

# Approaches to the Blended Learning Organisation

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**Keywords:** Blended Learning, Blended Learning Organization, Teacher Education, Teacher Training, Teacher Retraining.


**Abstract:** The relevance of research on blended learning (BL) has increased significantly during and after the COVID-19 quarantine. Particular attention should be paid to teachers' training and retraining to conduct BL classes. The study aims to analyze scientific sources from the Scopus database systematically on the BL utilization in teacher training and retraining during the onset and progression of the COVID-19 pandemic. The final sample consisted of 27 sources. By analyzing studies, the following leading approaches to BL organization were identified: by the combination method (in particular, a pre-planned combining of face-to-face, synchronous and asynchronous distance learning through BL design and emergency transition from full-time to distance learning; combining of full-time and part-time forms of learning, learning on weekdays and weekends; on-campus and distance learning, etc.), by ICT tools (in particular, application LMS; institutional training in open courses posted on MOOC platforms; application of software and hardware for BL implementation); by pedagogical technologies BL (effective communication, interaction, and collaboration in the BL environment; teacher-led group and individual reflection on students' experience of using BL tools in their own lessons; students' work in small groups; project approach; mobile learning, in particular, on-demand learning; gamification in learning). The identified approaches to BL organization provide a number of advantages, including personalization; improved access to resources; intellectualization of learning. However, BL is not without its weaknesses, including dependence on technology; technical difficulties, and the need to train both teachers and students.

## 1 INTRODUCTION

The first studies on the introduction of blended learning (BL) in education date back to the beginning of the twenty-first century and the full-scale introduction of BL in education was organised in 2020 due to the need for social distancing caused by the COVID-19 pandemic (Kovalchuk et al., 2023). Even before the pandemic, researchers voiced numerous arguments in favour of using BL, including, for example, meeting the needs of learning in small remote and isolated areas where there are not enough students (of the same speciality) to form a group or there is no teacher or training centre, it is not possible to implement traditional – face-to-face – study programmes, to cover hard-to-reach areas (e.g., small islands, mountainous areas), as well as in case of lack of educational facili-

ties (Zagouras et al., 2022, p. 12944). It is also noted in (Asghar et al., 2022, p. 1) that “BL approaches are considered as the most viable for the delivery of training to remote areas and accessing learners at a mass level”, and that “students who cannot maintain regular traditional schools . . . with severe health issues . . . and students in long-term incarceration” (Asghar et al., 2022, p. 2). An important addition to the above is that BL promotes “continuity of the education during the COVID-19 crisis and even in war situations like Ukraine, Yemen” (Iyer et al., 2023, p. 43).

Scholars have consistently emphasised the relevance of research on the practical implementation of BL, as “a review of empirical research on BL can help stimulate thinking about effective strategies for designing and implementing BL teacher education programmes” (Keengwe and Kang, 2013, p. 480), but despite the numerous studies, “there are still limited studies concerning the implementation of BL”

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(Zagouras et al., 2022, p. 12942). One of the important factors influencing the effective implementation of BL approaches is the competence of teachers, so the issue of their BL and readiness to implement it needs to be studied first.

**The purpose of the study** is to systematically analyse scientific sources on the use of BL in teacher training and retraining at the beginning and during the development of the COVID-19 pandemic.

## 2 RESEARCH METHODOLOGY

The scientometric database Scopus was used to obtain a sample of publications. Since the goal is to analyse scientific sources on the use of BL for teacher training, a preliminary selection was made on 11.01.2023 using the search query: (TITLE-ABS-KEY ("blended learning") AND TITLE-ABS-KEY ("teacher education" OR "teacher training")). The query resulted in 397 sources. The chronological boundaries of the study, defined according to the objective as 01.01.2020 – 11.01.2023, allowed us to reduce the number of selected sources to 130. The need to get acquainted with the content of the sources led to a reduction in the sample by removing sources that were not publicly available. The final sample consisted of 27 sources: (Ridwan et al., 2020; Joseph and Trinick, 2021; Abaci et al., 2021; Zagouras et al., 2022; Asghar et al., 2022; Jiang et al., 2022; Jen and Hoogeveen, 2022; Meulenbroeks, 2020; Lorenza and Carter, 2021; Calderón et al., 2021; Theelen et al., 2020; Garcia-Ponce and Mora-Pablo, 2020; Harangus et al., 2021; Almendingen et al., 2021; Sumarni et al., 2021; Mihret et al., 2022; Şentürk, 2021; Kemaloglu Er and Bayyurt, 2022; Sutiah et al., 2020; Alsina Tarrés et al., 2022; Herliana et al., 2021; Jenkins and Crawford, 2021; Glietenberg et al., 2022; Le and Pham, 2021; Yan and Chen, 2021; Bozkurt, 2022; Short et al., 2021).

The analysis of the sample made it possible to identify the main areas of research (figure 1): a reflective review of own experience of implementing BL (Ridwan et al., 2020; Joseph and Trinick, 2021; Abaci et al., 2021), quantitative and qualitative analyses of certain aspects of BL implementation (Zagouras et al., 2022; Asghar et al., 2022; Jiang et al., 2022; Jen and Hoogeveen, 2022; Meulenbroeks, 2020; Lorenza and Carter, 2021; Calderón et al., 2021; Theelen et al., 2020; Garcia-Ponce and Mora-Pablo, 2020; Harangus et al., 2021; Almendingen et al., 2021; Sumarni et al., 2021; Mihret et al., 2022; Şentürk, 2021; Kemaloglu Er and Bayyurt, 2022; Sutiah et al.,

2020; Alsina Tarrés et al., 2022; Herliana et al., 2021; Jenkins and Crawford, 2021; Glietenberg et al., 2022; Le and Pham, 2021), and systematic reviews on the subject (Yan and Chen, 2021; Bozkurt, 2022; Short et al., 2021).

On the other hand, we can identify studies that have been conducted with both future teachers (Jiang et al., 2022; Meulenbroeks, 2020; Lorenza and Carter, 2021; Vielma Puente and Ruano, 2021; Theelen et al., 2020; Garcia-Ponce and Mora-Pablo, 2020; Harangus et al., 2021; Almendingen et al., 2021; Sumarni et al., 2021; Mihret et al., 2022; Şentürk, 2021; Ridwan et al., 2020; Kemaloglu Er and Bayyurt, 2022; Sutiah et al., 2020; Alsina Tarrés et al., 2022; Herliana et al., 2021; Jenkins and Crawford, 2021; Joseph and Trinick, 2021; Le and Pham, 2021) and practitioners (Zagouras et al., 2022; Asghar et al., 2022; Bruggeman et al., 2022; Jen and Hoogeveen, 2022; Calderón et al., 2021; Salonen et al., 2021; Abaci et al., 2021; Glietenberg et al., 2022).

The research geography covers Europe (Greece (Zagouras et al., 2022), Romania (Harangus et al., 2021), Netherlands (Meulenbroeks, 2020; Theelen et al., 2020), Croatia, Malta, Germany, Portugal, and Norway (Jen and Hoogeveen, 2022; Almendingen et al., 2021), France (Lami et al., 2021), Spain, the United Kingdom (Alsina Tarrés et al., 2022; Abaci et al., 2021), Belgium (Bruggeman et al., 2022), Finland (Salonen et al., 2021), and Turkey (Şentürk, 2021; Kemaloglu Er and Bayyurt, 2022)), Asia (Hong Kong (Jen and Hoogeveen, 2022), Pakistan (Asghar et al., 2022), China (Jiang et al., 2022), Indonesia (Sumarni et al., 2021; Ridwan et al., 2020; Sutiah et al., 2020; Herliana et al., 2021), Vietnam (Le and Pham, 2021)), Australia (Lorenza and Carter, 2021; Jenkins and Crawford, 2021; Joseph and Trinick, 2021), South America (Ecuador (Vielma Puente and Ruano, 2021), Mexico (Garcia-Ponce and Mora-Pablo, 2020)), Africa (Ethiopia (Mihret et al., 2022), South Africa (Glietenberg et al., 2022)) (figure 2).

Research topics include (figure 3):

- *BL in teacher training:*
  - BL organization for future teachers (Vielma Puente and Ruano, 2021; Le and Pham, 2021; Bruggeman et al., 2022), in particular during the COVID-19 pandemic (Sutiah et al., 2020; Herliana et al., 2021; Joseph and Trinick, 2021);
  - the impact of BL on the academic achievements of future teachers, in particular aspects of self-regulation of learning activities (Jiang et al., 2022), online activity (Salonen et al., 2021), and the development of 21st-century skills (Şentürk, 2021);

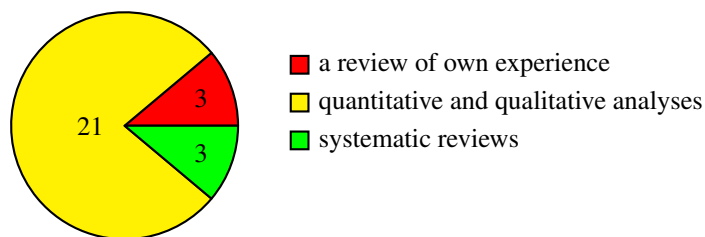


Figure 1: Distribution of sources by research area.

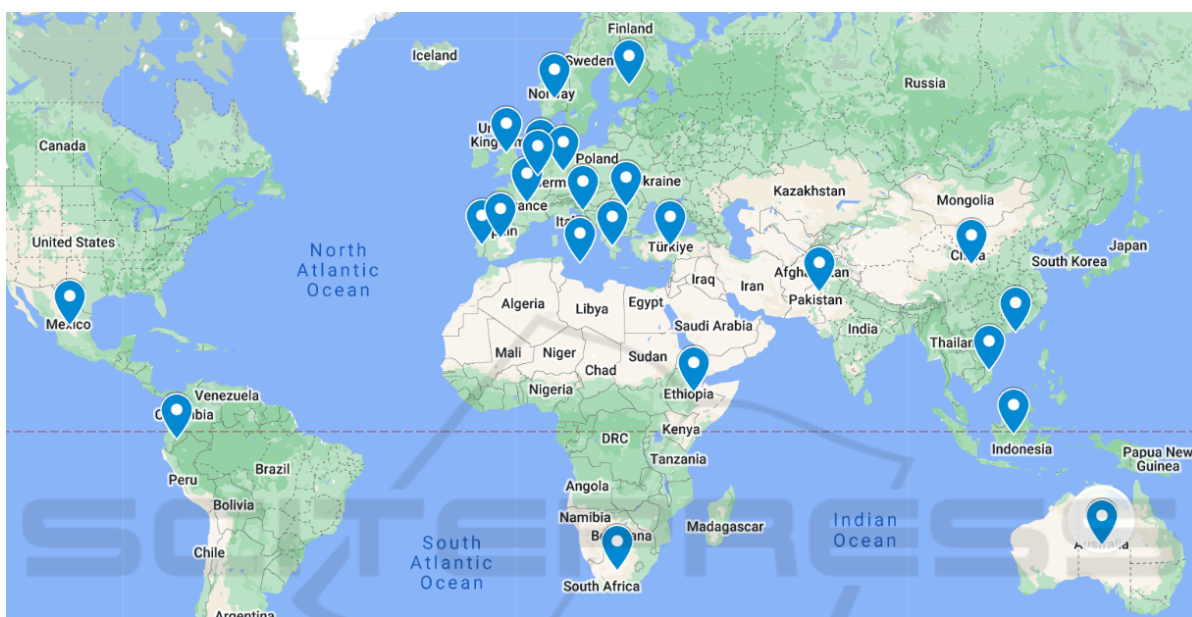


Figure 2: Research geography.

- academic mobility of future teachers in the BL context (Theelen et al., 2020; Alsina Tarrés et al., 2022);
- BL in the formation of future teachers’ professional competencies, including general (Almendingen et al., 2021) and methodological ones (Short et al., 2021; Harangus et al., 2021; Sumarni et al., 2021);
- BL in the training of subjects teachers: physical education and primary school (Calderón et al., 2021), English (Garcia-Ponce and Mora-Pablo, 2020; Ridwan et al., 2020; Kemaloglu Er and Bayyurt, 2022), physics (Mihret et al., 2022), music (Jenkins and Crawford, 2021);
- *BL in teacher retraining*: for teaching gifted children (Jen and Hooegeven, 2022) and using digital technologies in formal (Zagouras et al., 2022) and non-formal education (Abaci et al., 2021);
- *BL in teacher training and retraining*: determining the balance of BL parts (Asghar et al., 2022), analyzing the organization of emergency BL in

the context of COVID-19 (Meulenbroeks, 2020; Lorenza and Carter, 2021; Glietenberg et al., 2022).

### 3 RESULTS

While the studies of previous years focused more on the conceptual and theoretical foundations of BL, in particular, the definition of BL, discussion of its components, identification of BL organization models (Staker and Horn, 2012), etc., the beginning and the process of the COVID-19 pandemic are characterized by studies that consider the practical experience of BL implementation. The analysis of key papers (Zagouras et al., 2022; Asghar et al., 2022; Jen and Hooegeven, 2022; Meulenbroeks, 2020; Vielma Puente and Ruano, 2021; Garcia-Ponce and Mora-Pablo, 2020; Sumarni et al., 2021; Mihret et al., 2022; Şentürk, 2021; Lami et al., 2021; Ridwan et al., 2020; Kemaloglu Er and Bayyurt, 2022; Alsina Tarrés

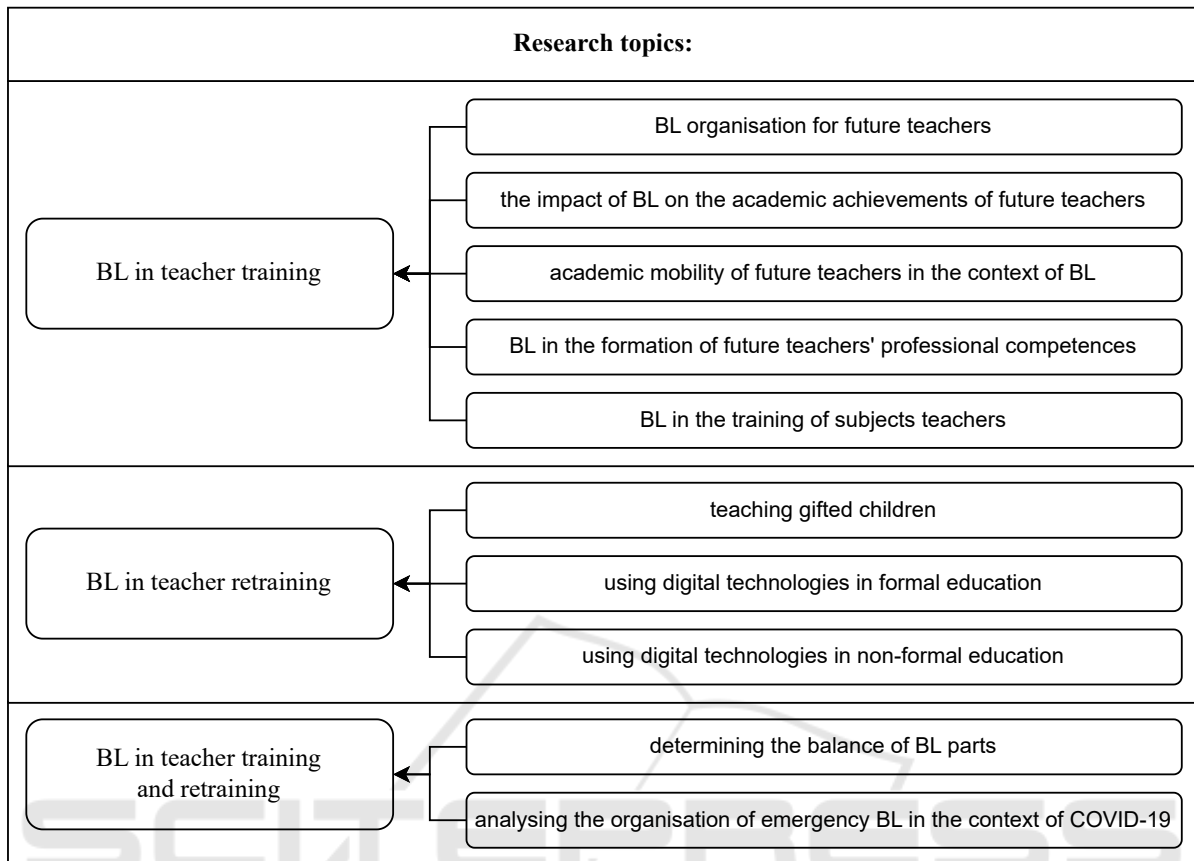


Figure 3: Research topics.

et al., 2022; Jenkins and Crawford, 2021; Joseph and Trinick, 2021; Salonen et al., 2021; Abaci et al., 2021; Glietenberg et al., 2022; Le and Pham, 2021) made it possible to identify the following *leading approaches to BL organisation* (figure 4):

- by the combination method:
  - pre-planned combining of face-to-face, synchronous and asynchronous distance learning (Zagouras et al., 2022; Asghar et al., 2022; Jen and Hoogeveen, 2022; Calderón et al., 2021; Mihret et al., 2022; Ridwan et al., 2020) through BL design (Lami et al., 2021; Ridwan et al., 2020; Abaci et al., 2021);
  - emergency transition from full-time to distance learning (Meulenbroeks, 2020; Sutiah et al., 2020; Abaci et al., 2021; Glietenberg et al., 2022);
  - combining of full-time and part-time forms of learning (Zagouras et al., 2022);
  - combining learning on weekdays and weekends (Zagouras et al., 2022);
  - combining on-campus and distance learning (Zagouras et al., 2022; Şentürk, 2021; Mihret et al., 2022; Jen and Hoogeveen, 2022);
  - combining learning in different physical locations that are related to the student's educational and professional activities (Abaci et al., 2021);
  - combining teaching methods into learning strategies (Ridwan et al., 2020);
- by ICT tools for BL:
  - application of learning support systems: LMS (Blackboard (Zagouras et al., 2022; Glietenberg et al., 2022), Moodle (Zagouras et al., 2022; Jenkins and Crawford, 2021; Salonen et al., 2021), Elena (Sumarni et al., 2021), Google Classroom (Sutiah et al., 2020)) and CMS (Ridwan et al., 2020);
  - institutional training in open courses posted on MOOC platforms (edX (Vielma Puente and Ruano, 2021));
  - application of software tools:
    - \* to assess learning achievements (Zagouras et al., 2022; Meulenbroeks, 2020; Şentürk, 2021);

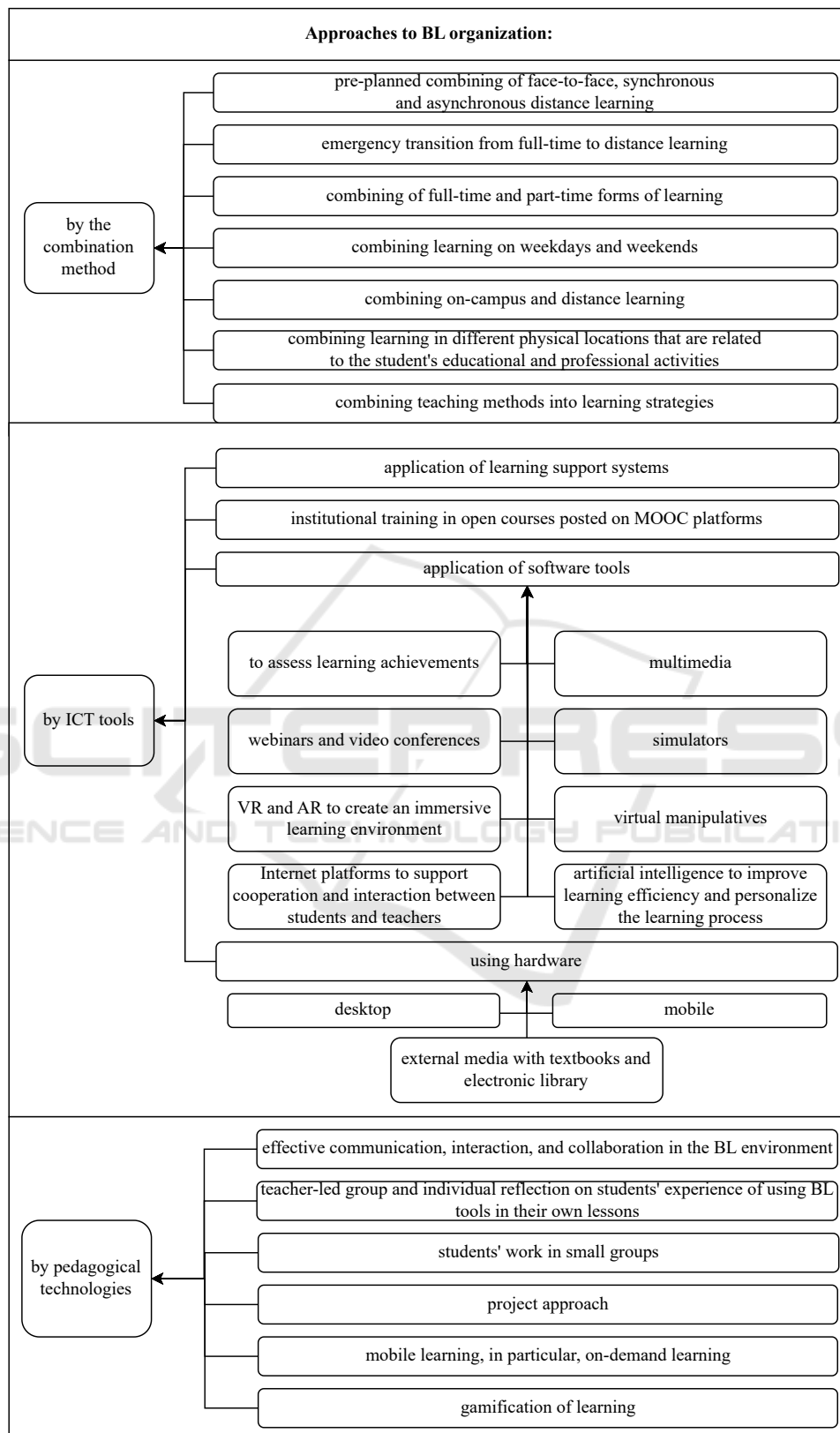


Figure 4: Approaches to BL organization.

- \* webinars (Zagouras et al., 2022; Jen and Hoogeveen, 2022; Abaci et al., 2021) and video conferences (Meulenbroeks, 2020; Sutiah et al., 2020; Abaci et al., 2021);
- \* multimedia (Asghar et al., 2022) (in particular, informational videos, lecturer recordings (Vielma Puente and Ruano, 2021; Lami et al., 2021; Salonen et al., 2021; Le and Pham, 2021), video blogs (Jen and Hoogeveen, 2022), animations (Şentürk, 2021), presentations (Ridwan et al., 2020; Le and Pham, 2021), and other interactive materials (Vielma Puente and Ruano, 2021));
- \* virtual reality (VR) and augmented reality (AR) to create an immersive learning environment (Fragkaki et al., 2020);
- \* simulators (Mihret et al., 2022);
- \* virtual manipulatives (Mihret et al., 2022);
- \* artificial intelligence to improve learning efficiency and personalize the learning process (Salonen et al., 2021; Pospíšilová and Rohlíková, 2023);
- \* Internet platforms to support cooperation and interaction between students and teachers:
  - social networks (Joseph and Trinick, 2021);
  - messengers (WhatsApp (Asghar et al., 2022; Kemaloglu Er and Bayyurt, 2022; Salonen et al., 2021));
  - e-mail (Asghar et al., 2022; Salonen et al., 2021);
  - online voting and surveys (Meulenbroeks, 2020; Vielma Puente and Ruano, 2021);
  - online chats (Meulenbroeks, 2020; Calderón et al., 2021; Şentürk, 2021; Abaci et al., 2021);
  - online forums (Meulenbroeks, 2020; Şentürk, 2021; Ridwan et al., 2020; Kemaloglu Er and Bayyurt, 2022; Jenkins and Crawford, 2021);
  - virtual whiteboards (Vielma Puente and Ruano, 2021);
- using hardware for BL implementation:
  - \* desktop (computers (Asghar et al., 2022));
  - \* mobile (laptops (Asghar et al., 2022; Jenkins and Crawford, 2021), mobile phones (Asghar et al., 2022; Kemaloglu Er and Bayyurt, 2022; Jenkins and Crawford, 2021), tablets (Jenkins and Crawford, 2021));
  - \* external media with textbooks and electronic library (Asghar et al., 2022);
- by pedagogical technologies BL:
  - effective communication, interaction, and collaboration in the BL environment (Zagouras

et al., 2022; Şentürk, 2021; Alsina Tarrés et al., 2022; Jenkins and Crawford, 2021; Joseph and Trinick, 2021);

- teacher-led group and individual reflection on students' experience of using BL tools in their own lessons (Zagouras et al., 2022; Jen and Hoogeveen, 2022; Garcia-Ponce and Morapablo, 2020; Alsina Tarrés et al., 2022; Jenkins and Crawford, 2021);
- students' work in small groups (Meulenbroeks, 2020; Joseph and Trinick, 2021);
- project approach (Garcia-Ponce and Morapablo, 2020; Sumarni et al., 2021; Joseph and Trinick, 2021);
- mobile learning, in particular, on-demand learning (Glietenberg et al., 2022; Jenkins and Crawford, 2021);
- gamification of learning (Hooda et al., 2022; Handle-Pfeiffer and Winter, 2021).

## 4 CONCLUSIONS

The identified approaches to BL organization provide a number of advantages, including

- *personalization*: BL provides a more individualized and adapted approach to learning, students can work at their own speed and focus on their specific needs and interests;
- *increased engagement*: the introduction of technology and online resources into the learning process can increase student interest and motivation;
- *flexibility*: BL provides students more flexibility in choosing when and where to study, and can accommodate different learning styles;
- *improved access to resources*: BL gives students access to a wider range of learning materials, such as online videos and simulations, that may not be available in a traditional classroom;
- *increased efficiency*: BL can increase the efficiency of the learning process by allowing teachers to use class time more efficiently and cover more material;
- *intellectualization of learning*: using data to monitor students' progress and make changes to teaching.

At the same time, BL is not without its weaknesses, including

- *access to technology*: for successful BL, teachers, and students need to have access to appropriate

hardware/software and the Internet. For some students, especially those from low-income families, this can be a barrier;

- *technical difficulties*: the use of technology can be subject to technical difficulties and glitches, which can disrupt the learning process and cause frustration for both students and teachers;
- *teacher/student training*: both teachers and students need training on how to integrate/use technology effectively, as well as support in navigating the various BL tools and platforms. As we can see, many institutions have created special commissions/centers for teacher training or technical support during BL or individual consultations, but there are also cases of the absence of such a centralized policy in educational institutions.

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