
Perception of Blended-Learning Modalities Among Medical Students

Lea Galia, MD, Angelika Acabado, Rischthelle Aton, Arvin Agura, Archie Amoguis, Von Bautista, Bas Brink, Azel Bulalas, Daniel Caballero, Amiel Capacio, Benjo Catibayan, Janine Crisostomo, Carlamaine De Leon, Brian Dy, Marie Ferrer, Jannah Gacos, Victoria Gonzales, Rhea Malapit, Mariel Labrador, Benedict Logmao

ABSTRACT

Background: Medical students hold mixed perceptions of blended learning (BL), with some favoring it while others prefer face-to-face instruction according to several studies. Gaps exist in understanding students' preferences for specific parameters of BL implementation, including the blend of online and face-to-face modes among others.

Objective: This study at Far Eastern University-Nicanor Reyes Medical Foundation (FEU-NRMF) aimed to determine medical students' perceptions of blended learning, assessing its feasibility, their learning preferences, and overall perception of the blended learning process. These are valuable to enhance educational institutions' understanding of their students in implementing blended learning optimized for their learning.

Methods: This descriptive cross-sectional study surveyed 235 medical students online using a modification and combination of the survey questionnaires of Singh, H. et al. and Shantakumari and Sajith. It assessed their demographics, feasibility of online classes, preferences for blended learning, and perceptions of the blended learning process using frequency distribution statistics.

Results: Students generally reported having satisfactory conditions for remote learning, such as with their devices, internet, and study spaces. Connectivity issues were rare, with occasional audio/video problems. The majority are in favor of blended learning finding it encouraging, less stressful, and promoting deeper interest in subjects, but expressed limitations on personal interaction. Students generally prefer 1–2-hour classes with a daily limit of 4-6 hours and with 30–60-minute breaks between classes. Students also prefer didactic lectures, practical demonstrations, laboratory classes, uploading presentations in advance, and sharing of recorded lectures more often ($\geq 50\%$ of the time), while small group discussions (SGDs) and preceptorials, theoretical quizzes, practical exams, and return demonstrations, reading assignments, manuals, taking Moodle online quizzes onsite only sometimes ($< 50\%$ of the time), but playing of recorded video lectures in F2F classes were preferred not at all. Students generally favor F2F or an equal mix of online and F2F modes for various teaching methods.

Conclusion: This study found that medical students are well-prepared for online blended learning and are in favor of its implementation in their medical courses. The authors extensively detailed student preferences to aid in designing blended learning strategies. The findings offer valuable insights into medical students' preferred blended learning approaches, serving as a reference for educational institutions to enhance student learning experiences.

Key words: Hybrid learning, traditional classroom, student perception

The COVID-19 pandemic has imposed challenges on all sectors of society, particularly in medical

education wherein it accelerated the adoption of e-learning. As pandemic restrictions ease, a fully online system evolved into a blended learning (BL) mode.¹ The effective implementation of BL faced hurdles, as seen in a survey by Giray, Gumalin, Jacob, and Villacorta (2020)² where Filipino students expressed negative views, citing reduced essential

student-teacher interactions and feelings of social isolation. However, Tong, Uyen, and Ngan (2022) found that BL enhances student engagement and learning experience. According to Owston, York, and Murtha (2013)³, high-achieving students exhibited greater satisfaction with their blended courses compared to their low-achieving counterparts, finding them more convenient, engaging, and conducive to learning, therefore understanding medical students' perceptions of the various components of BL is crucial for optimizing teaching strategies.

In a 2021 study, it was found that medical students preferred traditional face- to-face (F2F) classes before the COVID-19 pandemic attributing it to greater social interactivity, but during COVID-19 however, their perceptions toward Blended Learning became more positive.⁴ A 2022 study by Atwa et al.⁵ also assessed medical students' and faculty's perceptions of online, blended, and F2F learning, and observed similar preferences among students, favoring F2F learning over blended and online formats. Similarly, another study on E-Learning perception among health sciences students during the COVID-19 pandemic found that 41% experienced network issues, 60% preferred learning clinical skills in clinics and laboratories, one-third favored traditional classroom teaching, and 34% lacked confidence in passing exit tests after e-learning sessions.⁶ However, a study at a University in Nigeria found that students and instructors had a positive view of the E-learning system adopted during the COVID-19 pandemic and suggested a hybrid approach even beyond the pandemic.⁷ A pre-pandemic study by Shang and Liu (2018) in a Chinese university compared students' perceptions of blended learning versus traditional classroom lectures in a physiology class, yielding 68% of students preferring blended learning, citing flexible learning time (84%) and improved independent study skills (75%) as its main advantages.⁸ It was also noted among students that online learning was not the issue itself, it was the transition from F2F to online that was causing issues.⁹ The general lack of innovative methods employed for e-teaching can be attributed to the unpreparedness of the educational system due to the sudden shift to an online mode which is necessitated by the pandemic.¹⁰ A commonality among many of these studies is that they were done during the pandemic, with most learning institutions unprepared to shift their style of education. Today, educational institutions are better equipped to handle online and blended learning, hence there may be changes in perceptions. However, some gray area

still needs to be elucidated regarding the specific forms of blended learning as in the blend of online and face-to-face modes.

In light of the incongruence of the findings of past studies conducted in various countries, the authors have recognized the significance of a local study to ascertain the preferences and perceptions of students on blended learning. Thus, we hypothesize that a significant proportion of medical students hold a favorable perspective toward blended learning compared to fully online or traditional F2F learning. This study aimed to determine the medical students' perceptions of blended learning at Far Eastern University-Nicanor Reyes Medical Foundation (FEU-NRMF). Specifically, the authors aimed to determine the perceived feasibility of blended learning by medical students, the preference of medical students for class times, the regularity of various teaching methods and practices, and the blend of face-to-face and online modes for various teaching methods and practices, and finally, their perception on the blended learning process in FEU-NRMF. This would help educational institutions to further understand the students as end users of blended learning to better facilitate learning.

MATERIALS AND METHODS

Study Design

This study used a descriptive cross-sectional research design to determine the perceptions of blended-learning modalities via an online survey format among medical students from first to fourth-year who were enrolled for Academic Year 2023-2024 at FEU-NRMF. Data were collected once via online survey. No follow-up was done.

Setting

Medical student participants were recruited from FEU-NRMF from March 16 to April 1, 2024. FEU-NRMF is an institution offering medical and allied health courses in Fairview City, Philippines which has implemented online mode classes, assessments, and infrastructure ever since the COVID-19 pandemic pushed for lockdowns in early 2020. It started easing into F2F classes thereby implementing blended learning around 2022. This institution's Doctor of Medicine Program was accredited a Level II status by the Philippine Accrediting Association of Schools,

Colleges, and Universities (PAASCU) which assures that the program has attained standards above the minimum requirements by government agencies. According to the Office of the Registrar, the School of Medicine had a total of 1,156 students comprising 772 regular (R) students and 384 irregular (IR) students enrolled in the second semester of A.Y. 2023-2024. The breakdown per year level was as follows: First year (R: 361, IR: 17, Total: 378), Second year (R: 164, IR: 130, Total: 294), Third year (R: 98, IR: 121, Total: 219), Fourth year (R: 149, IR: 116, Total: 265).

Participants

Upon approval from the Research and Ethics Committee, Data Privacy Officer, and the Dean of Medicine, the authors recruited a total of 243 medical student participants via purposive sampling technique meeting their predefined inclusion criteria of 1) first to fourth-year medical students of FEU-NRMF; 2) enrolled for the Academic Year 2023- 2024 medical students who have filed for a leave of absence (LOA) for the said Academic Year were excluded. Withdrawal Criteria were as follows 1) participants who requested to withdraw during and after answering the survey, 2) participants deemed by the investigators as untruthful in answering the survey. None met the exclusion and withdrawal criteria. The respondents from first to fourth-year medical school received an invitation with a link to a Google Forms survey which was disseminated via email blast through the Data Privacy Officer. Students were encouraged to participate by contacting the students and point persons (class presidents and coordinators) via messaging to visit the survey link. With an excess from the computed sample size, the responses were randomized only selecting 235 out of the 243.

Variables

1) **Perceived feasibility for blended learning:** refers to the student's satisfaction or dissatisfaction with factors that facilitate blended learning as determined by the availability of devices (own personal computer/laptop, phone, or borrowed gadgets), the source of the internet (mobile data, home Wi-fi, public Wi-fi), their perceived proficiency in using computer/devices and the internet, and the availability of appropriate study space for online classes. These were rated on a Likert scale (Satisfied, Neutral, Dissatisfied).

Experiences on internet connectivity issues were rated in a Likert scale of how frequent (Rarely to Never: less than 20% of the time; Sometimes: between 20 to 50% of the time, Often: more than 50% of the time). These may be determinants of the feasibility of online modalities in blended learning.

- 2) **Preferred teaching agenda and methods:** refer to the preference of the students regarding the following:
 - (a) **Class times:** refers to the preferred estimated total duration of classes in a day and duration of each class, and duration of breaks between classes.
 - (b) **Common teaching methods:** refer to the pedagogical methods conducted in classes consisting of didactic lectures and small group discussions for theory classes; laboratory and practice demonstrations for practical classes; theoretical quizzes, practical exams, and return demonstrations for assessments. Each is rated by the students on how frequently they prefer each to be utilized in school expressed on a Likert scale (Never: 0% of the time; Sometimes: less than 50% of the time, Often: $\geq 50\%$ of the time), as well as rated in terms of their preferred blend of modes held for each expressed in a Likert scale (Entirely F2F, Mostly F2F, More or less Equal, Mostly Online, Entirely Online).
 - (c) **Enhancing practices:** refer to the preferred frequency of practices done to enhance learning, such as uploading the presentation in advance, sharing recorded lectures, reading assignments and manuals expressed in a Likert scale (Never, Sometimes, Often).
 - (d) **Hybrid methods:** refers to the preferred frequency of special teaching and assessment methods done wherein digital/online mode is mixed in an F2F setting expressed in a Likert scale (Never, Sometimes, Often).
- 3) **Students' perception toward blended learning:** refers to the students' agreement, disagreement, or undecidedness on the statements regarding whether they are in favor of incorporating blended learning into their course if incorporating blended learning has deepened their interest in the subject matter, and if blended learning has encouraged them to learn.

Data Sources/Measurements

The assessment tool used in this study for data collection was an online survey via Google Forms which was a modification and combination of three of the six-part survey from a study conducted by Singh H. et al. (2021) and one of three parts of the survey from the study of Shantakumari and Sajith which were both publicly available and downloadable online. The questionnaire of Singh, et al. was reported to be validated by ten subject experts and was then pilot-tested among 100 students (both medical and nursing) according to their study, while the questionnaire developed by Shantakumari and Sajith was validated by two expert faculties. The survey questionnaire in our study consisted of several parts to assess various aspects of the student's perceptions and preferences regarding blended learning:

1. **Demographic Details:** Basic information about the students were collected, including age, sex, year in medical school, residence, and approximate monthly family income.
2. **Feasibility Issues:** Students were asked about their satisfaction with factors that can affect their ability to participate in blended learning, such as the availability of devices, internet sources, proficiency with technology, and access to suitable study space. Likert scales and frequency ratings were used to measure satisfaction and experience with internet connectivity issues (audio/video problems, disconnection).
3. **Preferred Teaching Agenda and Methods:** This section explored students' preferences regarding class duration, frequency of different teaching methods (lectures, discussions, labs, etc.), enhancing practices (uploading presentations, sharing recordings), and hybrid methods (mixing online and F2F elements). Likert scales were used to assess the preferred frequency and preferred blend of online and F2F modes for each method.
4. **Students' Perception of Blended Learning:** Students responded to statements regarding their agreement or disagreement with various aspects of blended learning, such as its impact on their interest, learning, interaction, stress, etc.

Bias

A purposive sampling technique was employed in this study to acquire 243 respondents with an excess of what is required in our sample calculation. This was more feasible in this case to recruit responses than probability sampling counterparts. However, to minimize the selection bias inherent in this nonprobability sampling, 235 respondents were randomly selected out of 243 to suffice the required sample size.

Study Size

The sample size was calculated based on the estimation of population proportion: perceptions about blended learning compared to full online or traditional F2F learning modalities. If 68% of medical students preferred blended learning (Shang, F. & Liu, C.Y., 2018), the required sample size was calculated based on a maximum allowable error of 5% with a reliability of 90%. Following the computation, a total of 235 participants were required and were met.

Statistical Methods

The study employed descriptive statistics (frequency and percentages) to analyze categorical variables, while chi-square tests for independence were done to determine whether there were significant differences in results between year levels.

RESULTS

Participants

A total of 243 medical student participants were surveyed in FEU-NRMF from March 16 to April 1, 2024, via online survey, while 235 were randomly included as part of the study.

Descriptive Data

Among the 235 respondents in the study (Table 1), the majority belonged to the 21 – 25 years old around four-fifths, followed by 26 – 30 years old. Most were female participants, and a little over than four-fifths were 1st year and 2nd-year students. With regards to residence, a more than two-thirds live around Fairview in dormitories/apartments while the second largest group lives in residential homes

outside Fairview. Lastly, most students estimate their monthly family income to be either between Php21,000 to Php125,000 or >Php125,000.

Table 1. Distribution of respondents based on respondents' demographic profile

Demographic variable (n=235)	N (%)
Age (in years)	
21-25	197 (83.83%)
26-30	35 (14.89%)
31-35	2 (0.85%)
35-40	1 (0.43%)
Sex	
Male	73 (31.06%)
Female	162 (68.94%)
Year in Med School	
1st year	102 (43.40%)
2nd year	100 (42.55%)
3rd year	18 (7.66%)
4th year	15 (6.38%)
Residence	
Dormitory/Apartment (around Fairview)	160 (68.09%)
Dormitory/Apartment (outside Fairview)	3 (1.28%)
Residential home (around Fairview)	34 (14.47%)
Residential home (outside Fairview)	38 (16.17%)
Monthly Family income	
<Php21,000 per month	9 (3.83%)
Php21,000 - Php125,000 per month	116 (49.36%)
>Php125,000 per month	110 (46.81%)

Feasibility Issues in Online Classes

Several factors may reflect the feasibility of students attending online classes such as device availability, internet source, knowledge/proficiency with computers and the internet, and availability of study space conducive to online classes. These were rated by each participant whether they were satisfied, neutral, or dissatisfied.

With regards to feasibility issues, out of 235 responses, more than 90% were satisfied with their available devices (computer, tablet, phone, etc.) for attending online classes. About two-thirds of respondents were satisfied with the internet (e.g., Mobile data, home Wi-Fi, public Wi-Fi) they use. In terms of their knowledge or proficiency with computers and the internet, more than three-fourths were satisfied, while the rest were neutral, and no one was dissatisfied. When having study space conducive to online classes, around two-thirds 160 expressed satisfaction (Table 2).

For Internet connectivity issues, students were asked about the frequency these common problems occur in their online classes. Almost two-thirds experience audio/video issues during class sometimes (20 – 50% of the time), while only one-fifths experienced these often ($\geq 50\%$). For the issue of being inadvertently logged out, almost half of the students rarely have this problem, while only a small minority experience this often ($\geq 50\%$ of the time).

Preferred Duration of Classes and Breaks of Medical Students

A great majority of the respondents preferred the duration of classes to be between 1-2 hours, the daily limit for total class hours to be between 4-6 hours, and the duration of breaks in between classes to be 30 to 60 minutes (Table 4).

Preferred Regularity of Teaching Methods and Practices for Medical Students

Under theory classes, the majority of the respondents prefer didactic lectures as in PowerPoint presentations, videos, and images to be held often ($\geq 50\%$ of the time). Two-thirds of them prefer small

Table 2. Feasibility issues in online classes

Feasibility Issues	Satisfied n (%)	Neutral n (%)	Dissatisfied n (%)
Available devices (computer, tablet, phone, etc.) for attending online classes	217 (92.34%)	17 (7.23%)	1 (0.43%)
Source of internet (Mobile data, home wi-fi, public wi-fi)	157 (66.81%)	59 (25.11%)	19 (8.09%)
Knowledge/proficiency with computer and internet	184 (78.30%)	51 (21.70%)	0 (0.00%)
Study space for online class	160 (68.09%)	59 (25.11%)	16 (6.81%)

Table 3. Frequency of Internet connectivity issues

Internet connectivity issues	Rarely to never (<20%) n (%)	Sometimes (20-50%) n (%)	Often (≥50%) n (%)
There are audio/ video issues during the class.	61 (25.96%)	152 (64.68%)	22 (9.36%)
I get logged out during classes/tests.	114 (48.51%)	104 (44.26%)	17 (7.23%)

Table 4. Preferred duration of classes and breaks of medical students at FEU-NRMF

Preferred class times of medical students	N (%)
Duration of each class (hours)	
<1 hr	17 (7.23%)
1–2hrs	201 (85.53%)
>2 hrs	17 (7.23%)
Daily class hours	
<2 hrs	10 (4.26%)
2-4 hrs	60 (25.53%)
5-6 hrs	141 (60.00%)
>6 hrs	24 (10.21%)
Duration of breaks	
No Breaks	3 (1.28%)
<30 minutes	74 (31.49%)
30-60 minutes	123 (52.34%)
>1 hour	35 (14.89%)

group discussions (SGDs) and preceptorials to be held only sometimes (<50% of the time).

For practical classes, the majority of the respondents preferred both practical demonstrations (e.g., physical examination, patient interview) and laboratory classes (e.g., anatomical models and cadavers, microscopic specimen viewing, and procedural experiments) to be held often (≥50% of the time).

For the different forms of assessment, around half of respondents preferred theoretical quizzes, practical exams, and return demonstrations to be held only sometimes (<50% of the time), but the number of those who preferred often (≥50% of the time) were relatively not so far behind.

For practices that enhance learning such as uploading presentations in advance and sharing recorded lectures, the majority preferred these often, while around half of respondents preferred reading assignments and manuals only sometimes (<50% of the time).

Hybrid methods such as in cases of holding Moodle quizzes (online) in a F2F setting, almost half of the respondents preferred it only sometimes

(<50% of the time), while the playing of recorded video lectures in F2F classes, the majority preferred it to be done never (Table 5).

Preferred Blend of Teaching Methods of Medical Students

The same teaching methods and practices were also evaluated by the participants on whether it would be optimal if each of the systems was conducted purely face-to-face, purely remote, or a combination of both modes to certain extents.

For theoretical classes, the majority of participants, almost two-thirds, were relatively split on preferring didactic lectures held entirely F2F or mostly F2F, while around almost a third of participants preferred SGDs and preceptorials to be held equally in both F2F and online modes.

The medical students primarily believed that laboratory classes and practice demonstrations should be purely conducted in person, only a very small minority of less than 1% preferred both to be held entirely online.

For assessments, specifically for theoretical quizzes, the majority showed a preference for a balanced mix of F2F and online delivery. Meanwhile, practical exams and return demonstrations were both preferred by the majority to be conducted F2F exclusively (Table 6).

Medical Students' Perception of the Blended Learning Process

To determine the pulse of the students on blended learning, they were asked about their stance on several

ideas and scenarios related to blended learning. They were asked to identify whether they agreed, disagreed, or were undecided with each of the statements (Table 7).

Most of the respondents, around three-fourths, showed agreement with the incorporation of blended learning in their course, while around half of them believed that BL has deepened their interest in the subject matter and encouraged them to learn. On the other hand, students were unsure whether blended learning improves their interaction with professors as their responses of agreement, undecided, and

Table 5. Preferred regularity of teaching methods and practices for medical students

Teaching methods and Practices	Never (0%)	Sometimes (<50%)	Often (≥50%)
Theory			
Didactic lectures	2 (0.85%)	45 (19.15%)	188 (80.00%)
Small Group Discussions (SGDs) and preceptorials	7 (2.98%)	157 (66.81%)	71 (30.21%)
Practical Classes			
Laboratory classes	5 (2.13%)	53 (22.55%)	177 (75.32%)
Practice demonstration	8 (3.40%)	69 (29.36%)	158 (67.23%)
Assessments			
Theoretical quizzes	4 (1.70%)	118 (50.21%)	113 (48.09%)
Practical exams	3 (1.28%)	130 (55.32%)	102 (43.40%)
Return demonstrations	14 (5.96%)	138 (58.72%)	83 (35.32%)
Enhancing Practices			
Uploading the presentation in advance	12 (5.11%)	39 (16.60%)	184 (78.30%)
Sharing of recorded lectures	4 (1.70%)	32 (13.62%)	199 (84.68%)
Reading assignments	56 (23.83%)	126 (53.62%)	53 (22.55%)
Manuals	74 (31.49%)	120 (51.06%)	41 (17.45%)
Hybrid Methods			
Moodle quizzes held F2F	45 (19.15%)	106 (45.11%)	84 (35.74%)
Recorded videos shown F2F	140 (59.57%)	58 (24.68%)	37 (15.74%)

Table 6. Preferred blend of teaching methods of medical students

Preferred teaching methods	Entirely F2F	Mostly F2F	More or less Equal	Mostly Online	Entirely Online
Theory					
Didactic lectures	69 (29.36%)	70 (29.79%)	54 (22.98%)	33 (14.04%)	9 (3.83%)
Small Group Discussions (SGDs) and preceptorials	51 (21.70%)	62 (26.38%)	77 (32.77%)	33 (14.04%)	12 (5.11%)
Practical Classes					
Laboratory classes	187 (79.57%)	27 (11.49%)	14 (5.96%)	5 (2.13%)	2 (0.85%)
Practice demonstration	182 (77.45%)	33 (14.04%)	14 (5.96%)	4 (1.70%)	2 (0.85%)
Assessments					
Theoretical quizzes	58 (24.68%)	39 (16.60%)	75 (31.91%)	38 (16.17%)	25 (10.64%)
Practical exams	100 (42.55%)	47 (20.00%)	55 (23.40%)	18 (7.66%)	15 (6.38%)
Return demonstrations	141 (60.00%)	63 (26.81%)	21 (8.94%)	7 (2.98%)	3 (1.28%)

disagreement were relatively evenly distributed, while most disagreed with the improvement in the interaction with their classmates through blended learning. Almost two-thirds of medical students believed that blended learning is less stressful than traditional classroom set-up, while they were mostly undecided about whether the former is more effective than the latter. Lastly, students agreed that they receive adequate assistance in the network and connectivity issues that they face.

Other Issues on Blended Learning

An open-ended question was asked at the end of the survey regarding any other issues on BL (Table 8). More than two-thirds of the respondents reported no other issues regarding BL. However, connectivity issues were an utmost concern reported. Additionally, medical students were concerned about how classes were scheduled in a day, whether face-to-face or online, this may be due to some students finding it difficult and a waste of time to go back and forth to school due to switching of class modes in a day. Also, students reported online classes are prone to distractions.

Table 8. Other issues on blended learning mentioned by medical students

Issues raised	N (%)
None	163 (69%)
Connectivity Issues	17 (7.2%)
Scheduling of which classes are face-to-face and online ^a	13 (5.5%)
Prone to distractions	11 (4.2%)
Inaccessibility to lecture resources	8 (3.4%)
Examinations ^b	6 (2.5%)
Playing recorded lectures	5 (2.1%)
Preference for face to face	3 (1.3 %)
Less familiarity in applications	3 (1.3 %)
Cheating	2 (0.85%)
Difficult to interact with others	2 (0.85%)
Higher expectations from professors	1 (0.42%)
Overtime ^c	1 (0.42%)
Professor's negative perspective on online learning	1 (0.42%)
Manuals are unproductive	1 (0.42%)
Effectivity varies per person	1 (0.42%)
Strict implementation during online class	1 (0.42%)
Financial burden	1 (0.42%)

Notes. This table is a summary of the responses from the open-ended question asking if the respondents have other concerns regarding blended learning.

^aInappropriate scheduling of online and F2F classes especially on the same day hassles students with the frequent switching of modes, especially when unannounced

^bExamination issues: must have tests zoom-proctored, being able to view answers, taking a long time for preload, no scratch paper, and if face-to face examination, it should be pen and paper instead of using Moodle.

^cHaving online classes and online quizzes outside class hours due to the notion of online flexibility

Table 7. Medical students' perception of blended learning process

Statements	Agree n (%)	Undecided n (%)	Disagree n (%)
I am in favor of incorporating blended learning to my course.	183 (77.87%)	33 (14.04%)	19 (8.09%)
Incorporating blended learning has deepened my interest in the subject matter.	117 (49.79%)	80 (34.04%)	38 (16.17%)
Blended learning encouraged me to learn.	123 (52.34%)	77 (32.77%)	35 (14.89%)
Blended learning improved my interaction with the professor	83 (35.32%)	74 (31.49%)	78 (33.19%)
Blended learning improved my interaction with my classmates	76 (32.34%)	64 (27.23%)	95 (40.43%)
Blended learning is less stressful than traditional classroom set-up	146 (62.13%)	51 (21.70%)	38 (16.17%)
Blended learning is more effective than traditional classroom set-up.	65 (27.66%)	98 (41.70%)	72 (30.64%)
I received adequate assistance in the network and connectivity issues I faced.	112 (47.66%)	81 (34.47%)	42 (17.87%)
Blended Learning was a waste of time	25 (10.64%)	53 (22.55%)	157 (66.81%)

DISCUSSION

Key Results

In this study, the majority of the students belonged to the age bracket of 21 – 25 years old, mostly female, and most were either first- or second-year students residing in dormitories and apartments near Fairview. The medical students also have a monthly family income of either Php21,000 to 125,000 or more than Php125,000 which can be considered to be around the middle to upper class income derived from the article published by the Philippine Institute for Development Studies (PIDS).

The respondents were typically satisfied with the conditions for remote learning. Most have available devices and sufficient, stable Internet connections to support online learning. Study spaces were also conducive and they were satisfied with their knowledge and proficiency in the utilization of technology. For connectivity issues, there were rarely issues in getting logged out during classes, while there were audio/video issues experienced sometimes (20-50% of the time).

The students were typically in support of blended learning especially incorporated in their course. They believed that this mode of education has significant effects such as encouragement to learn, promotion of a less stressful environment, and deepened interest in the subjects. However, educational institutions must still be wary of limitations of personal interaction among students with their professors and fellow peers, which are necessary for character development and social camaraderie, especially in medical school and also in preparation for their future professional practice. Although the majority favored blended learning incorporated with their course, students were mostly undecided yet whether blended learning is more effective than the traditional classroom set-up. This may indicate the recognition of the benefits and potential of BL in their course but is yet to be fully optimized for effective utilization.

Medical students generally prefer spending 1-2 hours per class, totaling 4-6 hours a day, with 30- to 60-minute breaks in between. Students also prefer didactic lectures, practical demonstrations, laboratory classes, uploading presentations in advance, and sharing of recorded lectures more often ($\geq 50\%$ of the time), while small group discussions (SGDs) and preceptorials, theoretical quizzes, practical exams, and return demonstrations, reading assignments,

manuals, taking Moodle quizzes (online) in a F2F setting only sometimes ($< 50\%$ of the time), but playing of recorded video lectures in F2F classes were preferred not at all. With regards to the preferred blend of modes, medical students preferred didactic lectures to be entirely or mostly F2F, while SGDs and preceptorials to be held equally in both F2F and online modes. Laboratory classes and practice demonstrations were preferred to be conducted entirely in person. A balanced mix of F2F and online modes was preferred for theoretical quizzes, while purely F2F mode was preferred for practical exams and return demonstrations.

Limitations

The study is limited to its sample size, while reasonable, it is primarily composed of first and second-year students, potentially obscuring perspectives from higher-year students. This raises concerns about whether the results represent the entire student body. Furthermore, the study relies on self-reported data, which can be susceptible to social desirability bias, where students might answer in a way they perceive as favorable rather than reflecting their true experiences. Inherent to the nature of nonprobability sampling done in this study, self-selection bias can make representation questionable compared to its probability sampling counterparts.

Demographic factors such as age, gender, year level, and family income can significantly influence the findings. The students' average age of 24 years old suggests the students were likely comfortable with technology. This might influence their reported preferences for online resources and blended learning approaches. Similarly, the female-dominated sample could skew the results towards preferences typically associated with females, such as a focus on collaborative learning activities. First and second-year students might have different preferences compared to higher-year students with more traditional learning experiences. Students with higher family income brackets might have better access to devices and reliable internet, potentially impacting their perceptions of feasibility. Furthermore, the curriculum or syllabus specifies a minimum class duration that must be met to receive credit for that particular subject, thus the participants' preferred length of one to two hours is not practical.

The study also focuses solely on student perceptions and preferences of blended learning. It

doesn't assess actual learning outcomes or compare blended learning to traditional methods in terms of effectiveness. This limits the ability to determine if student preferences for blended learning translate to improved learning. This limitation highlights the need for future research to go beyond perceptions and incorporate assessments of learning outcomes. This would provide a more complete picture of the effectiveness of blended learning at FEU-NRMF.

Interpretation

The authors have demonstrated that in general, the majority of medical students have the capacity to join and participate in online mode of classes in blended learning. In general, they are in favor of incorporating blended learning into their course. Students cited that it encourages them to study and has deepened their interest in the subject matter indicating the impact of BL on student's engagement and motivation. This is in line with a previous study that indicated an increase in self-study, and learning attitudes comes with blended learning.¹² Additionally, students found that blended learning is less stressful than the traditional setup, likely due to blended learning being far more flexible than purely face-to-face (Alabdulkarim, 2021). However, many respondents also found it less effective to communicate with their peers and professors, previous studies suggest that this is because the social elements in face-to-face not yet embedded into netiquette networks, suggesting the need for improvement in facilitating peer interaction within the blended learning environment.⁴ Activities lacking social interaction with instructors or peers may decrease student engagement.^{5,6} The overall positive outlook can be an improvement over how online learning aspects were previously perceived negatively in comparison to purely face-to-face in other studies.¹³ This change may be attributed to increased familiarity with online learning, which is linked to a more positive perception.¹⁴ While many students prefer blended learning in their courses, they remain undecided about its effectiveness compared to traditional classroom setups. This suggests recognition of the benefits of blended learning but indicates a need for further optimization to maximize its effectiveness.

With the means for conducting blended learning and the general desire of students for blended learning, it is crucial to specifically detail what blended learning looks like for it to be favorably

optimized for students, hence the other half of our survey attempted to investigate those details (i.e., class times, teaching methods and practices, and the specific blend of modes).

Generally, most medical students, regardless of year level, typically favor spending 1-2 hours per class, amounting to a daily total of 4-6 hours, interspersed with breaks lasting between 30 to 60 minutes. In contrast with the study of Singh H, et al.¹⁰ medical and nursing students prefer 2-4 hrs of classes in a day (66.8%, 47.5% respectively), and only <40 minutes per class (70.3%, and 62.6% respectively) with at least 10-20 min breaks in between. However, this is only a matter of preference and perhaps the experience from different schools in the implementation of education, and doesn't indicate effectiveness. However, it is known that sufficient breaks in between classes, limited teaching sessions, more interaction, and the use of a variety of teaching methods help students assimilate information better.¹⁰

Overall, students prefer more frequent didactic lectures, practical demonstrations, laboratory classes, uploading presentations in advance, and sharing of recorded lectures. However, they prefer SGDs and preceptorials, theoretical quizzes, practical exams, return demonstrations, reading assignments, and manuals, and taking Moodle online quizzes onsite only sometimes, and the playing of recorded video lectures in F2F classes was preferred not at all.

Interestingly, a general trend favoring F2F or an equal mix of online and F2F modes can be observed with the predominant modes preferred by students for each of the teaching methods. Generally, students do not prefer mostly or full online modes, but lean more to more F2F or at least balanced modes. With this, students generally prefer didactic lectures mostly in F2F format, while SGDs and preceptorials were preferred equally in both F2F and online settings. Laboratory classes and practice demonstrations were preferred to be entirely in-person. Balanced modes are favored for theoretical quizzes, whereas practical exams and return demonstrations are preferred strictly in F2F mode which is expected since these activities require physical interaction and skills.

Generalizability

Although the study focused only on a single institution and course, it provides valuable insights and implications for current and future educational practices. The school is compliant and follows the

minimum requirements of standard medical education practiced by the medical schools in the Philippines as FEU-NRMF has a Level 2 status under the PAASCU, indicating that the findings may be significant to other schools. Other factors such as the online and F2F infrastructure of each institution, culture within the school, socioeconomic classes of the student body, etc. may vary from school to school. This study can possibly not be generalized to other medical schools in the Philippines or worldwide since the results reflect the case of a single institution, hence may warrant surveying a larger population.

CONCLUSION

The present study determined that medical students were generally equipped to conduct online modes of blended learning, and they are significantly in favor of blended learning and its implementation in their medical courses. However, interaction with professors and peers needs improvement. It extensively detailed the students' preferences to potentially help design blended learning implementation. Key findings were students prefer a blend of a predominantly F2F or balanced mix of F2F and online for most of the classes and prefer spending 1-2 hours per class limited to a daily total of 4-6 hours, and with 30 to 60-minute breaks in between. Future research should consider investigating actual learning outcomes to provide a more holistic picture of blended learning's effectiveness. Overall, the findings of this study provide a valuable characterization of the preferred blended learning modality among medical students as a reference for educational institutions to better optimize student learning experiences.

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