ORIGINAL RESEARCH

Medical Students Preference in Blended Learning after Covid-19 Pandemic: Online vs Offline

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ABSTRACT

Background: Blended learning has been preferred to be implicated during the transition phase after the pandemic. Nowadays, universities started to shift back into offline learning after being retained for nearly 2 years. The effectiveness of digital learning should be considered. Even though it provided simplicity and ease, the effectiveness was questionable due to a lack of interaction and hands-on practice. Thus, blended learning combines face-to-face and digital learning to maximise the knowledge transfer during classes. However, the efficacy of both offline and online learning was still questioned. Each has benefits and drawbacks, which differ for every student in various conditions. This study assessed medical students' preferences in the blended learning era.

Method: This study used a cross-sectional design. An online survey was conducted among first-year medical students in the Faculty of Medicine, Public Health, and Nursing Universitas Gadjah Mada (N=201). Data were analysed using a descriptive qualitative approach referring to Doyle et al.

Results: Among 201 students who were included in our study, the topmost learning categories chosen to be given in an online setting were lectures (N=97), learning skills (N=18), and discussion (N=16). For offline settings, they preferred practical skills (N=114), lectures (N=41), and skills laboratory (N=40). Students mentioned network problems as their finest challenge during online classes, and network support was the most needed to improve the learning outcome.

Conclusion: Passive activities that require the least effort were favoured to be given online, and activities requiring active participation were preferred to be given face-to-face. Limitations were challenging for students in participating in online classes; further evaluation and improvement are needed.

Keywords: Blended learning, online, offline, medical students preference, after pandemic

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PRACTICE POINTS

- Medical students prefer the offline approach for classes, which requires active participation, and the online approach, which allows them to be passive.
- Distractions and network problems are the two most challenging challenges medical students face during digital learning.
- Suggestions to improve digital learning quality include involving students in more student-teacher-engaged settings during classes and network support, including internet connection and facilities.

INTRODUCTION

The COVID-19 pandemic has been relieved, and universities have started reviving campus-based learning after being detained for nearly two years, which has impacted more than 200 million students.[1] Universities cope with the challenge by combining online and offline modalities, mainly blended learning. The offline or in-person approach has been a method of choice for learning facilitation in medical education for a long time, since before the pandemic. Although the advancement of technology has induced the use of online learning platforms, the proportion for the offline approach has always been dominating. Nonetheless, the COVID-19 pandemic has resulted in a sudden shift that requires the system to adapt and make the online approach the new normal in medical education.[2]

Both offline and online approaches possess positive and negative impacts. However, studies conducted in India and Australia reported most students preferred offline classes due to more opportunities for peer and teacher interactions. In-person classes allow active participation and open discussion in academic and non-academic materials, enhancing students' performance and improving their interpersonal skills.[3] Students found staying focused during offline classes easier since there were only minimal distractions and encouragement from the atmosphere during face-to-face learning. They also stated that classes were less boring due to various interactions and socialisation.[4]

On the other hand, the online approach's efficacy was also significant during the pandemic. A survey has shown that there was an improvement in academic performance during the online session due to the materials given, such as recorded lectures, supplemental videos, and extra reading materials.[5] A study also reports that online learning can both prevent COVID-19 transmission, time and place flexible, and convenient based on students' point of view. In addition, good internet access enables students to learn at their own pace and in places they prefer.[6] Nonetheless, the most common difficulty raised by faculty was the student's inability to engage in live interactions during online learning. Although online sessions did not offer interaction, face-to-face interactions were still preferable. The efficacy of online learning also depends highly on the environment. Students were more likely to be distracted during online classes. Technology and internet connection are essential for both the teacher and students. Most online learning platforms are accessible by expensive advanced gadgets. Moreover, some areas might have poor internet signals, and some students could not afford internet connections.[7]

Medical education curricula are complex and continuously improving with various learning activities incorporated. For example, lectures, tutorial or small group sessions, clinical skill laboratory sessions, and community-based learning programs.[8] All the learning activities were inevitably shifted to online during the pandemic. Universities

were obligated to amend their programs and ensure the students could meet their competencies.[6] The implications for online and offline learning modalities should be individualised according to their current condition. Nevertheless, medical students' perspectives on blended learning are always debatable.[9] Some studies on undergraduate medical students' perspective toward blended learning remained inconclusive. Cross-sectional studies on undergraduate medical students have shown the effectiveness of blended learning.[10,11] Otherwise, another study has shown teachers and students need to master technologies to optimize the blended learning outcome.[9] Hence, this study aimed to observe medical students' perspectives towards implementing online, offline and blended learning, as well as their preferences, challenges, and suggestions to optimise digital learning.

METHODS

The study applied a qualitative approach and cross-sectional method. The population in this study were first-year medical students of the Faculty of Medicine, Public Health, and Nursing Universitas Gadjah Mada who attended a lecture entitled 'How to be an effective online learner' in August 2023. The study attempted to use a total sampling approach to include all 201 students in the data collection. Total sampling is recommended for evaluating medical education programs, particularly when involving students' perceptions, allowing a complex and comprehensive array of participant data.[12]

All participants completed an open-ended questionnaire to explore their perspectives on offline and online learning modalities. The questionnaire was distributed using Google Forms® to allow anonymity and better access so that students' identifiers would be concealed and psychological safety ensured.[12] The questionnaire collected baseline demographics, particularly gender and region of origin. The main section of the questionnaire had four open-ended questions as follows:

1. What learning programs do you prefer to be delivered using online learning approaches?

2. What learning programs do you prefer to be delivered using offline/in-person approaches?
3. What were the challenges you encountered during online classes or sessions?
4. What are your suggestions to the faculty/ university to enhance the quality of online learning?

Participants' demographics were reported using frequency analysis. Qualitative data derived from the questionnaire was analysed using a content analysis approach.[13] Qualitative responses were collated and prepared for preliminary reading by two researchers (first and second authors) before the analysis. Subsequently, the initial coding was conducted by two coders (second and first authors). Any disputes were discussed to ensure intercoder unanimity. The third and fourth authors provided an overarching analysis of the codes and accorded any disputes to ensure consensus. These steps were undertaken to ensure triangulation and corroboration of the data analysis.[14] Codes and categories that emerged in the analysis were then quantified using frequency analysis to see major and minor data patterns.[15]

The study was granted ethical clearance from the Medical Health Research Ethics Committee (MHREC) of the Faculty of Medicine, Public Health, and Nursing Universitas Gadjah Mada with reference number KE/FK/1215/EC/2023. All participants provided their consent before completing the questionnaire. Participants' identities and identifiers were concealed to ensure anonymity. Data were stored in the first author's personal computer, and access was limited to all researchers who authored this manuscript.

RESULTS AND DISCUSSION

Table 1 illustrates 201 first-year medical students participated in the study. They were dominated by female participants, which accounted for 74.1% (N=149), and males for 25.9% (N=52). Based on their origin, participants were grouped into Yogyakarta, City in Java, and City in non-Java. The city in Java had the highest numbers, at 48.75% (N=98), followed by the city in Non-Java and Yogyakarta, with 32.3% and 18.9%, respectively.

Table 1. Participants' Demographics

Demographics	N	%
Total participants	**201**	**100**
Gender		
Female	149	74.1
Male	52	25.9
Region of Origin		
Yogyakarta City	38	18.9
City in Java*	98	48.8
City in non-Java	65	32.3

*Outside Yogyakarta City

This survey was held in the late phase of the academic year and aimed to collect participants' responses that assess and criticise the whole yearly learning experience from first-year students' points of view. They responded to this survey and shared their preference for learning activities regarding their first year of learning experience in both online and offline methods. Participants were grouped based on their category and ranked based on frequency (see Table 2). Participants preferred practical sessions best to be facilitated using in-person/offline sessions (56.7%), compared to online sessions (n=5, 2.5%). Another distinct preference was found in the skills laboratory, which was named by 19.9%(N=40) of students for the offline session yet only amounted to 3%(N=6) on the online preference. Most participants preferred lectures for both online and offline approaches, amounting to 47.3% and 20.4%, respectively. Lectures become the most preferred category to be given online and the second highest preference for offline. There were 32 participants (15.9%) who had no preference for online sessions. Unlike the offline session, in which none of the participants had any preference. On the other hand, only 1 (0.5%) student preferred all sessions to be performed online, distinct from the offline session, while 27 (13.4%) students preferred the offline approach for all sessions. Discussion had almost similar results for both approaches, 8% for online and 10.4% for offline sessions.

From the first question, "*What learning program do you prefer to be given online?*", Students preferred lectures to be given online; aside from their flexibility, both live lectures and pre-recorded videos have benefitted students and positively affected their knowledge and understanding. Asynchronous sessions allow students to be passive and have control of their own pace.[16] In concordance with our findings, lectures occupied almost half of the answers. Some of them were highlighted,

> "*Unfortunately, there is no learning program that I like in an online setting. But if I must choose, I prefer to learn theories online.*" (F152)

Table 2. Participants Preference on Delivery of Learning Activities

Offline/In-person Mode	N (%)	Online Mode	N (%)
Practical session	114 (56.7)	Lectures	95 (47.3)
Lectures	41 (20.4)	Learning skill	18 (9.0)
Skills lab	40 (19.9)	Discussion	16 (8.0)
Discussion	21 (10.4)	Quiz	10 (5.0)
Tutorial	17 (8.5)	Self-study	9 (4.5)
Learning skill	5 (2.5)	Skills lab	6 (3.0)
Quiz	2 (1.0)	Practical session	5 (2.5)
Self-study	1 (0.5)	Assignments	5 (2.5)
Assignments	0 (0.0)	Tutorial	2 (1.0)
Others	9 (4.5)	Others	14 (7.0)
All Session	27 (13.4)	All Session	1 (0.5)
None	0 (0.0)	None	32 (15.9)

"One-directional learning." (F106)

"Learning activity in which we do not have to be active." (F87)

The second question was, *"What learning program do you prefer to be given offline?"*. It was inevitable that digital learning also has its drawbacks. Lack of peer and teacher interaction leads to decreased productivity, mostly during practical sessions. Since hand skills depend mostly on in-hand training hours, which are unavailable during the pandemic, students reported doubts and inadequate understanding of the materials. Online learning was proven to be ineffective for practical sessions. Similar to our findings, more than half of the participants preferred the face-to-face approach for practical sessions. As revealed by their statements,

"Which require motoric skill such as practical session." (M131),

"Practical session particularly skills laboratory." (F73)

"Discussion and direct interactions with my peers." (F174)

Participants' perceptions of challenges and suggestions to improve online learning were grouped and ranked based on the categories in Table 3. The highest-named challenge was difficulty focusing, which constituted 44.8% (N=90). Network problems were mentioned by 36.8% (N=74) of the total participants, which was the second-highest challenge. This was supported by the highest suggestions, network support in the form of campus Wi-Fi and data package, mentioned by 55 (27.4%) and 34 (16.9%) participants, respectively. Students also reported difficulty understanding the materials given during online sessions, accounting for 14.9% (N=30). The participants suggested more interactive sessions and supporting materials for 17.9% (N=36) and 14.9% (N=30) subsequently. Additionally, eyestrain was found in 8 students (4.0%), enhanced by the time limitation suggested by nine students (4.5%).

The third question was, *"What are the challenges in online learning?"*. It was inevitable that technology became the main equipment during digital learning. Universities were challenged by the necessity to ensure the availability of students' and teachers' gadgets, including internet connections. Poor technology utilisation might jeopardise the efficacy of knowledge transfer during digital learning. Most students were afflicted, revealed by:

"It is quite challenging for us since most of us have an unstable internet connection, and the data package is also expensive to buy." (F40)

Table 3. Challenges and Suggestions for Online Learning

Challenges		Suggestions	
Category	Qty (%)	Category	Qty (%)
Difficulty focusing	90 (44.8)	Campus Wi-Fi	55 (27.4)
Network problem	74 (36.8)	Interactive session	36 (17.9)
Difficulty understanding	30 (14.9)	Data package	34 (16.9)
Lack of social interaction	23 (11.4)	Supporting material	30 (14.9)
Tendency to sleep	22 (10.9)	Others	18 (9.0)
Laziness	14 (7.0)	E-Learning platform	11 (5.5)
Environmental issue	11 (5.5)	Strict rules	10 (5.0)
Bored	9 (4.5)	Time limitation	9 (4.5)
Eyestrain	8 (4.0)	Technical support	5 (2.5)
Others	8 (4.0)	None	5 (2.5)
		Break time	3 (1.5)

The flexibility in time and place provided by online learning might became one of the drawbacks . Lack of supervision and interaction, students' interest in materials given played a significant role in their learning process. As their internal motivation will affect their focus level, their environment determines the preservation of their attention. Home surroundings and family support affect significantly.[17] Reported by participants in our study,

> *"Hard to focus and easy to be distracted, especially with social media" (M22)*
>
> *"It is easier to fall asleep since we don't have friends around." (F86)*

We also asked students, "*What are your suggestions to improve online learning outcomes?*". UNICEF has released its recommendation for further improvement of digital learning in Indonesia. It was their topmost concern to broaden access to internet connectivity, particularly in rural areas, and to collaborate with private and public sectors to provide internet access for students in both school and public areas.[18] Participants in this study agreed and elicited almost similar suggestions, such as

> *"More interactive session to engage a better discussion with students." (F33)*
>
> *"Free internet data package." (F87)*
>
> *"Accessible and strong campus Wi-Fi." (M21)*

Online setting was indeed suitable for one direction learning or passive learning. It was cost-effective and more efficient for both teachers and students. Nonetheless, digital learning was challenging for skills practice since they need direct interaction between teacher and students. Choosing the better approach for blended learning was crucial to achieve the desired outcome.

We highlight several challenges reported by our participants during digital learning amidst the pandemic. They are technical problems, including network connections and gadget issues, difficulty focusing during the class, and difficulty understanding the materials given. To counteract this, they were also asked for suggestions to improve the efficacy of digital learning. The top suggestions mentioned were enhancing class interactions and providing supplemental materials and e-learning platforms.

The foremost issue disturbing digital learning process was difficulty focusing during online classes. This finding was conformable to several other studies. A systematic review of 26 studies showed a higher chance of attrition during online classes, making it one of the significant drawbacks of digital learning.[18] Most participants mentioned distraction as the main cause of lacking focus. Distraction may have arisen from internal factors of the students, such as self-discipline, motivation, and commitment to keep their attention and resist the urge to do other activities while the class is taking place. External factors are related to the temptation to use a mobile phone, scroll social media, and multitask. It is worsened by the lack of supervision and minimum interaction, which have caused them to ignore the class, feel isolated, and disconnected from the course.[11]

Difficulty understanding the materials given was also reported in high proportion. The predominant approach of digital learning explains it. The digital learning process was dominated by student-centred learning, which provides flexibility and highly depends on self-discipline and motivation.[19] Unfortunately, teacher-centred learning is rooted in Indonesia, and students are habituated to receiving information passively. Thus, knowledge transfer during e-learning has been challenging for them since it requires more work and effort.[20] Inadequate interaction with both teacher and peers has caused fewer discussions with limited feedback. It led to a lack of understanding regarding the tasks and materials given by the instructors. Moreover, a study in China also reported a psychological approach to the issue that most students were having anxiety about asking and engaging in discussion during online classes compared to face-to-face classes.[21] Thus, these diminished the efficacy of knowledge transfer during e-learning.

Many students have complained about the significance of network connections in attending online classes. The poor connection has disrupted the knowledge transfer process during synchronous classes as it led to low-quality voices and videos displayed by

the teacher. Moreover, connection also relies upon geographical location, which becomes a serious issue for students who live in a rural area with limited access to the Internet. Aside from the use of Wi-Fi, a mobile data package is also essential during online classes. In addition, an advanced mobile phone is needed to access various platforms. Both advanced gadgets and internet plans are putting economic burdens on low-income families. Even though the government has subsidised students' internet data plans, it only lasted for several months during an early pandemic and mostly reported that it did not cover the needs. Thus, network connections still become the main concern for continuing online classes.[22,23] A survey conducted on 1,700 students in Indonesia found that 72% of their families had constraints for online learning during the pandemic due to uneven distribution of internet plans subsidisation, and it became useless since they did not have any gadgets in the first place.[22]

The current industrial era has made optimising information and technology usage a regular and substantial need for individuals. Therefore, people's readiness for technology also plays a significant role. It is determined by their adaptation to updated technologies and their substantial use for daily and professional work. Indonesia's Network Readiness Index (NRI) is ranked 59 out of 131 countries in 2022, based on four important aspects: technology, governance, people, and impact. This shows we are still far behind other countries in terms of technology utilities and their applicability.[24] Studies conducted on 327 Indonesian people who ranged varied in age and occupation showed that people in Indonesia did not all readily behave toward current technology adaptation, except for the younger generation. However, the study also showed that age does not affect new technology's learning and adapting process if it is supported by motivation and facilities.[25]

Few participants (4%) in our study have mentioned eye strain as their challenge. Digital Eye Strain (DES) is a group of visual and ocular symptoms caused by excessive use of digital devices. The prevalence has expectedly risen to 50 – 60% in children during the pandemic due to restrictions on outdoor activities.[26] Studies found prolonged exposure to visual digital technology led to excessive accommodation effort, impaired binocular vergence, decreased near point of convergence, and illusory visual fatigue. This condition might have worsened in students with previous refractive errors.[27,28] Preference for laptops and a minimum of 5 hours of use of digital devices contribute to the presence of eyestrain. In this study, the average use of mobile phones per day was 7.5 hours, conforming to the minimum hours in developing eyestrain.

As the pandemic has ended, there must be adaptation in education adjusting to the current condition. The decision to establish whether online or offline learning sessions should be perceived after the pandemic depends on many aspects. Aside from the drawbacks and the challenges of digital learning, some benefits should be applied even after the pandemic has ended. Insight from students and teachers should be considered, particularly concerning their psychological well-being after almost two years of attending online classes with minimum interactions. Research has also shown the declining motivation of students through digital learning. Thus, further evaluation and adjustment should be made.[29,30] The approach for specific learning modalities should not be generalised since each has a different expected outcome. While the new normal era has finally allowed offline classes to be held, the decision should be individualised.[29] This study found notable differences in students' preference for different modalities. The lecture was the topmost chosen to be conducted online, and the practical session was expected to be offline. Hence, to attain the desirable outcome, blended learning has been chosen. A combination of online and offline learning.[30]

Implication of blended learning is expected to applaud positive feedback from students. Different environments and new settings are supposed to improve the efficacy of the learning process and lift students' motivation. Blended learning has been proven more efficient since online and offline learning complements teaching others. Offline sessions will comprise outcomes that cannot be obtained by e-learning, such as clinical skills and practical sessions.[6,30]

The limitation of this study was that limited students were participating in it, and the participants involved were only students. Evaluation towards digital learning should involve all stakeholders, such as teachers and university staff. There was also a probability of having biased answers that did not represent this study's actual condition. However, participants were given open questions and expected to be able to express their opinions freely.

CONCLUSION

The number of students in our study who preferred offline learning sessions to online is significant. As for specific learning modalities, they favoured offline practical sessions, but lectures were rather given online. The main challenges highlighted from this study were difficulty focusing during online classes, network problems, and difficulty understanding the materials written in order from the most mentioned. They have suggested internet support through both campuses' Wi-Fi and internet plans and more interactive sessions to maximise the learning outcome. In conclusion, passive activities that require the least effort were favored to be given online, and activities requiring active participation were preferred to be given face-to-face..

RECOMMENDATIONS

This study was conducted online with an inadequate number of participants and was limited to students only as their participants. Nevertheless, evaluation and perception towards digital learning should be obtained by students and teachers, university staff, and educational stakeholders. Further studies are suggested to provide perspectives from all parties with more participants.

COMPETING INTEREST

There is no conflict of interest in this study.

KONTRIBUSI PENULIS

Doni Widyandana – developing research, collecting data, and writing the main draft.

Nurul Izzah – literature searching and developing publication manuscript.

Prattama Santoso Utomo – data analysis and developing manuscript.

Mora Claramita – developing manuscript and supervising the research process.

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