

# Blended Learning as Part of Instructional Design: The Effectiveness in Teaching and Learning by Students

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**Abstract:** The instructional design model can assist educational institutions in implementing blended learning and in helping educators and learners adjust to the blended learning environment. This paper uses a meta-synthesis of previous studies. It aims to explore the influence of instructional design in blended learning and the direction of further research development. A total of 10 articles were selected through in-depth screening through a Web of Science search. The data selection uses blended learning and instructional design as two keywords, and the paper was published around 2020 to 2024. The findings of this study show that instructional design in blended learning can effectively improve the positive influence of teachers and students in participation, interaction, and assessment. This study also clarifies the direction of future research. These insights play a role in summarizing the instructional design of blended learning in the "post-pandemic era" and provide directions for stakeholders to continue to focus on future development.

**Keywords:** Blended Learning; Instructional Design; The Effectiveness of Teaching; Post-Pandemic Era.

## 1. Introduction

In a nutshell, blended learning is a learning environment that combines face-to-face communication with online learning[1]. The impact of the COVID-19 pandemic on the viability of face-to-face interaction and teaching is profound, making using technology to enhance learning a necessity rather than an option[1,2]. Many scholars predict that blended learning will become the dominant teaching method in the post-CoV-19 era[3].

### 1.1. Blended Learning

#### 1.1.1. The Concept of Blended Learning

There are many definitions of blended teaching. The broad definition of blended teaching is the comprehensive application of multiple teaching modes and teaching techniques. It is not just a mix of online and face-to-face learning, but a combination of multiple learning approaches, for example, focusing on learning resources, learning media, learning environments, and learning styles[4]. In many cases, while blended teaching and blended learning are used interchangeably to refer to the same practice, they are also used to refer to slightly different practices[5].

In most literature, blended teaching is considered to be the integration of face-to-face and online teaching, which has the characteristics of both online and face-to-face teaching to ensure that they complement each other[2]. An increasing amount of research demonstrates the flexibility of blended learning. For example, Bozkurt and Sharma (2021) pointed out in their research that the flexibility of blended teaching lies in the fact that it can give full play to the advantages of online teaching and face-to-face teaching, thus controlling the disadvantages and providing learners, teachers and institutions with the flexibility of time, space, speed and path[6].

#### 1.1.2. The Emergence of Blended Learning

Blended teaching can be roughly divided into the initial stage and development stage. In the early stages, when

blended learning emerged as a new concept, scholars emphasized the combination of face-to-face teaching (traditional teaching) and computer-mediated (online teaching) activities as the dominant element of blended learning[7]. Since 2000, "blended learning" has mainly emphasized its characteristics[8]. Blended learning provides a clearer definition of the ratio between online and face-to-face teaching[8]. Since blended learning allows unlimited combinations, as mentioned in the study of Park and Doo (2024), the type of blended learning depends on what is mixed? What's the mix? How many teaching components are mixed and in what order? Allen et al. (2007) categorize blended learning into four categories based on the proportions of traditional learning, web-facilitated learning (under 30%), blended learning (30% to 79%), and most online learning (over 80%)[9]. Future researchers will often determine that hybrid courses are 30-70% delivered online[10,11].

#### 1.1.3. The Development of Blended Learning

Blended learning maintains the integrity of traditional learning while stimulating the adoption of online learning, mobile technology, and active approaches[10,12]. With the development and application of blended learning, scholars have begun to define blended learning from the perspective of teaching strategies, teaching methods, and teaching design in the context of blended learning[8]. Horn and Stolker (2017) proposed four types of blended learning in the context of K-12 education: rotating model, flex model, self-mixing model, and rich virtual model[13].

#### 1.1.4. The Driving Role of the Epidemic and the Changes After the Epidemic

At the beginning of 2020, the global education community is in the grip of an unprecedented crisis[14]. The unexpected outbreak of COVID-19 has ushered in a new era of social change, especially in the education system[15]. While the severity of COVID-19 restrictions varies by country and region, students and teachers around the world are being forced to abandon any face-to-face, synchronous, and offline elements of education[16,17]. The flexibility of blended

learning appeals to many stakeholders in the "post-pandemic" new normal education sector. It can mitigate disruptions to education caused by COVID-19 and ensure continuity in the provision of education during current and future crises[6,18]. Prior to the pandemic, blended learning was already considered the new normal in education[19], but the COVID-19 pandemic has accelerated the adoption of blended learning models to address unique circumstances[18]. An important starting point for many studies is that COVID-19 exacerbates and exposes existing problems, rather than creating new ones[14].

Initial hesitation to use a hybrid approach stemmed from faculty and student concerns about technical support; The upfront costs of institutions needing to transition to more asynchronous, distance learning; And the reluctance of the staff to spend more energy and time[20].

## 1.2. Instructional Design

Instructional design (ID) is an essential element to support the success of blended learning methods[21]. Blended learning increases the opportunities for teachers to design more effective teaching and learning environments[10]. Teachers need to redesign their curriculum so that pre-class activities are better integrated into the face-to-face curriculum, with active learning teaching methods so that students understand patterns and prepare for class[10]. The successful implementation of BL strategies requires careful preparation by teachers and is more expendable than preparing a traditional lecture[22]. Not only may students resist, but teachers may also be reluctant to give up the way they teach. History tells us that teachers should first address teacher resistance to change to promote teacher adoption and integration of instructional media with technology[23]. To overcome these challenges, instructional design (ID) can be used to support the planning and management of blended courses[10].

## 2. Research Purpose

The COVID-19 pandemic further highlights the challenges associated with BL[8]. Based on the above analysis, it can be seen that there is still room for discussion on the design and implementation of effective BL[24]. There are many studies on blended learning during the epidemic period, but as a normal teaching mode, there is a lack of literature research and analysis in the "post-epidemic era". The researchers suggest that conducting a literature review can help identify challenges and solutions in a given field[25]. Review papers may contribute to the development of new theories and may also shape future research studies, as well as disseminate knowledge to promote scientific discussion and reflection on concepts, methods, and practices[8]. The research questions determined based on the research purpose:

1. Determine the influence of the blended learning environment on teaching design.
2. Identify future research directions for teaching in mixed learning environment.

## 3. Data Sources and Research Methods

The data comes from the Web of Science (WoS) database. The search for these articles on the WoS electronic database began in January 2020 and will end in April 2024. The WoS electronic database was chosen because of its high reputation and reliability in investigating major articles [8]. Based on a

search for "blended teaching" and "instructional design" as key topics, articles published from 2020 to April 2024 were identified and the articles were in English. In this study, a total of 10 articles were selected for meta-analysis research methods. Meta-synthesis is a qualitative research method that involves systematically reviewing and synthesizing findings from multiple qualitative studies to generate new insights or understandings.

## 4. Findings

### 4.1. The Influence of Teaching Design.

Teaching design in a mixed environment can have a variety of positive effects. Through the meta-analysis, it can be seen that ID improves students' participation and interaction ability and significantly impacts students' learning. At the same time, it also improves teachers' interaction and assessment ability and promotes teachers' reflection on teaching design. Figure 1 depicts the impact of ID implementation in a blended teaching environment.

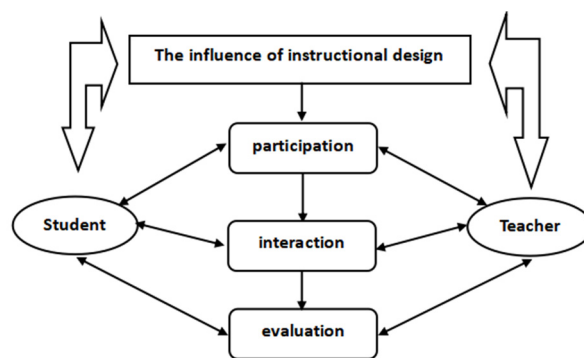


Figure 1. The influence of instructional design

The positive influence of instructional design is manifested in two aspects: teachers and students. Teachers and students, as two important subjects in teaching design in mixed environments, influence each other through teaching design.

The instructional design strengthens students' participation and interaction in the course learning. On the one hand, interaction is reflected in the interaction between students and students. Students responded to the curriculum design, peer assessment opportunities, and group work, which provided them with the opportunity to communicate and collaborate with their peers, improving students' learning satisfaction[26]. On the other hand, it reflects the interaction between students and teachers. In a technology-enhanced blended learning environment, teacher-student connection can influence students' self-efficacy. Therefore, ID can create a blended learning environment that effectively enhances self-efficacy[27]. [28] the research shows that a well-organized module structure and learning approach are key factors in promoting positive learning experiences for students.

In blended learning, the role of the teacher is crucial and teachers should be instructional designers and learning facilitators whose primary responsibility is to support students in a highly engaged and personalized learning experience[29].

**Table 1.** Literature list

Title	Author/s	Year	Journal 3
Instructional design with ADDIE and rapid prototyping for blended learning: validation and its acceptance in the context of TVET Bangladesh	Shariful Islam Shakeel · Md Abdullah Al Mamun · Md Faruque Ahmed Haolader	2022	Education and Information Technologies (2023) 28:7601–7630 <a href="https://doi.org/10.1007/s10639-022-11471-0">https://doi.org/10.1007/s10639-022-11471-0</a>
Creative Problem-Solving Process Instructional Design in the Context of Blended Learning in Higher Education	Nurrijal, Punaji Setyosari, Dedi Kuswandi and Saida Ulfa	2023	The Electronic Journal of e-Learning, 21(2), pp 80-97, available online at <a href="http://www.ejel.org">www.ejel.org</a>
Students' perceptions of an extensive blended learning implementation: the effects of instructional design and interaction	Marcelo Werneck Barbosa	2022	INTERACTIVE LEARNING ENVIRONMENTS <a href="https://doi.org/10.1080/10494820.2022.2121727">https://doi.org/10.1080/10494820.2022.2121727</a>
Exploring the Factors That Influence College Students' Academic Self-Efficacy in Blended Learning: A Study from the Personal, Interpersonal, and Environmental Perspectives	Yitong Wei, Yinghui Shi, Jason MacLeod, and Harrison Hao Yang	2022	SAGE Open April-June 2022: 1–12 © The Author(s) 2022 DOI:10.1177/21582440221104815 <a href="http://journals.sagepub.com/home/sgo">journals.sagepub.com/home/sgo</a>
Students' experience of peer-interaction in a blended learning course at a South African higher education institution	Kimera Moodley, Mari van Wyk, Eugenie Wolff, Anna Sophia Robberts	2022	International Journal of Technology Enhanced Learning ISSN online: 1753-5263 - ISSN print: 1753-5255
Perceptions of Saudi Students to Blended Learning Environments at the University of Bisha, Saudi Arabia	Ammar Anas	2020	Arab World English Journal (AWEJ) Special Issue on CALL Number 6. July 2020 Pp. 261-277 DOI: <a href="https://dx.doi.org/10.24093/awej/call6.17">https://dx.doi.org/10.24093/awej/call6.17</a>
Action research to reassess the acceptance and use of technology in a blended learning approach amongst postgraduate business students	Muhammad Surajo Sanusi	2022	Cogent Education <a href="https://doi.org/10.1080/2331186X.2022.2145813">https://doi.org/10.1080/2331186X.2022.2145813</a>
Investigating relationships among regulated learning, teaching presence and student engagement in blended learning: An experience sampling analysis	Hongjian Liao Qianwei Zhang · Lin Yang · Yuenong Fei	2023	Education and Information Technologies (2023) 28:12997–13025 <a href="https://doi.org/10.1007/s10639-023-11717-5">https://doi.org/10.1007/s10639-023-11717-5</a>
A Cost-Effective Work-Based Interprofessional Collaboration Program for Healthcare Professionals	Karli Brittz, University of Pretoria, South Africa	2023	International Journal of Online Pedagogy and Course Design Volume 13 • Issue 1 <a href="https://orcid.org/0000-0001-6342-567X">https://orcid.org/0000-0001-6342-567X</a>
Enriching the Linguistic Concept Development of English Undergraduates though Covid-Induced Blended Learning Pratices: A Design-Based Research Perspective	Anita Buczek-Zawila	2023	Zeszyt SPECJALNY / SPECIAL ISSUE DOI: <a href="http://doi.org/10.18290/rh237110s-2">http://doi.org/10.18290/rh237110s-2</a>

By controlling the factors of teaching design in the blended learning environment, teachers can support students at different stages and evaluate all aspects of teaching. Teachers should design and deliver dynamic learning to facilitate student engagement[29]. In the study of [30], the design of the learning environment has a significant impact on learners' interaction and engagement in BL courses. In a knowledge-centered environment, learners prefer to combine learning materials. In an evaluation-centric environment, they prefer flexibility and low anxiety.

In the application of instructional design, many scholars have mentioned the use of the ADDIE model. Since its inception at Florida State University in 1975, the add-on model has become increasingly influential[31]. This is an

iterative approach to instructional design in which instructional designers can make formative assessments based on any step in the process[32]. Teaching design using the ADDIE model effectively improves teaching practice in the blended learning environment by improving participation, interaction, and evaluation. This process-based model enables instructional designers, content developers, and even teachers to produce efficient, and effective instructional practices[33]. [34] studied ADDIE-based instructional design products to better support students' critical and creative thinking skills. With good thinking skills, students can take responsibility for regulating their participation in the problem-solving process. This learning design helps students become independent learners and work collaboratively in teams. Interaction is an

important mediator in instructional design practice, affecting more than 50% of instructional differences. Online interaction is more important than classroom interaction, and teacher-student interaction is more frequent than student-student interaction[26]. [24] reported that the application of the ADDIE enabled researchers to provide continuous feedback through evaluation of the contents and activities of the scaffold.

## 4.2. Follow-up Research Direction

Through the meta-analysis, it is found that there are still some problems in the teaching design in the mixed environment. Subsequent research can be summarized in the following four aspects.

In terms of research methods, in the existing research, qualitative research should be properly supplemented with quantitative research to improve the depth of data. The existing model research is still very few, and the application and attempt of various models can be strengthened in the future. There is a lack of control studies, such as teaching design in a mixed environment can better improve students' thinking ability, but there is a lack of different control studies for different age groups or teaching design[34]. It should also be contrasted to see if the relationships observed in the assessment study differ between first-time BL students and students who have experience with this pattern[10]. The research analysis also found that there is a lack of research on the multi-factor in teaching design in mixed environments. For example, it is suggested that future research on learning styles, learning strategies, and learning methods should be carried out in teaching design in mixed environments[28,29].

## 5. Conclusion

Instructional design under blended learning is an important environment that connects online and offline teaching and helps the two different instructional models play a positive role through the organization and implementation of instructional design methods. It can effectively improve teachers' and students' participation, interaction, and evaluation effect. So as to improve the teaching effect of the course and students' enthusiasm for learning. Because blended teaching continues to evolve along with instructional technology, research on it is increasing. Future research suggests strengthening the innovative application between different teaching models from the perspective of relevant stakeholders, comparing and evaluating the differences between different teaching methods, exploring the influence of teaching factors on teaching, and in-depth exploration of students and teachers in mixed teaching environments.

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