Journal of Advances in Medical Education & Professionalism

Evaluation of Blended Learning in Terms of the Perceptions of Medical Students: A Mixed Method Study

SALMAH SHELLY[1,2*], MD; IRFAN IDRIS[1,3], MD; NASRUDDIN ANDI MAPPAWARE[1,4], MD; HAERANI RASYID[1,5,6], PhD; AGUSSALIM BUKHARI[1,6], MD, PhD; ICHLAS NANANG AFANDI[1,7], PhD; ASTY AMALIA[1,8], MD

[1]Departement of Medical Education, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia; [2]Departement of Histology, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia; [3]Departement of Physiology, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia; [4]Departement of Obstetrics and Ginecology, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia; [5]Departement of Internal Medicine, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia; [6]Departement of Clinical Nutrition, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia; [7]Psychology Study Program, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia; [8]Departement of Anatomy, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia

Introduction: The ongoing 4.0 industrial evolution, characterized by the rise of digital technology, has had a massive impact on human lifestyles worldwide. Faculty members in medical school are expected to respond to this industrial revolution by implementing teaching strategies, one of which is Blended learning as a suitable solution to overcome the limitations of space and time in the teaching process. For effective utilization of blended learning, it is important to conduct extensive studies on its implementation. The aim of this study was to assess the effectiveness and efficiency of implementing blended learning in the faculty of medicine in Hasanuddin University from the students' perspective.

Methods: This study used a sequential explanatory mixed method approach, combining quantitative and qualitative methods. The quantitative part involved 782 undergraduate medical students from the first, second, and third years. Data were collected through a questionnaire survey distributed among the students. The qualitative part of the research was conducted through focus group discussions involving 13 students based on the questionnaire scores, representing both high and low scores. The results of the quantitative and qualitative research were collected and integrated.

Results: Based on the results, the majority of students agreed that blended learning provided many advantages to their learning (Mean±SD: 3.79±0.78). Also, they reported e-learning platform significantly contributed to their learning process (Mean±SD: 3.88±0.67). The workload of blended learning method was still considered quite heavy by students, and good time management was highly needed (Mean±SD: 3.45±0.84). As for qualitative part, some positive results were obtained; they reported that it increased motivation for learning, enhanced the efficiency of learning and gaining adaptability, while the negative opinions were the network error in e-learning, erratic e-learning display, and video quality problem.

Conclusion: Most of the students expressed positive opinions about the advantages of blended learning; according to them, learning was more efficient and effective, it enhanced learning motivation, and it provided comprehensive accessible learning materials.

Keywords: Active learning, Student, Perspective, Learning

Introduction

Medical education has changed due to the quick advances in science and technology as well as the growing public knowledge of ailments. The learning process, which was at first exclusively teacher-centered is now beginning to change as lecturers encourage the students to actively seek the knowledge and skills they need (1). Active student participation in the learning process is crucial because it fosters the development of students' critical thinking and problem-solving abilities, helping them to become more adaptive (2). Blended learning is a popular option used today, which combines traditional classroom instruction with online learning including web-based instruction, streaming video, audio, synchronous and asynchronous communication, or the best aspect of information technology application (3).

A paradigm change from a traditional learning model to a student-centered learning model is represented by blended learning. In order to create effective, efficient, and adaptable learning, blended learning mixes face-to-face interactions with online learning opportunities (4, 5).

In a formal education program called blended learning, students learn at least partially online and at their own pace and according to their own schedules (6). The influence of these new teaching strategies on student learning outcomes comes from enhancing them rather than by decreasing or replacing them with technology (7).

However, despite the potential of blended learning to enhance flexibility and accessibility of education and to help students develop relevant digital skills, it is still essential to understand students' perceptions of this teaching method. By understanding the students' perceptions of blended learning, valuable insights can be gained to improve instructional design, adjust teaching strategies, and provide the students with appropriate support and understanding. Research on students' perceptions of blended learning can offer a holistic view of how this method can be effectively integrated into the education system and identify the potential improvements to maximize the benefits of blended learning for students.

Methods

Based on the curriculum of the undergraduate medical program of the faculty of Medicine in Hasanuddin University has implemented blended learning since 2017. Numerous educational resources are included in this program that will be used in blended learning techniques. Students can complete the learning process with the use of learning tools like instructional videos, lecture presentation materials, assignments, and various formative exams.

The role of both lecturers and students in the learning process has undergone significant modifications as a result of the implementation of blended learning. Evaluation of the learning environment is crucial for the proper usage of blended learning. In order to maximize the efficacy of the implementation of blended learning, this study aimed to ascertain how students perceive it.

Study Design

This study used an explanatory mixed methods approach, allowing the researcher to gather data both quantitatively and qualitatively. Therefore, this study can provide a more comprehensive and in-depth insight into the student's perceptions of blended learning. In the first phase, quantitative data were collected through questionnaires to examine the student's perception of the implementation of blended learning, followed by qualitative method to further explore implementation of blended learning through focus group discussion. This study was conducted on the undergraduate medical program of the faculty of Medicine in Hasanuddin University, from February to May 2023.

Instrument

Questionnaire development in the quantitative research:

A modified version of the Perception of the Blended Learning Environment questionnaire was used as the questionnaire (8). It is an adaptation of the questionnaire used in the study by Han and Ellis (2020). Several statements were adjusted to align it with the research objectives and conditions, resulting in a total of 14 statements. These statements were categorized into three topics: General Perception of Blended Learning (5 statements), Perception of the Contribution of Online Platforms (e-learning) (5 statements), and Perception of Workload (4 statements). The questionnaire was scored using a 5-point Likert scale; 5 indicated "strongly agree", 4 indicated "agree", 3 indicated "neutral", 2 indicated "disagree", and 1 indicated "strongly disagree". The questionnaire was tested for the validity and reliability using Pearson correlation.

In the qualitative research, a Focus Group Discussion (FGD) was conducted, involving participants from the quantitative study who voluntarily agreed to participate in the qualitative research. The FGD sessions were facilitated by trained facilitators who were not involved in the

research and had received guidance from the researchers regarding the research objectives. The questions used in the FGD were semi-structured and designed by selecting themes that were relevant to the research objectives and derived from the results of the questionnaire. The qualitative research data served to strengthen and confirm the preliminary data obtained from the quantitative study. During this process, the researchers recorded the FGD sessions using a laptop video and enhanced the audio quality by using a portable microphone.

Sampling and participants' characteristics

The participants in the quantitative phase of the research were selected using the census enumeration method, which includes all active students in the first, second, and third years of the undergraduate medical program of the faculty of Medicine, Hasanuddin University, who were willing to complete the questionnaire comprehensively. The exclusion criteria were students who were not registered as participants at the time of study and those who were not willing to participate in the research. The total number of participants in the quantitative phase of the research who met the inclusion criteria was 782 individuals.

In the qualitative study, there were 13 participants who fulfilled the specified criteria. They willingly volunteered to take part in the focus group discussion and possessed a thorough understanding of the research goals. Furthermore, they were capable of contributing valuable data regarding the implementation of blended learning. Among the FGD participants, there were 9 females and 4 males, with 3 being from the first year, 6 from the second year, and 4 from the third year.

Data analysis and statistical methods

Quantitative data were collected through a Google Form questionnaire and analyzed using IBM SPSS software, version 26.0. Descriptive statistics were presented using percentages, means, standard deviation, and significance value. Validity was tested using the Pearson correlation, and reliability was assessed using Cronbach's Alpha test, which showed a valid and reliable value (r count above r table) (9)

Qualitative data obtained during the FGD were recorded in video format and then transcribed verbatim. The verbatim transcripts were analyzed, and the themes were identified by an experienced independent team to categorize the information according to the research objectives. MAX QDA 2020 was used for the thematic analysis.

Ethical approval

Hasanuddin University ethics committee approved the study (UH23020084). Before the study was conducted, the research subjects are provided with detailed information and explanation about the study and were assured of the confidentiality of their personal data. The respondents then filled out a consent form to become research participants.

Results
Quantitative Data

As shown in Table 1, the number of participants who completed the questionnaire was 782 medical students, consisting of 250 males (32%) and 532 females (68%). Based on their academic year, the participants were divided into first-year students, totaling 331 individuals (42.3%), second-year students, totaling 204 individuals (26.1%), and third-year students, totaling 247 individuals (31.6%). Each different academic year group received a different duration of exposure to blended learning.

Table 1: Demographic Characteristic of Quantitative Respondent

Variable	N (%)
Age (year)	
17-19	455 (58.2%)
20-23	327 (41.8%)
Gender	
Male	250 (32%)
Female	532 (68%)
Years of study	
Year 1	331 (42.3%)
Year 2	204 (26.1%)
Year 3	247 (31.6%)

As shown in Table 2, the majority of the students believed that the use of blended learning increased their learning enjoyment (Mean±SD: 3.71±0.78); it also had many benefits, such as encouraging an independent learning attitude (Mean±SD: 3.89±0.72); increasing learning effectiveness (Mean±SD: 3.73±0.80); improving learning motivation (Mean±SD: 3.80±0.79); and making interaction and communication between the lecturers and students (Mean±SD: 3.86±0.79).

The e-learning platform contribution to blended learning included facilitating students' comprehension of all lecture material (Mean±SD: 4.02±0.75), assisting in learning evaluation (Mean±SD: 3.98±0.74), and aligning the learning resources of e-learning platform with face-to-face learning (Mean±SD: 3.92±0.75).

To complete the learning activities on the e-learning platform, however, most of the

30

J Adv Med Educ Prof. January 2024; Vol 12 No 1

Table 2: Mean score in each item on perception of blended learning

NO.	Statement	Mean±SD
	Perception of General Blended Learning	
1	More fun learning with Blended learning.	3.71±0.80
2	Blended learning can foster an attitude of independent learning.	3.89±0.72
3	Blended learning fosters motivation in the learning process.	3.80±0.79
4	Blended learning makes the learning process more effective.	3.73±0.80
5	Blended can make it easier for lecturers and students to interact and communicate with each other anytime and anywhere.	3.86±0.79
	Perception of the contribution of online platforms (e-learning)	
6	Learning with an online platform (e-learning) helps me to better understand the course material.	4.02±0.75
7	Learning resources in online platforms (e-learning) are very helpful to understand the material in class.	4.06±0.72
8	Learning materials from online platforms (e-learning) help in learning evaluation.	3.98±0.74
9	I found that the material on the online platform (e-learning) was very helpful in my learning.	4.01±0.71
10	All learning activities on the online platform (e-learning) are in line with face-to-face activities.	3.92±0.75
	Perception of the workload	
11	I need more time to fulfill learning activities on online platforms (e-learning).	3.71±0.82
12*	Learning with online platforms (e-learning) takes too much time.	3.23±0.92
13*	The workload for learning activities on online platforms (e-learning) is too heavy.	3.12±0.89
14	Balancing well between online learning (e-learning) and other tasks will help lighten my workload.	3.73±0.74

*Negative statement

students required additional time (Mean±SD: 3.71±0.82). Students frequently reported that their assignments were too heavy (Mean±SD: 3.12±0.89). To reduce the workload of blended learning, the majority of students tended to state (Mean±SD: 3.73±0.74) that a balance between learning on e-learning platforms and other learning was required.

Qualitative Data

Three themes emerged from the thematic analysis of the qualitative data gathered during the FGD. These include the general perception of blended learning, workload associated with blended learning, and the utilization of e-learning platform. Additionally, participants were asked for their suggestion regarding the evaluation and improvement of the implementation of blended learning. Assessment of the trustworthiness of qualitative research data requires consideration of four key aspects, namely credibility, transferability, dependability, and confirmability (10). This study used a variety of measures to ensure the reliability of the qualitative data. These measures included maintaining a comprehensive audit trail, documenting the data collection and analysis process, and conducting peer reviews of research data.

General Perception of Blended Learning
● *Positive results*
1. Increasing motivation for learning
Participants in the study revealed that blended learning encouraged the students to further their acquired knowledge. Here is a statement that demonstrates this.

"I was triggered to watch the video and was afraid that I would not be able to answer questions about the day's material" (participant 4).
2. Enhancing the efficiency of learning
Participants believed that because they watched the video and studied before the talk, it might be simpler to have a more focused conversation.

"When I discuss teaching videos that I see at home with friends, we can exchange information" (participant 7).
3. Gaining adaptability
Participants believed they could choose any time to study.

"We can access it anytime if we want outside of lecture hours" (participant 6).
"E-learning can be accessed at any time, so I can adjust when I will learn" (participant 11).

● *Negative results*
1. The initiative to find their own educational resources is not taken into account by students.
Using a variety of educational tools and approaches to discourage students from seeking out their own sources of information.

"The material in e-learning is already complete, making me lazy to search another material" (participant 4).
2. Between online and offline sessions, there is no synchronization.
Videos used in e-learning do not correspond to the information presented in offline sessions, and offline materials frequently merely rehash online/video content.

"All the material explained by the lecturer in the video is not necessarily in sync with the

lecture, so if, for example, it is explained again directly, of course it will be difficult for students to understand" (participant 10).

"I think there needs to be synergy between online and offline materials" (participant 13).

3. Lecturers take students' comprehension level into consideration.

The professor assumed that because the online session was the first, all students were already familiar with the topic.

"Not all students have studied, so there will be students who already understand, and there are also students who do not understand" (participant 8).

"During the offline session, lecturers ask questions without knowing our previous learning readiness" (participant 10).

Blended Learning Workload

Participants stated that flexible online sessions were accessible at any time and from any location, which makes learning easier for students. However, doing so is now optional, so that the blended learning workload is manageable.

● *Positive results*

Blended learning does not require a lot of learning.

Participants believed that students might attend flexible online sessions at any time and any place, which makes learning easier for them.

"I'm very happy with blended learning because we can study at night, so when in class, we only need to remember what we have learned at home. Thus, our burden to work in this class is no longer heavy" (participant 1).

"It helps to be more focused and easier when studying in class because you have studied the night before, so in the offline session, you just strengthen the important things" (participant 2).

● *Negative result*
Too much information

Participants concur that the amount of teaching resources in e-learning prevents them from finishing on time.

"A lot of material is actually assigned for 1 day; it can be up to 7 materials and a lot of videos and we can definitely not watch all of them" (participant 3).

"Too much material, blended learning but little time to learn through e-learning, so it becomes a burden on students if they are required to watch learning videos before class starts; it is better to have a discussion activity" (participant 6).

Utilization of E-learning Platforms

● *Positive results*

1. Give students a chance to practice and prepare the content.

Students use e-learning to review what they have learned in class after they leave. E-learning contains study tools for tests.

"When I watched the video and then reexplained it in class and then continued the discussion session with friends, I could easier remember the material because of the continuous repetition" (participant 10).

"When going to exams, I can read exam learning resources through e-learning" (participant 9).

2. Incredibly useful for finishing college homework

Students have easy access to assignment materials through e-learning, which makes completing tasks quicker and simpler.

"Because the materials are available, it makes it easier for me to complete the assignments from the lecturers" (participant 4).

● *Negative results*

1. A network error in e-learning

Due to the high number of users in the campus area and the network dependency of e-learning, participants become irritated, especially while using it on campus.

"When on campus, it is quite difficult to access e-learning because many people use it. Thus, it can't be maximally used" (participant 13).

2. The e-learning display is erratic.

Participants believe that the e-learning presentation is erratic.

"It is very helpful if the e-learning is neatly arranged because sometimes it's really messy" (participant 12).

"In terms of making videos and making PPT and teaching in class, there must be rules" (participant 11).

3. Video quality

Participants thought the instructional movies were too long and of worse quality.

"Watching videos through YouTube channels is more interesting because it is more detailed and provides concise explanation" (participant 3).

"The video is indeed too long, and then the explanation is too complex" (participant 5).

Contributions to Evaluating and Enhancing Blended Learning

1. Improve the lecturers' proficiency in using e-learning

To fully utilize blended learning, lecturers as well as students must be skilled in the usage of e-learning.

"Not only students must be able to master e-learning but also lecturers are also expected to master e-learning, so that they can provide the material appropriately, more up-to-date; in this way, the students can easily access the materials that have been prepared by lecturers" (participant 8).

2. Make e-learning more accessible

"There are quizzes that are both open in e-learning; sometimes it takes longer to load" (participant 2).

"There are E-learning problems like errors. Maybe it's because there are too many users, especially on campus" (participant 12).

3. Improve the appeal of instructional videos

One of the crucial components of blended learning is instructional video production.

"Maybe for the video to be made even shorter" (participant 5).

"Let's just make a video that explains outline all the contents of the material" (participant 9).

Integration of Quantitative and Qualitative Data

As shown in Table 3, the integration of quantitative and qualitative research findings in this study revealed three themes for positive perceptions and one theme for negative perceptions of students towards blended learning. For the positive theme, it was found that blended learning was effective and could enhance the efficiency of learning while encouraging increased motivation for learning. Additionally, the availability of learning materials on the

e-learning platform meets the students' learning needs. On the other hand, for the negative theme in this study, it was found that students require more time for learning activities (Table 4 and 5).

Discussion

Although blended learning is a popular teaching strategy used in educational institutions, particularly in the field of medicine, and is thought to be able to meet a variety of students' needs, there are a number of difficulties that could prevent this approach from fully realizing its potential.

In this study, positive and negative perceptions were found regarding the implementation of blended learning in the undergraduate medical study program. Positive perceptions of blended learning include increased student learning motivation, encouragement of independent learning, and learning flexibility, which contribute to improved efficiency of learning. Additionally, the availability of comprehensive learning materials on the e-learning platform also helps students fulfill their learning needs.

This is consistent with earlier research that shows that one of the strengths of blended learning is its flexibility and focus on students' learning needs that enhance their independent learning (11). In other studies, blended learning offers flexibility in the learning process and curriculum and increases access to information (12, 13). One of the benefits of blended learning is also conveying positive feelings to students (14).

Table 3: Integrating quantitative and qualitative data on students' perceptions of blended learning

Quantitative Result	Qualitative Result	The result of Integration
Positive Perception		
Blended learning is enjoyable. Blended learning makes the learning process more effective. It enhances learning motivation and encourages independence. Blended learning makes lectures more communicative. The teaching materials on the e-learning platform meet the students' learning needs. The teaching materials on the e-learning platform are highly beneficial for understanding the learning materials and evaluations.	Improving learning motivation. Effective and flexible. The teaching materials on the e-learning platform help students better understand the learning materials.	Effective and efficient. Enhancing learning motivation. The teaching materials on the e-learning platform meet the student's learning needs.
Negative perception		
Blended learning activities require more time. Blended learning activities can be quite heavy.	Students become less proactive. Lack of synchronization between online and offline learning. Lecturers assume the same level of understanding among students. Blended learning learning activities require more time. Videos are too long and of insufficient quality IT quality. Unattractive e-learning interface.	Blended learning activities require more time.

Table 4: Validity Test and Reliability Test of Blended Learning Questionnaire

NO.	Statement	r-Calculated[a]	Cronbach-α[b]
	Perception of General Blended Learning		
1	More fun learning with Blended learning.	0.614	0.857
2	Blended learning can foster an attitude of independent learning.	0.719	0.855
3	Blended learning fosters motivation in the learning process.	0.726	0.855
4	Blended learning makes the learning process more effective.	0.794	0.856
5	Blended can make it easier for lecturers and students to interact and communicate with each other anytime and anywhere.	0.810	0.858
	Perception of the contribution of online platforms (e-learning)		
6	Learning with an online platform (e-learning) helps me to better understand the course material.	0.728	0.856
7	Learning resources in online platforms (e-learning) are very helpful to understand the material in class.	0.804	0.855
8	Learning materials from online platforms (e-learning) help in learning evaluation.	0.816	0.854
9	I found that the material on the online platform (e-learning) was very helpful in my learning.	0.739	0.855
10	All learning activities on the online platform (e-learning) are in line with face-to-face activities.	0.740	0.858
	Perception of the workload		
11	I need more time to fulfill learning activities on online platforms (e-learning).	0.636	0.873
12	Learning with online platforms (e-learning) takes too much time.	0.465	0.884
13	The workload for learning activities on online platforms (e-learning) is too heavy.	0.468	0.885
14	Balancing well between online learning (e-learning) and other tasks will help lighten my workload.	0.598	0.864

[a]Pearson test=Validity test (valid if above r table) (9); [b]Pearson test=Reliability test (reliable if above r table) (9).

Table 5: List of FGD Question

NO.	Question
1	Do you know what blended learning is? Please explain.
2	Do you like blended learning? If yes, what are the reasons? If no, what are the reasons?
3	How do you perceive the workload in blended learning? If it's heavy or not, please provide reasons.
4	How do you manage your time when it comes to blended learning?
5	Regarding the use of e-learning platforms, do they enhance your learning activities? If yes or no, please provide reasons.
6	What are your expectations and suggestion for improving the implementation of blended learning in the future?

Students in this study agreed that the e-learning platform really helps them to better understand the lecture materials, assists in working on assignments, and assists the students in learning evaluation. Moreover, the availability of infrastructure, specifically e-learning platforms, is one of the crucial elements that facilitate blended learning methods. Through blended learning, students are able to independently learn the learning material by utilizing the resources available on the e-learning platform, which provides them the opportunity to prepare and review the material anywhere and anytime (15). Flexibility assists students in the learning process, turning it into a support rather than a burden (16).

The availability of comprehensive learning materials on the e-learning platform in blended learning has received positive responses from students. The quantitative results indicate that the e-learning platform is highly beneficial in meeting the students' learning needs. The qualitative findings also support it, indicating that the use of the e-learning platform in blended learning significantly contributes to fulfilling the students' learning needs and provides an effective means of evaluating their understanding.

Blended learning allows for the utilization of diverse digital resources, such as instructional videos, simulations, and other interactive learning materials. The use of these resources helps the students comprehend challenging concepts and enriches their learning experience (17). Through technology integration in education, students also develop important technological skills relevant in this digital era. They become accustomed to using various online tools and platforms, which will be advantageous for their future careers and daily lives (18).

The use of the e-learning platform in blended learning has been a relevant topic of research in the field of education. Numerous studies have

been conducted to evaluate the effectiveness of e-learning platforms in the context of blended learning. Research carried out by Zhang et al. (2020) investigated the use of e-learning platforms in higher education blended learning contexts, demonstrating that it enhances learning effectiveness, optimizes teacher-student interactions, and increases student engagement in the learning process (19). Moreover, using e-learning platforms can lead to better learning outcomes and provide a more positive learning experience for students (20).

The results of Kenan's research (2013) using the SWOT framework show that the accessibility of electronic content for lecturers and students in e-learning is one of the strengths of higher education institutions (21). The availability of good infrastructure for learning methods of e-learning can be one of the forces to facilitate migration from traditional learning methods to modern ones in every educational institution. This is consistent with Husamah's (2013) explanation of some of the advantages of blended learning, which also mentions that through blended learning, students are free to learn the subject matter independently by using the material available online, students can discuss with teachers or other students away from the classroom, and with blended learning, learning activities carried out by students away from the classroom can be managed and controlled properly by the teacher (22).

Access to learning resources and technology for students and lecturers is a crucial issue that must be considered; in this case, they require culturally appropriate learning resources and technology. It is crucial to gather specific information about issues and solutions for each learning environment, so that improvements can be made more effectively, and better educational opportunities can be offered to students (23, 24).

Regarding learning activities in blended learning, it requires more time for students to complete their learning tasks. However, respondents also acknowledge that by balancing learning with e-learning platforms and other tasks, workload can be managed more effectively.

Therefore, it is essential for educational institutions and educators to pay attention to managing the students' learning activities when using e-learning platforms. Efforts can be made to enhance platform utilization efficiency, provide clear guidelines on time allocation, and strike a balance between online and offline learning tasks to effectively manage the students' workload.

Several studies have been conducted to evaluate the workload in the context of blended learning. For instance, a study by Hew et al. (2016) on students' workload in blended learning showed that the use of technology in learning, including accessing and interacting with e-learning platforms, could add to the students' workload. Students need to manage their time effectively, adapt to different learning environments, and acquire necessary technological skills (25). Another study by Balci (2017) on students' workload in blended learning at the higher education level demonstrated that blended learning could increase the task demands and time requirements for students, particularly in managing and accessing online materials, participating in online discussions, and completing assignments or projects given through the e-learning platform (26). How students manage their time so that they can complete all learning activities, in both e-learning and face-to-face learning, affects the effectiveness of the blended learning method, according to Eke's research (27).

The strengths and weaknesses of this blended learning method are expected to be revealed in this study to provide insight for policymakers and universities on how strategies for smooth blended learning methods get full benefits.

Conclusion

Based on the results and discussions, researchers came to several conclusions. The majority of students expressed positive opinions about the advantages of blended learning; to them, learning was more efficient and effective, it enhanced their learning motivation and provided comprehensive and easily accessible learning materials.

There are several suggestions from students for improving the implementation of blended learning, including enhancing the competency of lecturers, particularly in technology skills, upgrading infrastructure and IT facilities, and improving the quality and updating of teaching materials.

We encourage future researchers to use this research as a reference to explore the different aspects of Blended Learning and its benefit to medical education.

Acknowledgement

Authors' Contribution

SSh, conception or design of the work, data collection, data analysis and interpretation, drafting the article, critical revision of the article, and final approval of the version to be published. II, conception or design of the work, data analysis and interpretation, critical revision of the article, and final approval of the version to be published. NAM, HR, AB, INA, AA. conception or design of the work, critical revision of the article, and final approval of the version to be published.

Conflict of Interest

The authors declare no conflicts of interest.

References

1. Hussin AA. Education 4.0 made simple: Ideas for teaching. Int J Educ Lit Stud. 2018;6(3):92–8.
2. Peterson TO. So you're thinking of trying problem based learning?: Three critical success factors for implementation. J Manag Educ. 2004;28(5):630–47.
3. Sukoco PC. Blended learning dalam Pembelajaran. USA: Allen Institute. 2017. pp. 339–46.
4. Powell A, Rabbitt B, Kennedy K. iNACOL Blended Learning Teacher Competency Framework. USA: Int Assoc K-12 Online Learn. 2014. pp. 2-17.
5. Stein J, Graham CR. Essentials for blended learning: A standards-based guide. UK: Routledge; 2020.
6. Horn MB. K-12 online education is increasingly hybrid learning. Distance Learn. 2010;7(2):18.
7. Lim DH, Morris ML. Learner and instructional factors influencing learning outcomes within a blended learning environment. J Educ Technol Soc. 2009;12(4):282–93.
8. Han F, Ellis RA. Initial development and validation of the perceptions of the blended learning environment questionnaire. J Psychoeduc Assess. 2020;38(2):168–81.
9. Taherdoost H. Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. Int J Acad Res Manag. 2016;5:28–36.
10. Stahl NA, King JR. Expanding approaches for research: Understanding and using trustworthiness in qualitative research. J Dev Educ. 2020;44(1):26–8.
11. Jebraeily M, Pirnejad H, Feizi A, Niazkhani Z. Evaluation of blended medical education from lecturers' and students' viewpoint: a qualitative study in a developing country. BMC Med Educ. 2020;20(1):1–11.
12. Rahman NAA, Hussein N, Aluwi AH. Satisfaction on blended learning in a public higher education institution: what factors matter? Procedia-Soc Behav Sci. 2015;211:768–75.
13. Owston R, York D, Murtha S. Student perceptions and achievement in a university blended learning strategic initiative. Internet High Educ. 2013;18:38–46.
14. Sari SP. Investigating the students' perception toward blended learning method implemented in teaching english at seventh semester english students of unismuh Makassar. Makassar, Indonasia: Digital Library Universitas Muhammadiyah Makassar; 2020.
15. Kokoç M. Flexibility in e-Learning: Modelling Its Relation to Behavioural Engagement and Academic Performance. Themes in eLearning. 2019;12:1-16.
16. Müller C, Mildenberger T, Steingruber D. Learning effectiveness of a flexible learning study programme in a blended learning design: Why are some courses more effective than others? Int J Educ Technol High Educ. 2023;20(1):1–25.
17. McCabe C, Francis RW. Effective instruction in blended learning environments. Learn Digit Age. 2020;20:1.
18. Dziuban C, Graham CR, Moskal PD, Norberg A, Sicilia N. Blended learning: the new normal and emerging technologies. Int J Educ Technol High Educ. 2018;15:1–16.
19. Zhang W, Zhu C. Review on blended learning: Identifying the key themes and categories. Int J Inf Educ Technol. 2017;7(9):673–8.
20. Bi J, Javadi M, Izadpanah S. The comparison of the effect of two methods of face-to-face and E-learning education on learning, retention, and interest in English language course. Educ Inf Technol. 2023;28:1–26.
21. Kenan T, Pislaru C, Othman A, Elzawi A. The social impact and cultural issues affecting the e-learning performance in Libyan higher education institutes. Int J Inf Technol Comput Sci. 2013;12(1):50–6.
22. Husamah H. Pembelajaran bauran (Blended learning). Jakarta, Indonasia: Prestasi Pustakaraya; 2014.
23. Spring KJ, Graham CR, Hadlock CA. The current landscape of international blended learning. Int J Technol Enhanc Learn. 2016;8(1):84–102.
24. Broadbent J. Comparing online and blended learner's self-regulated learning strategies and academic performance. Internet High Educ. 2017;33:24–32.
25. Tan M, Hew K. Incorporating meaningful gamification in a blended learning research methods class: Examining student learning, engagement, and affective outcomes. Australas J Educ Technol. 2016;32(5):19-32.
26. Balci E. Perceptions of blended learning in an EFL setting. UK: Cambridge University Press Teacher Research Programme; 2017.
27. Eke HN. Modeling LIS students' intention to adopt e-learning: a case from university of Nigeria, Nebraska. Nigeria, Nebraska: University of Nebraska; 2011.