities have been utilized for years in higher education, their application has been criticized for lacking a systematic approach and review [8,19]. During the pandemic, such modalities offered students the flexibility to learn from home while still having some face-to-face interaction, which supported their retention and pace of study. This approach can also increase access for students excluded from traditional "brick-and-wall" education while still promoting beneficial physical interaction to enhance academic engagement.

Building on these definitions, this section then explores the key qualities that make these learning modalities effective, as identified through desk research, and discusses the various pedagogical tools and methods used to deliver them.

2.1. Blended Learning

Blended learning refers to an instructional approach that combines traditional face-to-face classroom teaching with online learning activities. It is a model that integrates in-person interactions and online resources, creating a flexible and personalised learning environment. In a blended learning setting, students typically engage in both physical classroom sessions and online components, such as virtual lectures, multimedia materials, interactive modules, or discussion boards. The combination of these methods aims to optimise learning outcomes by enhancing the benefits of both in-person and digital learning

approaches [20]. Additionally, according to [21], "Blended learning should not be conceived solely as a method of enriching the class with technology or making the learning process more accessible and engaging. Its main purpose is to modify and adjust the teaching and learning interaction in order to upgrade it. It assists and enables the growth of critical thinking, creativity and cognitive flexibility".

2.2. Virtual Learning

Virtual learning, also known as online learning or e-learning, involves delivering educational content entirely through digital platforms and resources. It is a form of remote education that utilises technology to provide instruction and facilitate learning without the need for physical classrooms. Virtual learning can take various forms, such as live online classes, pre-recorded video lectures, interactive exercises, virtual simulations, or digital assessments. Students participate remotely using internet-connected devices, accessing educational materials and engaging with instructors and peers through online communication tools.

The formats of virtual learning encompass a variety of learning activities, ranging from active and passive learning approaches to synchronous and asynchronous interactions. Understanding the distinctions between these methods can help educators create dynamic, engaging, and flexible learning experiences that respond to diverse student needs and preferences [19].

2.3. Key Qualities of Blended and Virtual Learning

While the advantages of blended and virtual learning are widely recognized, it's important to clearly define their specific contributions to the learning process and the broader educational system. Key qualities of these formats, identified through extensive desk research, are outlined in the following:

- **Flexibility and personalisation:** Blended and virtual learning can be tailored to the individual needs and learning styles of students by providing a variety of learning options and activities. For example, students can choose to learn through lectures, discussions, hands-on activities, or online simulations. Students can also learn at their own pace and in their own time [22]. This optimisation of the learning experience requires, though, the understanding of course development based on needs and with a digitalisation mindset over digitisation [8].
- **Engagement:** It can be more engaging than traditional face-to-face learning by incorporating a variety of multimedia and interactive activities. For example, students can watch videos, listen to podcasts, play games, and collaborate on projects online [8].
- **Collaboration:** It can provide students with opportunities to collaborate with each other and with experts from around the world. For example, students can work on group projects online, participate in online discussions, and attend virtual guest lectures [23].
- **Accessibility:** It can make education more accessible to students who live in remote areas or who have disabilities. For example, students can access online courses and materials from anywhere in the world, and students with disabilities can use assistive technologies to participate in online learning activities [9].
- **Affordability:** It can be more affordable than traditional face-to-face learning, as it can reduce the need for classrooms and other resources. For example, students can take online courses without having to travel to a campus [9].
- **Internationalisation:** Virtual and blended learning in HEI breaks down barriers to internationalisation. Students can gain valuable international experiences without the significant commitment of studying abroad for a semester or more. This traditional

approach can be daunting for many due to financial constraints and the lifestyle changes required [9].

- **Interculturality:** Intercultural experiences for HE students can be highly beneficial. Virtual and Blended are much more cost-effective, and more environmentally friendly [9].
- **Flow and telepresence:** These psychological states enhance the immersive quality of blended and virtual learning. Flow refers to a deep, focused engagement where learners lose track of time, while telepresence is the sensation of "being there" in a virtual environment. When well-designed, digital learning experiences can foster these states, improving attention, satisfaction, and learning outcomes [24].

2.4. Tools for Virtual and Blended Learning Activities

Of course, the aforementioned qualities of these modes of learning need to have a correspondence with how they are delivered in the learning space. The most successful and popular tools or methods to apply virtual and blended learning activities are those that are relevant and aligned to students' preferred ways of learning, interests and learning goals [8]. Some of the most popular include:

- **Flipped classroom:** In a flipped classroom, students watch video lectures at home and then come to class to participate in discussions and activities. This allows students to learn at their own pace and in their own time, while also providing them with opportunities to interact with their teacher and classmates [8].
- **Video lectures:** Video lectures can be a great way to deliver information and content to students in a way that is engaging and visually appealing. However, it is important to make sure that video lectures are well-produced and that they are broken up into shorter segments to keep students' attention [8].
- **Online discussions:** Online discussions allow students to interact with each other and with the instructor to explore a topic in more depth. Online discussions can be used to share ideas, ask questions, and debate different perspectives [8].
- **Group projects:** Group projects allow students to collaborate with each other on tasks and assignments. Group projects can help students to develop their teamwork skills and to learn from each other [8].
- **Simulations:** Simulations allow students to experience real-world scenarios in a safe and controlled environment. Simulations can be used to teach students about a variety of topics, such as science, technology, and business [9].
- **Games:** Games can be a fun and engaging way for students to learn. Games can be used to teach students about a variety of topics, such as math, science, and history [25].
- **Virtual internship:** A virtual internship is an internship that is completed online. Virtual internships can provide students with opportunities to gain experience in different fields without having to travel to a physical location [9].

There are also many new and emerging learning activity formats that are enabled by technology. For example, students can now use virtual reality (VR) and augmented reality (AR) to learn about a variety of topics in an immersive and interactive way. These formats are now more frequently used in science-oriented courses, also as new ways of applying simulations.

2.5. Post-Pandemic E-Learning Acceptance

E-learning acceptance has become a central focus in educational research, especially as digital learning environments evolve from emergency solutions to long-term strategies. Recent research highlights a significant shift in the perception and adoption of e-learning in higher education following the COVID-19 pandemic. Studies consistently show that learners' willingness to engage with e-learning is shaped by a combination of technological,

psychological, and contextual factors. The study in [26] conducted a large-scale study involving over 1000 university students in Poland, revealing that the perceived ease of use and usefulness of remote learning are now the strongest predictors of student engagement. His findings suggest that while demographic factors such as age, nationality, and employment status have limited influence, the intuitive design and accessibility of online platforms play a central role in shaping students' attitudes and behavioral intentions toward e-learning.

The study also emphasizes the evolving expectations of students in the post-pandemic era. Unlike during the crisis, when remote learning was a necessity, students now evaluate digital education based on its long-term value and integration into their academic and professional lives. This reflects broader trends in digital education, where usability is assumed, and pedagogical effectiveness becomes the key criterion.

These insights align closely with the principles of the INVITE Learning Design Framework (LDF), which emphasizes motivation, engagement, and accessibility. The post-pandemic normalization of e-learning calls for frameworks that go beyond technical functionality to address learners' psychological needs and intercultural contexts. By incorporating findings from [26] and others (like the study in [27]), the INVITE LDF is well-positioned to support the design of international blended and virtual learning experiences that are both effective and sustainable.

3. Methodology

A scoping review of relevant models, methods, and theories was undertaken to support the development of the learning design framework. To ensure transparency and rigor in the scoping review, we followed a structured search strategy. Relevant literature was identified through systematic searches in academic databases including Scopus, Web of Science, and ERIC, using combinations of keywords such as "blended learning", "virtual learning", "internationalisation", "learning design frameworks", and "higher education". The inclusion criteria focused on peer-reviewed articles, reports, and frameworks published between 2015 and 2024 that addressed blended and virtual learning modalities in international higher education contexts. Studies were included if they provided theoretical models, practical frameworks, or empirical insights relevant to the design and implementation of blended or virtual learning. The selected materials were then analyzed thematically to inform the development of the INVITE Learning Design Framework.

Additionally, we explored current learning design frameworks utilised in digital education. While the final framework primarily draws upon Self Determination Theory, Active Learning, and the ADDIE approach (discussed in detail in the next section), several other models and methods influenced its development and deepened our understanding of these core principles; such as the ARCS model, for considering the motivational needs of learners [28], Backward Design and SAM for aligning instruction with desired learning outcomes through an iterative process [29], and the CIPP model for evaluating educational programs and projects [30].

Furthermore, the project's scoping review considered the following relevant learning design frameworks: FRAMES-Toolkit for Integrating Virtual Exchange in Higher Education, by the FRAMES project & Erasmus+ Programme [31]; Digital Learning Design Framework & Toolkit by Teesside University and Jisc UK [32], the SCALA Framework in Student's Education: a Guide for Delivering Hybrid Learning by University of Leeds [33]; Resilient Teaching: A Learning Design Framework for a Post-Pandemic Era by University of Michigan [34], and Blended Mobility Handbook, from the C-Extended Intellectual Output 4 by C-EXTENDED Erasmus+ project [34,35].

While these existing frameworks have been instrumental in addressing the challenges of digital education in recent years and continue to offer valuable insights, they may not be specifically tailored for collaborative international blended and virtual learning scenarios. Therefore, there was the need for a framework that can be readily implemented in these specific educational contexts.

The development of the learning design framework has been also inspired and informed, drawing on insights from (a) the needs identification analysis based on experts [36] and the desk research analysis [37]. Both analyses were conducted in the context of the INVITE project: (a) The needs identification analysis aimed to understand the innovative ways of virtual and blended teaching in international contexts after the pandemic, their main characteristics, scope, and specific contribution to improving teaching and learning processes in higher education; (b) The desk research analysis encompassed research papers, reports, and other materials from relevant sources to identify relevant formats and methods, as well as to discuss appropriate digital pedagogies and tools to support the chosen methodologies

4. Developing a Learning Design Framework

To ensure the framework was grounded in robust pedagogical theory and responsive to the evolving needs of internationalised digital education, we identified and integrated key theoretical foundations that align with the goals of blended and virtual learning. This section outlines the core principles that informed the design of the INVITE Learning Design Framework, focusing on theories that support learner motivation, engagement, and instructional design. Specifically, the framework draws upon Self-Determination Theory (SDT), Active Learning, and the ADDIE model- each offering complementary perspectives that collectively shape a comprehensive and adaptable approach to course development in higher education.

4.1. Self Determination Theory (SDT)

Self-Determination Theory (SDT) is a theory of motivation and human development that proposes that all individuals have three innate psychological needs: autonomy, competence, and relatedness [38].

Autonomy is the need to feel in control of one's own life and to make one's own choices. Competence is the need to feel capable of achieving one's goals and to master new skills. Relatedness is the need to feel connected to others and to experience a sense of belonging.

SDT suggests that when these three needs are satisfied, individuals are more likely to be motivated, engaged, and successful in their endeavours. Conversely, when these needs are not satisfied, individuals are more likely to experience reduction in motivation, disengagement, and failure. By integrating SDT principles into the design and delivery of blended and virtual learning programs, educators can create a more engaging and motivating learning experience for students, ultimately leading to improved academic achievement [39]. Such learning environments offer a number of unique opportunities to support students' autonomy, relatedness, and competence. For example:

- **Autonomy**: Providing students with a clear sense of purpose and meaning for their learning aligns with the autonomy principle. Blended and virtual learning environments can give students more control over their own learning. This can be achieved by connecting learning to personal goals, choice and flexibility and goal setting [39].
- **Competence**: Blended and virtual learning environments can provide students with opportunities to develop new skills and to master their learning. Making effective use of technology to support students in this process is crucial. Some examples could

include: engaging learning resources (online simulations, games, and interactive learning experiences), immediate feedback and collaboration tools [40].

- **Relatedness**: Creating a supportive and collaborative learning environment promotes this relatedness principle. It can be achieved by Interaction and collaboration: Encouraging students to interact with each other and their instructors in meaningful ways fosters a sense of connection and belonging. This could involve online discussions, group projects, or peer review activities [39].

In this context, SDT can offer a valuable framework for designing and implementing blended and virtual learning environments that are effective and engaging for students. By supporting students' autonomy, relatedness, and competence needs, educators can help students to achieve their full potential. Here are some of the benefits: Increased student motivation and engagement, improved student achievement; reduced student dropout rates and improved student satisfaction [41].

4.2. Active Learning

This is an approach to instruction that involves actively engaging students with the course material through interactive and participatory tasks, such as discussions, problem solving, case studies, role plays, and other methods. It is a contrast to passive learning, where students are simply expected to listen to lectures and read textbooks. Active learning is based on the principle that students learn best by doing, as they can apply and test the acquired knowledge. When students are actively engaged in the learning process, they are more likely to understand and retain the information [42].

Active learning enhances student engagement and motivation, as active involvement in learning promotes attention and interest. It also fosters deeper understanding and retention by encouraging critical thinking and meaningful connections between concepts. Additionally, active learning improves essential problem-solving, critical thinking, communication, and collaboration skills, supporting success in both academic and professional settings [43].

Active learning is especially important in blended and virtual learning environments because it addresses the challenges of student engagement and knowledge retention often associated with online or partially online settings. In these environments, students may feel isolated, distracted, or less motivated without the immediacy of a physical classroom. Active learning methods, such as interactive discussions, problem-solving tasks, and collaborative activities, help counteract these issues by fostering a sense of connection and accountability.

4.3. ADDIE: A Systematical and Cyclical Approach to Design

The ADDIE model is an instructional design framework consisting of five phases: Analyze, Design, Develop, Implement, and Evaluate. It provides a structured, systematic approach to creating effective learning experiences by identifying needs, designing content, building materials, delivering instruction, and assessing outcomes. Widely used in education and training, ADDIE ensures that learning objectives align with learner needs and that continuous improvement is built into the process [44]. The cyclical nature of ADDIE also facilitates ongoing improvement, making it ideal for instructional design in complex learning environments where adaptability is key.

The ADDIE model is a powerful framework that can significantly enhance instructional design, especially within blended and virtual learning environments. Its structured approach - encompassing Analysis, Design, Development, Implementation, and Evaluation - ensures a comprehensive process for creating effective learning experiences. In the context of blended and virtual learning, ADDIE's methodical stages provide the

structure needed to address the unique demands of these formats, such as diverse learner needs, interactive content design, and ongoing engagement. In short, ADDIE's robust framework can offer instructional designers the strategic foundation to create dynamic, impactful learning experiences that thrive in blended and virtual settings.

5. The INVITE Learning Design Framework

As blended and virtual learning is becoming increasingly popular in higher education because of the advantages it offers over traditional face-to-face instruction, it can also be challenging to design and deliver effectively. One way to address these challenges is to use a learning design framework. This is a structured approach to designing and delivering learning experiences. It can help to ensure that learning experiences are well-aligned with learning objectives, and that they use appropriate teaching and learning methods and technologies [45].

In this context, a new model of a learning design framework for blended and virtual modules of education in higher institutions is presented, targeted specifically to educators who need to implement new courses or adapt their already existing ones to these contexts, while also incorporating internationalisation and collaboration elements. The framework is called Internationalisation-eNhanced blended and VIrTual lEarning (INVITE) Learning Design Framework (LDF).

The INVITE LDF is based on the following principles (see also Figure 1):

- Alignment: The framework is designed to ensure that learning experiences are well-aligned with learning objectives.
- Flexibility: The framework is designed to be flexible enough to accommodate a variety of teaching and learning methods and technologies.
- Accessibility: The framework is designed to be accessible to all students, regardless of their abilities or circumstances.
- Engagement: The framework is designed to promote student engagement and motivation.
- Assessment: The framework is designed to support effective assessment of student learning.
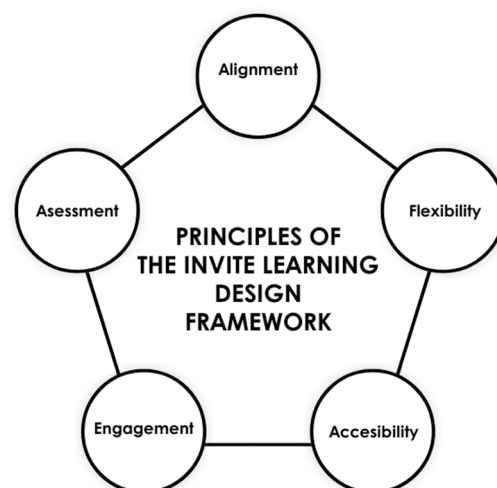

Figure 1. The 5 Principles of the INVITE LDF.

The aim of the INVITE LDF is informed by established and leading pedagogical principles, and by the research of state-of-the-art practices in the European context. The purpose of it is to support HEI in enriching the teaching and learning process, the proposed pedagogies, didactics and toolkits will aim to engage HEI staff in order to promote the

meaningful development of Virtual and Blended modalities in HEI; and it should be flexible enough to be adapted to different contexts.

The INVITE LDF also aims to further develop the emerging field of virtual and blended teaching and learning experience in HEI. The LDF encourages teachers and learners in HEI to freely organise and build a learning experience while providing a framework which supports their endeavour while providing space for including their individual learning objectives. With the support of the LDF, teaching staff can develop and also improve course design, as well as develop future iterations of their course. With the support of the LDF, they can carry out learning evaluations, gather feedback from participants, and open up conversations with other organisers and stakeholders by sharing the gathered insights. Consequently, it aims to support the intelligent integration of Virtual and Blended modalities for course design in HE mobility.

In the following Table 1 and Figure 2, the different phases and steps of this suggested model with its corresponding tasks are described (following ADDIE, SDT and Active learning principles):

Table 1. INVITE LDF Phases and Steps.

0. Preparation Phase	
Step 0—Getting ready	- Partners Identification - Course/Module Definition - Prepare international negotiation - Focus on Student Collaboration Stages - Consider Intercultural/International Assessment - Teaching Practice Reflection
1. Analysis Phase	
Step 1—Needs Assessment (SDT Focus)	- Define learners' composition - Assess learners' cultural and motivational backgrounds - Identify the international/intercultural added value to the activity
Step 2—Task Analysis (ADDIE Focus)	Define learning outcomes of the course, as well as internationalisation skills' development goals
2. Design Phase	
Step 3—Learner-Centred Design (SDT Focus)	Foster autonomy, competence, and relatedness by providing choices in learning paths, activities, and assessments.
Step 4—Active Learning Integration (Active Learning Focus)	Incorporate active learning strategies like problem-based learning, simulations, collaborative online projects, virtual discussions and webinars.
Step 5—Blended Learning Model Selection (ADDIE Focus)	Decide on the mix of face-to-face and online components to suit international and local contexts, as well as a synchronous approach with asynchronous learning.

Table 1. *Cont.*

	3. Development Phase
Step 6—Content Creation (ADDIE Focus)	• Develop culturally sensitive and diverse content. • Create multimedia resources to enhance engagement.
Step 7—Technology Integration (Active Learning Focus)	• Utilise online collaboration tools and select appropriate technologies. • Develop an interactive online learning environment that supports active engagement and interaction among students and with teachers, regardless of their physical locations. • Use AI tools in international activities to enhance personalised learning, efficiency, task automation, trend awareness.
	4. Implementation Phase
Step 8—Facilitation (SDT Focus)	• Train instructors in creating autonomy-supportive environments • Mentorship in the virtual space: Assign mentors or peer facilitators to support international teams and address any challenges that may arise during online collaboration. • Encourage peer interactions • Conducting Face-to-Face and Online Sessions with a Focus on Active Learning • Monitoring International and Local Students' Progress and Adjusting Accordingly
Step 9—Promote Intercultural Collaboration (SDT Focus)	• Organise regular virtual meetings, discussions, and collaborative work sessions in the online environment to ensure students from both universities have equal opportunities to participate, fostering relatedness. The use of icebreakers is a tool to start promoting a collaborative environment.
	5. Evaluation Phase
Step 10—Design assessment forms in line with learning outcomes (SDT Focus)	• Share grading criteria with students in advance • Choose formative and summative assessment forms (not only at the end of the course), including self-assessment, peer assessment and external evaluation • Consider the emerging trends for assessment
Step 11—Collect evidence that indicates the achievement of disciplinary and intercultural learning outcomes and provide feedback accordingly (ADDIE Focus)	• Collect data about the achievement both disciplinary and intercultural learning outcomes throughout the activity, through direct evidence (e.g., tests, assignments, peer feedback) and indirect evidence (e.g., observations, focus groups, interviews) • Emphasise the cultivation of intercultural mindsets overachieving specific assessment scores, as it redefines the focus of intercultural learning • Provide students with real-time feedback of their progress • Provide summative evaluation of the activity that reflects the achievement of learning outcomes and find the best way to certificate the activity (e.g., a certificate or a digital badge)

Table 1. *Cont.*

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Step 12—Collect feedback on the activity (SDT Focus)	• Design ways to collect students' feedback on their overall experience: surveys at the end of activities, interviews, discussions, focus groups, or direct observation of students' behaviour
Step 13—Reflect and Adapt (SDT Focus)	• Reflect on the implementation and evaluation feedback. • Adapt the framework and courses for continuous improvement and better internationalisation support
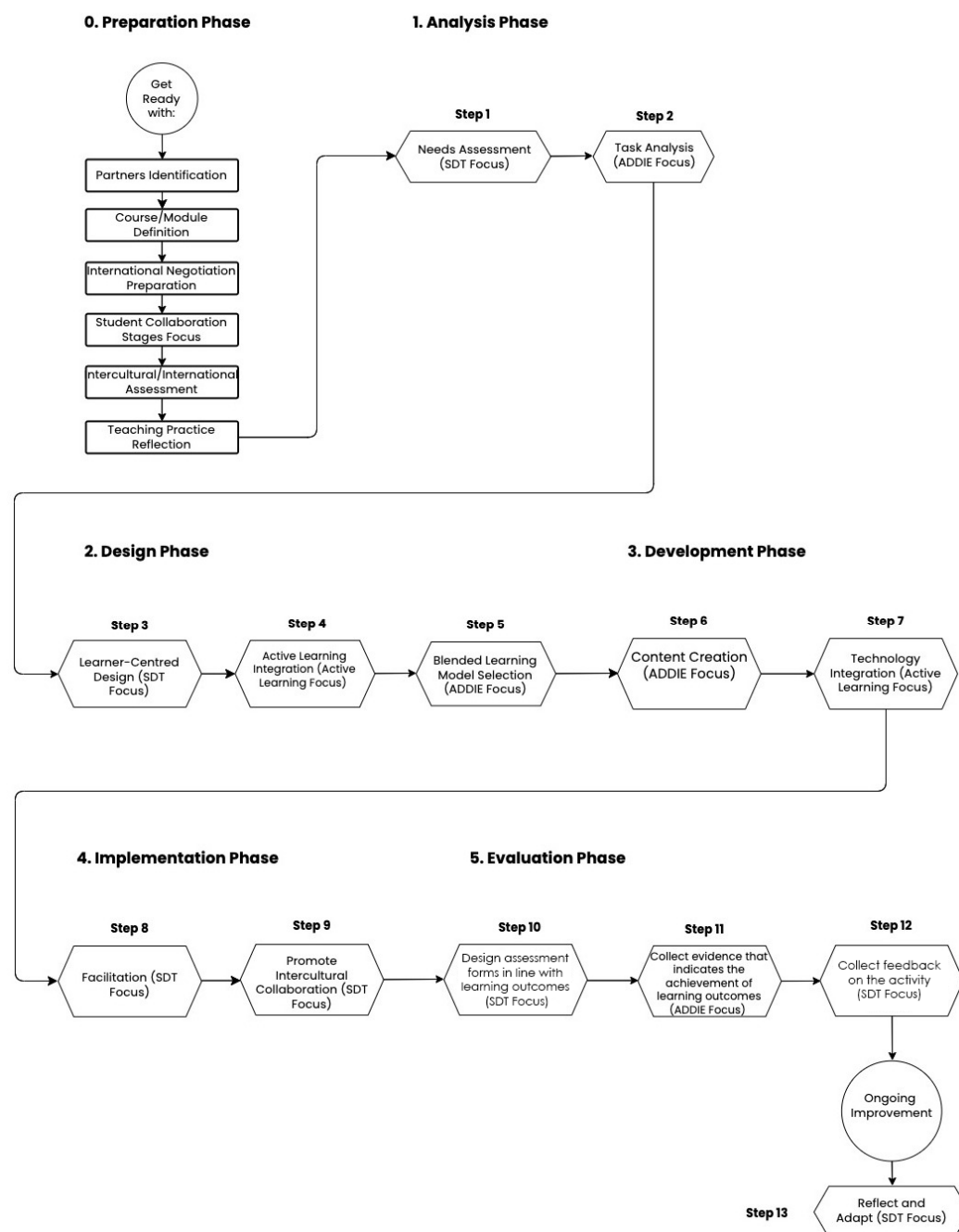
Figure 2. Overview of the INVITE LDF.

6. Benefits of the INVITE Learning Design Framework

The INVITE Learning Design Framework (LDF) demonstrates promising benefits for students, teachers, and universities due to its strong theoretical foundation, which underpins its approach and expected outcomes. By building on established educational theories like Self-Determination Theory and Active Learning and the structured ADDIE model, the framework addresses core aspects of motivation, efficient learning, and inclusive design, making it well-suited to meet diverse educational needs.

For students, the framework can enhance motivation and engagement through Self-Determination Theory (SDT), which fosters autonomy, competence, and relatedness. It also incorporates diverse learning experiences through active learning strategies, encourages cultural sensitivity, and offers flexible learning paths tailored to individual preferences. Additionally, the framework can provide a more systematic approach, combining formative and summative assessments to support continuous improvement and learning.

Teachers benefit from a structured instructional design approach based on the ADDIE model, allowing them to align course objectives with effective learning outcomes while promoting internationalisation. The framework can enhance teachers' facilitation skills by focusing on autonomy-supportive environments and inclusive learning spaces. With access to varied active learning methods, teachers are equipped to engage students in critical thinking, collaboration, and problem-solving. Furthermore, the module's built-in evaluation and feedback processes enable teachers to make data-driven adjustments, ensuring continuous course enhancement and relevance.

For universities, implementing this framework supports a competitive edge in the global education landscape by promoting internationalised courses that appeal to a diverse student body. The framework's emphasis on student engagement contributes to increased retention and graduation rates, which positively impacts the university's performance metrics. It also fosters research opportunities in effective teaching methodologies, bolstering the university's knowledge base and commitment to educational innovation. Lastly, the framework aligns well with mission statements focused on providing a diverse and inclusive learning environment, reinforcing the institution's dedication to global education and inclusivity. The following Table 2 summarizes the benefits of the INVITE LDF:

Table 2. Benefits of the INVITE LDF for the involved actors.

Students	Teachers	Universities
Enhanced Motivation and Engagement	Effective Instructional Design	Competitive Advantage
Diverse Learning Experiences	Enhanced Facilitation Skills	Increased Retention and Graduation Rates
Cultural Sensitivity	Varied Teaching Methods	Research Opportunities
Flexible Learning Paths	Data-Driven Improvements	Alignment with Mission Statements
Holistic Assessment		

7. Evaluation of the INVITE Learning Design Framework

Evaluating the success of the INVITE framework requires assessing various dimensions of the learning experience and outcomes across 10 strategic steps (see Figure 3). First, learning outcomes are assessed by comparing pre- and post-course knowledge to gauge gains in content and cross-cultural competence, and by measuring how well these outcomes align with the INVITE framework's objectives, including internationalisation and active learning. Second, student engagement and participation are measured through online

analytics, such as participation rates and time spent on materials, as well as through feedback surveys evaluating design, collaboration effectiveness, and overall satisfaction. Third, cross-cultural competence is assessed through assignments involving cultural analysis and teamwork, alongside self-reflections that encourage students to consider their intercultural growth. Fourth, technology and the online learning environment are evaluated by monitoring technical issues encountered by students and collecting feedback on the usability of virtual collaboration tools. Fifth, faculty feedback is gathered through instructor reflections on challenges and successes with the INVITE framework, as well as through peer evaluations to assess the effectiveness of facilitation and blended learning methods. Sixth, cross-institutional collaboration is reviewed by evaluating communication and logistical challenges, such as time zone coordination between partner institutions. Seventh, student feedback on international collaboration is collected, focusing on their interactions with peers and their views on the value of these experiences, including any challenges faced. Eighth, the impact on internationalisation goals is assessed by determining how well the INVITE model aligns with the institution's internationalisation strategy and fosters global awareness. Ninth, the framework's long-term impact is measured through alumni surveys that explore the lasting effects on career and global mindset. Finally, iterative improvement is achieved by using evaluation results to guide ongoing enhancements to the course and framework deployment.
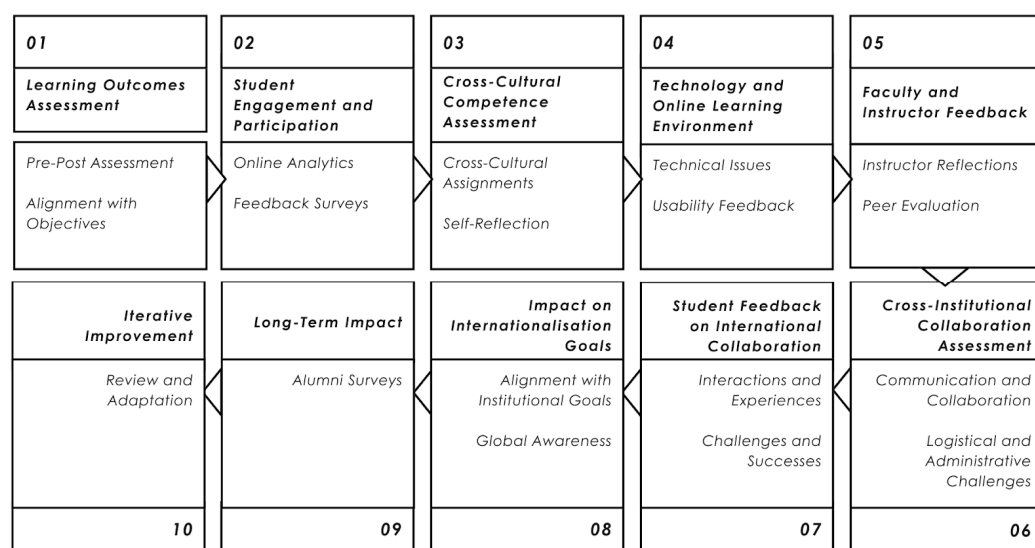

Figure 3. Key Evaluation Strategies of an INVITE LDF application.

By using a combination of quantitative and qualitative assessment methods, institutions can gain a comprehensive understanding of the success of the INVITE model in promoting blended and virtual learning, international collaboration, and the attainment of learning objectives. Regular evaluation and continuous improvement are essential for optimising the outcomes of this innovative educational approach.

8. Applying the INVITE LDF: A Training Course for HEI Teachers and Staff

The INVITE Project applied the INVITE LDF to an online training module conceived for HEI teachers, educators, instructors, and staff who could be involved in designing and developing virtual or blended international learning activities. The training module aimed to enable HEI teachers and educators to implement effective international virtual and blended environments and promote HEI staff awareness and mechanisms to support, scale up and sustain such programs. The module was fully online and delivered via a

Moodle platform hosted by the University of Turin, a partner of the INVITE Project. The activities were asynchronous and self-paced, except for an initial introduction meeting organised at the beginning of the module. The training modalities were based on active learning, collaborative learning, reflection, self-assessment, and formative assessment. The course itself was conceived as an interactive guide to designing virtual or blended activities of international collaboration, like COILs or BIPs, according to the INVITE framework. It included two paths: the path for HEI teachers (interested in developing digital international teaching and learning activities) and that for HEI staff (interested in creating international bridges among institutions and supporting teachers and/or students in developing or implementing digital international activities). The course is available at https://invite.i-learn.unito.it/ (accessed on 1 June 2025).

The course has a modular structure including nine sections (see Figure 4):

- An "Introduction" section with information about the module, the recording of the introduction meeting, a course contract and initial surveys for teachers and staff;
- A "Key terms and concepts" section, with a glossary and slideshows with the definitions of the underlying concepts of the module: the Self-Determination Theory, the ADDIE model, and blended and virtual international collaboration activities;
- Six main sections with the course content, one for each phase of the INVITE LDF (Preparation, Analysis, Design, Development, Implementation, Evaluation);
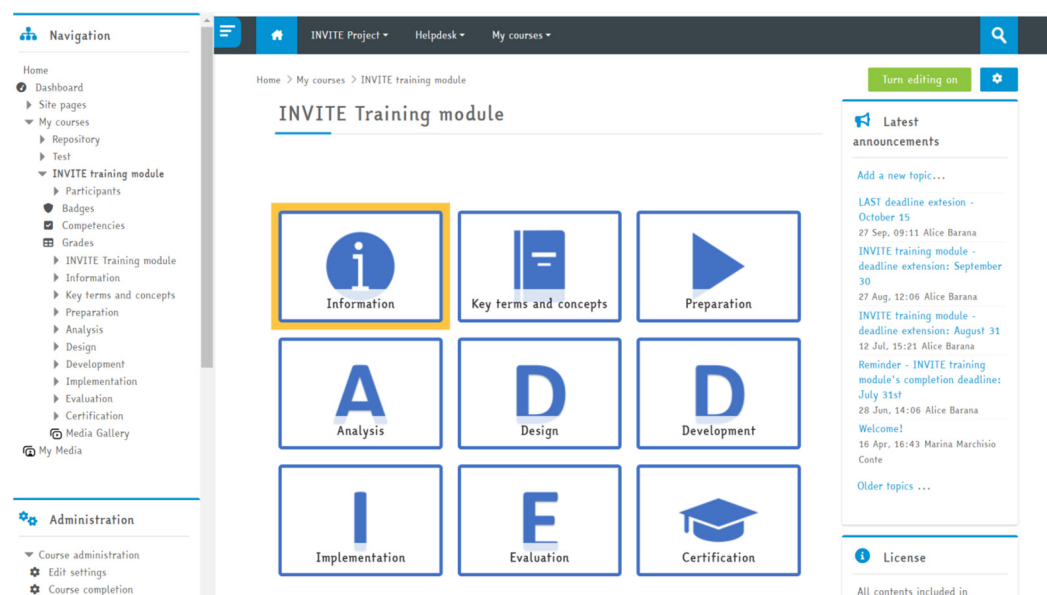- A "Certification" section with the final surveys.

Figure 4. Structure of the INVITE training course. The yellow box highlights the selected part.

The six main sections have the same structure. They explain the details of the six phases of the framework, providing participants with practical information on how to create virtual or blended international collaborative activities. In the Preparation phase, participants are guided to find ideas for their activities and partners. In the Analysis phase, they can focus on the need assessment and task analysis, defining an audience and learning outcomes for their activity. In the Design phase, they choose the learning strategies to include in their activity to engage students and foster their autonomy. The Development phase focuses on developing culturally relevant and sensitive content, including integrating Open Educational Resources, and identifying suitable digital technologies and learning environments to deliver the activities, including the role of AI in virtual or blended learning. The Implementation phase focuses on the role of the teacher during the activity and how to

foster interaction and intercultural collaboration. In the Evaluation phase, participants can learn about different assessment forms, focusing on formative and intercultural assessment.

In each of these sections, participants can find:

- Two starting reflection questionnaires (one for teachers and one for HE staff), with two or three questions each aimed at introducing the phase and making participants reflect on their experiences in that part of the process;
- An introductory video which highlights the main features of the phase;
- One or two slideshows on the main steps of each phase with some stimulus questions;
- A forum that participants can use to ask for doubts and answer the stimulus questions;
- Additional resources and external links to deepen the content;
- Two case studies, one about a virtual activity (a COIL) and one about a blended activity (a BIP), which shows the theory applied to real cases;
- A quiz with automatically graded questions about the content;
- Two final tasks (one for teachers and one for staff) where they are asked to put into practice what they learnt in the section. Teachers are asked to design a virtual or blended international activity and staff have to identify their potential role in supporting the development of such activities. The tasks include a self-assessment form.

Figure 5 shows the content of one section as an example. The tasks can be carried out individually or collaboratively. In the Preparation phase, participants can share their ideas and start collaborations. The two learning paths only differ for the initial questionnaires and the final tasks, while the rest of the content is the same. Participants can choose their path, change it throughout the course, or even follow both. Participants are awarded a Moodle badge after completing all the mandatory activities (questionnaires, quizzes, tasks, and surveys).
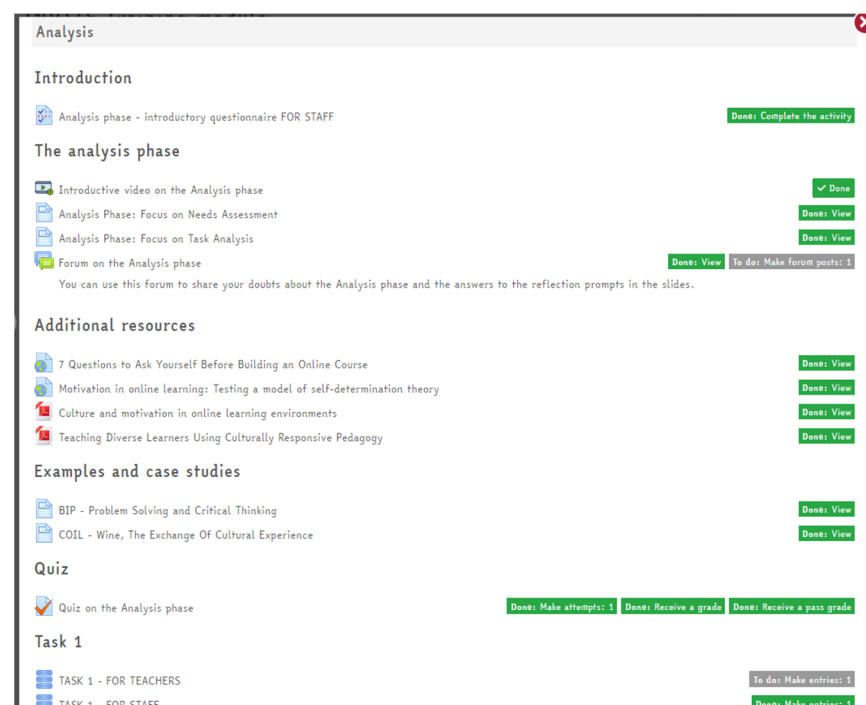

Figure 5. The Analysis section of the INVITE training course in the online platform.

The training module, which had more than 1000 participants, started in April 2024 and ended in September 2024, receiving very positive feedback.

9. Conclusions

The INVITE learning design framework (LDF) offers a comprehensive approach to instructional design that addresses the evolving needs in blended and virtual learning of modern, internationalised education. Its foundation in theories like Self-Determination Theory, Active learning and the ADDIE model ensures a systematic, student-centered design process that prioritizes motivation, adaptability, and continuous improvement.

While the INVITE LDF offers many advantages for higher education to students, teachers, and universities by promoting effective learning, enhancing motivation and engagement, and supporting the internationalisation goals of HEI, it is not without limitations, potential problems, and associated risks. Technological challenges in implementing the framework arise due to reliance on technology, with issues such as connectivity, hardware compatibility, and unequal access to necessary digital resources among students. Faculty members may also require extensive training, particularly if they are new to blended or virtual teaching, to apply the framework effectively. Ensuring quality and consistency across courses and materials can be difficult, especially in decentralised institutions, as can maintaining academic integrity and preventing cheating in virtual assessments, which often require innovative assessment approaches.

Engaging students in virtual and blended settings demands careful planning, as a lack of engagement strategies can lead to reduced motivation and participation. Equity and accessibility are essential, ensuring that all students, including those with disabilities or specific learning needs, can access resources equitably. However, resource constraints can limit the quality of online course development and maintenance, especially for smaller institutions with restricted budgets. Faculty resistance may also pose challenges, particularly for instructors accustomed to traditional, lecture-based teaching methods.

Aligning assessments with active learning and internationalisation goals requires thoughtful design to measure desired outcomes accurately. Internationalisation also necessitates cultural sensitivity, as culturally insensitive materials can lead to misunderstandings. Online data collection must adhere to strict privacy and security regulations, given the legal and ethical implications. Resistance to change can occur among faculty, administrators, and students, as the INVITE framework involves significant adjustments to teaching methods. Evaluating the framework's effectiveness, particularly regarding its impact on internationalisation, can be complex, requiring advanced assessment techniques. Faculty workload may increase due to the time needed to develop and manage online content and activities, while scaling the framework for large classes or entire institutions can be challenging, especially with limited resources.

It's important for institutions and educators to be aware of these limitations, problems, and risks and to develop strategies to address them effectively when implementing the INVITE framework. Careful planning, ongoing evaluation, and a commitment to addressing challenges can help mitigate these issues and maximise the benefits of the framework.

10. Future Works

To improve the INVITE learning design framework, future research should focus on the following areas. First, a rigorous evaluation and measuring of results is required to assess the framework's impact on student outcomes, including learner satisfaction, engagement, and academic achievement. This will help to iterate and refine the framework. In addition, it should also explore strategies to enhance the framework's personalisation and adaptability, considering factors such as student age, background, and the specific content domains or nature of the courses where it would be applied.

Second, replicating this framework's evaluation as another pilot testing with educators or testing its final application in diverse educational settings would provide valuable insights

into its generalisability and applicability. Finally, expanding the theoretical foundations of the framework beyond Self-Determination Theory and Active Learning could lead to even more innovative and effective learning designs. For instance, incorporating theories of gamification might offer additional strategies for fostering student motivation and engagement.

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Abbreviations

The following abbreviations are used in this manuscript:

LDF	Learning Design Framework
SDT	Self Determination Theory
ADDIE	Analysis, Design, Development, Implementation and Evaluation
HE	Higher Education
HEI	Higher Education Institute

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