Perception of Students on Online Assessment: A Descriptive Study among Medical Undergraduates at Basic Sciences

Maharjan BR,[1] Devbhandari RP,[2] Pradhan P,[3] Byanju J,[4] Aryal S[5]

[1]Department of Biochemistry,

[2]Department of Anatomy,

[3]Department of Microbiology,

[4]Department of Physiology,

[5]Department of Pharmacology,

Patan Academy of Health Sciences,

Lagankhel, Patan.

Corresponding Author

Babu Raja Maharjan

Department of Biochemistry,

Patan Academy of Health Sciences,

Lagankhel, Patan.

E-mail: baburajamaharjan@pahs.edu.np

ABSTRACT

Background

Assessment drives learning. Student assessment cannot be neglected in the long ongoing online learning during COVID-19 pandemic to motivate and assess students' learning. Hence Patan Academy of Health Sciences (PAHS) conducted online assessment to medical undergraduates amidst limitations.

Objective

To measure the perception of online assessment of students which will provide applicable insights for the further improvement.

Method

This is a single center, cross-sectional and descriptive study. A Google form containing a semi-structured questionnaire was sent to MBBS students of Basic Science at PAHS who attended online classes and online examination. The responses from close ended questions expressed in percentage and Chi-square test was used to find the association. Open ended questions were analyzed using Braun and Clarke's thematic analysis.

Result

Of 118 students that responded, 75% passed the online examination. A majority of students (73%) stated that online exam motivated them in learning process and it could be a good alternative during pandemic time. However the most of students (56%) were unsatisfied with the modality of online assessment and reasons that they mentioned were technical problems (89%), inadequate online proctoring (77%), insufficient examination time (58%), lack of orientation to exam, lack of computer skills. Technical problem was worse in rural areas.

Conclusion

Even though online assessment motivated students' learning during online classes, a large number of students were unsatisfied with assessment modality.

KEY WORDS

Cheating, Online assessment, Online learning

INTRODUCTION

COVID-19 pandemic has urged most of the medical schools across the world, including developing countries, to shift their curriculum delivery from face-to-face to online teaching learning methods.[1] Globally, 91% of higher education institutions reported that in-person teaching had been adopted by remote activities.[2] Nepal Medical Council also approved the use of online teaching learning as an alternative method for delivering theoretical content for MBBS students during COVID-19 pandemic.[3] Subsequently, Patan Academy of Health Sciences (PAHS) commenced online lecture and Problem Based Learning (PBL) for medical undergraduate in basic science years. Although the online learning was widely implemented during COVID-19 pandemic, adopting online assessment had been a big challenge.[4] Nevertheless students' assessment cannot be neglected in the long ongoing online learning to motivate and assess students' learning. Even though literatures pointed out the technical problems and cheating as major problems, others suggested that online assessment can be securely implemented.[5-9] As assessment drives students' learning to facilitate students' learning online assessment was conducted amidst limitations at PAHS medical undergraduates.[10] Since, online assessment was taken for the first time at PAHS, the effectiveness of online assessment in our context was not clear. Therefore, in this study we intended to measure the perception of online assessment among basic science students. The outcome of this study will provide useful information to improve online assessment.

METHODS

This is a single center, cross-sectional and descriptive study. Total of 130 students from first and second year MBBS students of Basic Science at PAHS were included who had attended online learning (online lectures and PBL) and appeared in online exam. In order to assess the students on the theoretical content, structured short answer questions (SAQs) were used. A discipline based structured SAQs was implemented in online exam for medical undergraduates rather than the regular assessment tools that are used in in-person exam at campus i.e. multiple choice questions (MCQs) and integrated problem based questions (PBQs). The reason for opting SAQs as the assessment tool for online exam was to preserve MCQ question bank and discourage cheating tendency as it required relatively elaborative answer. Exam.net, Swedish software for online exam platform, was used along with the Zoom video conferencing. Exam.net prevents students to browse the internet or other application in the device to find the answer and Zoom video conferencing monitors students' suspicious behavior. Students were oriented with the Exam.net platform by conducting a mock session prior an exam. Discipline based exam was conducted by combining three or four subjects in one day. Only after submission

of answers of one discipline, questions to other discipline was made accessible to students. Each discipline contained five SAQs and allocated time was 25 min and extra 5 min was given for submission of answers. Answers, either in typed form or an image of answers written in a hard copy, were submitted using Exam.net platform. For checking the answers, it was converted to PDF and sent to respective discipline which was marked and then marking was sent to exam section in Microsoft excel sheet. The result was distributed to students together with practical exam.

A semi-structured questionnaire on the perception of students on online assessment was constructed based on a various aspect of effective assessment after a literature review. Authors convened for multiple meetings to finalize the questionnaire. The finalized questionnaire was validated for i) face validity by sending the questionnaire to two of the basic sciences faculty who are involved in both online and face-to-face teaching learning process but not involved in research team, ii) content validity by sending the questionnaire to three content experts among them two were trained in medical education and one was qualitative research expert. The obtained suggestions from the validation process were incorporated in the questionnaire and then used for pretest among five students. Students' feedback in the pretest was included and the questionnaire was finalized which included demographic information, self-reported assessment score on online assessment, student satisfaction on online assessment, open or close ended questions on factors associated with the effective assessment. Self-reported assessment score was obtained for Principle of Human Biology I (IBE1) and Principle of Human Biology II+Hemopoetic block (IBE2) for first year, and Gastro-intestinal+Renal block (IBE4) and Endocrine+Reproductive block (IBE5) block for second year.

The study was approved from Institutional Review Committee, PAHS (Ref: bss2103301510). A Goggle form was created by principal investigator and the link was sent to students in their batch email linked to students' individual email address. Students' reply to the questionnaire was anonymised. Students were well informed that there would not be any consequences on receding to participate in this research. Two general reminder emails were sent to encourage students' participation at an interval of one week. Those students who did not respond to reminder emails and those who are involved in pre-test were excluded from the study.

The data obtained from Google form was exported to Microsoft excel sheet. The responses from close ended questions were presented in a percentage. Chi-square test was used to find the association of students' satisfaction on online learning with the assessment score. The qualitative data obtained from open ended questions were analyzed using Braun and Clarke's thematic analysis which was then triangulated with the analysis of closed ended questions.[11]

RESULTS

A total of 118 students (63 first year and 55 second year) submitted a completed questionnaire. Among them 59% were male and 41% were female. The average age of the students was 20.4±1.6 years. There was no significant association of gender with passes or fails in the exam (Table 1). Of the two IBEs taken each in year I and year II, 75% of the students passed both the IBEs, 15% students failed only one IBE and 10% students failed both the IBEs. Irrespective of a pass or fail in exams, students raised common problems in online assessment such as technical problems, lack of computer skill and lack of learning resources as reason for fails or scoring less marks (Table 1). On further inquiry 89% of students, who reported technical problems, had unstable internet, power cuts, no suitable device (laptop/computer) (Figure 1). Remaining 11% of the students did not report any technical problems and they all had passed the exam. All the students who failed in the exams stated that they had technical problems. The technical problems appeared to be even worse in the rural areas as stated in student's narration.

Table 1. Reasons for obtaining exam score by students

Category	Themes (n)	Codes
Passed students	Good preparation (37)	hard work, regular study from the beginning, deep study with understanding, discussion with friends, more free time for preparation and revision, regular to class and PBL
	Access to lecture recording and notes (10)	studying notes and revising the lecture videos, Better preparation with lecture recording, Recording helpful during confusion
	SAQ easier than PBQ (6)	easier questions, only subjective questions, SAQ easy compared to PBQ
Failed students	Lack of preparation (21)	unable to concentrate on study due to lockdown, unable to understand the course content, lack of revision time, health issues
	Lack of learning resource (2)	no textbooks, difficulty accessing to e-books and online resources due to poor internet
Both Passed and failed students	Insufficient time (11)	lack of computer skill, Slow typing, unfamiliar to computer/laptop
	Technical problem (13)	unstable internet, electricity disruption
	Unable to attend class (4)	unable to attend online class and PBL regularly
	Lack of exam orientation (7)	new method of online assessment and couldn't manage time

FR4: "Due to network and electricity issues, I was disconnected while giving exam. Mobile data does not working in my rural village. So I was unable to complete 2 subject exams."
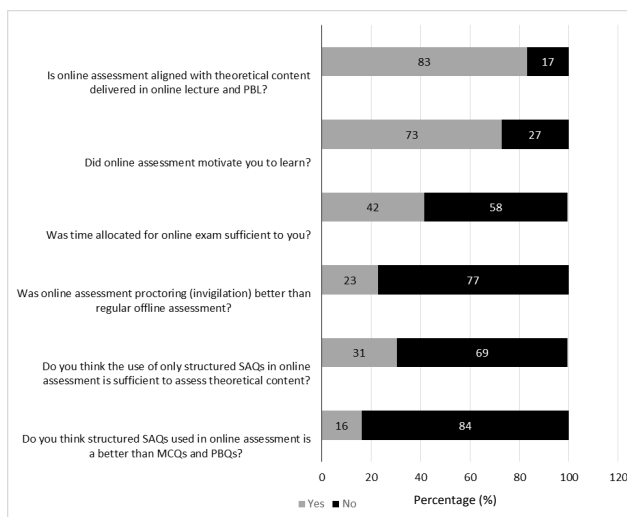

Figure 1. A percentage of students answering yes or no to questions stated

SR48: "My study was really hampered during online classes. I was not able to easily access the lectures due to the lack of internet facilities and gadgets like laptop. Furthermore, the classes on online medium weren't as effective as that of physical class. Books were not available and it was too difficult to concentrate on study."

FR32: "As I had poor access to internet, I used to come in online lectures and PBL through monthly data pack. Though, I had managed somehow to attend each and every lectures and PBL as much as I can, I couldn't join classes via video platforms as it used to cost more for data. In case of mobile data, connection is only stable and smooth if camera is disabled."

Students also stated a lack of orientation to online exam as a reason of their failure in online assessment (Table 1). This perception of students is again echoed from a significantly higher passing of students in the second attempt of IBE than the first attempt (Table 2). The passing in online assessment was also associated with the students' satisfaction to PBL performance, PBL attendance and online lecture but not with the online lecture attendance and adequate textbook availability (Table 2).

On further inquiry about the exam time adequacy, a majority of students (58%) stated that the time allocated for exam was insufficient (Figure 1). The reason that they stated were slow typing skill, technical problems (unstable internet, electricity problem), and need of elaborating answers in SAQ. (SR26: "I didn't get sufficient time since I am not good at typing and due to this reason I was unable to give exam properly. I wished I could draw diagram, but I was unable to do during online exam. Moreover, network issues always remained on the top of any reasons that lead me not to get the best result." Interestingly, other 42% of the students mentioned that the time was sufficient and reasons were their good typing skill and knowing the answer to questions. (FR50: "I found that the time was quite adequate to write the answers and also to revise my

Table 2. Association of passing and failing of students with various factors

Online Assessment Result	Online Assessment Attending Time			Chi-square (p) value
	First time	Second time	Total	
Pass	88 (37%)	106 (45%)	194 (82%)	
Fail	30 (13%)	12 (5%)	42 (18%)	0.002
Total	118 (50%)	118 (50%)	236 (100%)	
	Gender			
	Male	Female	Total	
Pass	50 (42%)	39 (33%)	89 (75%)	
Fail	20 (17%)	9 (8%)	29 (25%)	0.223
Total	70 (59%)	48 (41%)	118 (100%)	
	PBL Performance			
	Unsatisfactory	Satisfactory	Total	
Pass	8 (7%)	81 (68%)	89 (75%)	
Fail	10 (9%)	19 (16%)	29 (25%)	<0.001
Total	18 (16%)	100 (84%)	118 (100%)	
	PBL Attendance			
	Unsatisfactory	Satisfactory	Total	
Pass	7 (6%)	82 (69%)	89 (75%)	
Fail	8 (7%)	21 (18%)	29 (25%)	0.006
Total	15 (13%)	103 (87%)	118 (100%)	
	Online Lecture			
	Unsatisfactory	Satisfactory	Total	
Pass	14 (12%)	75 (63%)	89 (75%)	
Fail	10 (9%)	19 (16%)	29 (25%)	0.029
Total	24 (21%)	94 (79%)	118 (100%)	
	Online Lecture attendance			
	Unsatisfactory	Satisfactory	Total	
Pass	13 (11%)	76 (64%)	89 (75%)	
Fail	7 (6%)	22 (19%)	29 (25%)	0.234
Total	20 (17%)	98 (83%)	118 (100%)	
	Adequate Textbook Availability			
	Yes	No	Total	
Pass	56 (47%)	33 (28%)	89 (75%)	
Fail	14 (12%)	15 (13%)	29 (25%)	0.163
Total	70 (59%)	48 (41%)	118 (100%)	

answers."; FR18:" If we know the answer, we can finish it on time but if we don't know then it may consume more time and hence time may not be sufficient."; FR57: "As my typing speed was fast I had enough time.")

A 25% of students who have failed either both or single IBE, had reported lack of preparation as a major cause to their failure in the exam (FR1: "Even though it was online exam, I didn't face that must technical problems. My preparation was not good and I forgot that I studied."; FR3: "I didn't

have good preparation for exam. In lockdown I couldn't focus on my studies. I used to attend the lectures but could not understand and link to my studies."). Other reason of failure in exam was not having adequate textbooks (Table 1). On further questioning, 59% of the students had adequate textbooks but other 41% had not. Those students, who reported having adequate textbooks, had additional advantage of having access to e-books and online resources. But, of students without adequate textbooks, some were able to comfortably recompense it with e-books, online resources, lecture notes and lecture video recording sent by faculty, while others who had unstable internet and irregular electricity particularly from rural areas had a difficulty in accessing the online resources. However, it was encouraging to find how student perseverance towards the learning had made possible to get access to those resources despite many hindrances and some even could get through the exam. This again was substantiated by the lack of association of inadequate textbook with the failing of the students in exam (Table 2) and narration from passed students. (FR32: "I used to download lecture notes from the data packs and tried to learn from it. I was lagging somewhere behind as there were many uncovered topics. I didn't even have clear concept of the topics. With the help of my friends, I got an access to read some e-books. Studying through mobile screen was really challenging at that time."; FR47: "Books were not available at home but teachers provided us lecture notes and I studied e-books from my phone."; SR32: "I managed through e-books but I was not used to it. I could not have many references for studying. But I did my best to study from e-books and it helped me a lot.").

However, some students failed exam despite their determination as illustrated in narration. (FR5: "I couldn't manage my study material at that time because I was at my village. There was no internet facility (no wifi and data as well). I had to depend on Health Post wifi for attending classes and I couldn't review the lecture recordings as well. Only study material I had with me was some e-books that I already downloaded before going home and those sent by faculty later."; FR9: "I had not taken any books except physiology. In my village there was no internet. I used mobile phone for my study through lecture notes sent by teachers and e-books. The battery charge was not sufficient to study after my classes or PBL because I had to stay out of the house to take classes due to network issue. And there was no availability for charging facility outside so I had to charge the mobile for classes next day rather than reading the text that I had learnt on same day. I got more chance to read only on wednesday and saturday (scheduled day off)."

Among 75% of students who passed both the IBEs, the most of them regarded hard work and good preparation as the reasons behind their success in exam. Other reasons were the provision of lecture recording and lecture notes by faculty. (SR 26: "The reasons behind obtaining good scores were: i) my hard work and dedication toward study.

Table 3. A satisfaction of students on online assessment

Satisfaction	Themes	Codes
Yes (44%)	Good alternative (16)	good initiative at the given circumstance, best thing we can do for continuation for our study, saved our time and not much loss, something is better than nothing, testing of theoretical knowledge in some way
	Motivation for learning (5)	helped me to be more sincere in study, motivated me to study
No (56%)	Cheating (6)	not a fair way to measure students' performance, not reliable due to cheating, Cheating can easily be done, cheating unnoticed by invigilator, cheating can devalue the effort of hardworking students, result will be biased
	Technical problems (12)	unstable internet, electricity disruption, no proper device
	Less time (8)	Limited time and couldn't finish all questions, slow typing, difficult to draw flow chart, not enough time due to technical problem
	SAQ is not a good assessment tool (19)	MCQs and PBQs better for learning, our conceptual ability could not be assessed, lack of coverage of course content
	Lack of orientation (3)	not familiar with this model, no proper guidance in online model

Table 4. Students' perception on cheating in online exam compared to in-person exam

Cheating Perception	Themes	Codes
Easy (32%)	Poor supervision (14)	knowing that others have cheated, lenient as it was remote supervision, supervision through camera is quite difficult, not much invigilation, examiner have limited field of vision
	Getting help from the side (10)	use of other gadgets, can get help from anyone turning off microphone, camera is focusing to face only not surroundings, during the time of disconnection we tend to look for the answer, disconnecting time to time and Google search, searching in books on the side, help from friends on the side, searching in notes kept on the side
	Online search (13)	search the answer in mobile, Google search, Internet search, Google the answers from another device, Copy and paste through another website
Difficult (30%)	Fear of being caught (20)	watched by teachers, faculty invigilation, our camera was on, exam.net software can detect cheating, can`t open other application during exam, Fear of beingdisqualified
	Not sufficient time to cheat (11)	cannot cheat in that little time, if we cheat then miss the questions, lack of time to cheat, slow typing speed.
	Honesty of students (3)	didn't try to cheat, have never cheated in exams

ii) Lecture recording that was provided to us helped to review in case we had confusion. iii) No distraction during classes."; SR29: "I studied well for exam and furthermore there was enough time for preparation and also we had just 3-4 subject in one day and the SAQ pattern was easy."). Some students also mentioned that the online exam was easier than previous regular exams as they found that SAQ was easier than PBQ (Table 1).

On inquiring about the satisfaction of students to online assessment, a majority of them (56%) were unsatisfied with on online assessment while other 44% were satisfied. The students who were satisfied with online assessment reasoned that it was a good alternative during pandemic time (FR23: "Method adopted was a good one. Its' students fault to cheat, not the modality of exam." FR52: "At that time it was the best thing that could be done for the continuation for our study and even in future if such kind of situation occurs it could be done again." FR63: "As there had to be something that could assess us and we could not wait for the right moment to come, and I really appreciate our faculties and management team effort in trying to keep on the process of teaching and learning ongoing which also saved us our time without much loss."). While others mentioned that it motivated them to study (SR29: "We already had classes for months but no motivation to study but the assessment motivated to study."; FR32: "Yes, I'm satisfied with online assessments because it helped me to be more sincere about studying online classes.") (Table 3). Similarly when asked further, on positive note a majority

of students (73%) reported that it motivated them to study and 83% of the students perceived that the online assessment is aligned with online lecture and PBL content (Figure 1).

Those participants who were unsatisfied with online assessment stated reasons as cheating preponderance, insufficient exam time especially to those who had slow typing speed, lack of orientation to online assessment method, SAQ not a better assessment tool than MCQ and PBQ, and technical problems (Table 3). On further inquiry about cheating, mixed responses were obtained as easy (32%), difficult (30%) and similar (38%) in online assessment compared to offline assessment (Figure 2). Consistent to the 32% of students perceiving cheating being easier, most of them (77%) responded that online proctoring was inadequate and suggested that it needs to be improved to control cheating. Similarly, on exploring the reasons for online exam being "easy", majority of the students stated that it were due to i) poor supervision (SR37: "Because the examiner had limited field of vision about what the examinee is doing around. It would be very much easier for the examinee to cheat in exam, if s/he intended."), ii) could get help from the side from notes/book, friends/family members (FR32: "Family and friends could help in cheating."), iii) use other gadgets to search answers could Google or online search and copy the answer (FR32: "Copy and paste the answer through another website is easy
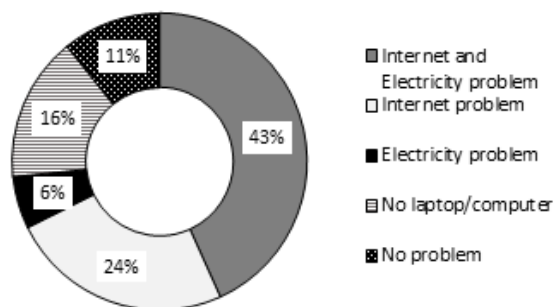
Figure 2. Types of technical problems that students faced during online exam

and convenient."; FR1: "If someone was fast at typing and they knew not the answer of 1 or 2 questions then they could search that question in their phone.") and iv) some students also heard that colleagues had cheated in exam and scored good marks (FR45: "I heard cheating could be easily done easily. This may have resulted in high pass marks this time."; SR16: "Because my friends said some of our batch mates cheated easily in exam.") (Table 4).

When we explored the reason for the difficulty in cheating, students stated that it is due to i) surveillance from faculty (FR51: "We had our cameras on at all times and I think we were being monitored so I would say it would be difficult."), ii) fear that Exam.net software could detect cheating or opening of other applications (SR10: "As we had to give exams in the Exam.net website which I think was the best to prevent cheating and good thing was that we were monitored throughout the exam from our webcam in Zoom by our teachers. So as far as I think nobody cheated and that is a healthy thing for everyone in the class."), iii) time allocated for exam was not sufficient to cheat (FR45: "We were lacking time to do so. Typing speed was very slow in laptop. We rather would be doing better with our own knowledge then wasting time in cheating."). Some mentioned that it is because of their honesty (FR31: "I have never cheated in exams. Also, there was no time for me to even read the questions.")(Table 4).

Since structured SAQ was used as an assessment tool, students' perception on this tool was measured. The preference of structured SAQ over PBQs and MCQ was overwhelmingly low (16%) (Figure 1). In addition, only 69% students perceived that SAQ is not sufficient to assess the theoretical content (Figure 1). Of these 16% students who preferred a structured SAQs, the reasons they stated were i) a good alternative for online situation (FR3:"It was a good alternative to test students in a short time."), (ii) easier than PBQs and MCQs (SR17: "In SAQ, we know exactly what to answer on respective questions but in PBQ sometimes, questions are vague and we get confused on what answer to write."), (iii) reduced cheating in online platform (SR43: "Less chance of cheating.")

Most of the students (84%) stated that SAQ is not a good tool for assessment compared to PBQ and MCQ. The

reasons they stated were (i) SAQ did not assess the case based applied aspect understanding level questions(FR5: "In PBQ, we have to understand the scenario first then answer accordingly which might be helpful later during our clinical practices to understand the cases of similar types of scenario."; FR16: "Because SAQs are not practical. PBQ is a lot more effective in accessing student's knowledge about the topic because it access the student's skill to correlate the theory with the clinical scenario."; FR46: "SAQ does not assess concepts and knowledge but just the remembering capacity."), (ii) could not cover more content areas of the curriculum(FR37: "I think if the question patterns were based on MCQ and PBQ then it would cover more part of our syllabus."), (iii) required long answer and took more time to answer questions. (FR52: "SAQ required fast typing skill to be able to finish the exam on time. MCQs and PBQs would be easier for time management.)"

When students were asked for the ways to improve online examination, students response were, (i) provision of adequate orientation to online exam (FR3: "Make students familiar to questions patter prior to exam and give them the demo questions."), (ii) need of more exam time (SR41: "Need more time and should not give the question which require answer in flow chart and diagram."; FR5:"Giving little bit more time to the students who were disconnected in between the exam could have helped to some extent regarding time management."; SR10: "Considering the students who had slow typing skills and those with the internet or electricity problems, the time duration of exam can be increased."), (iii) resolution of technical problems ("SR47: "If possible students should be in good place of receiving internet and electricity during the process of learning and exam."), (iv) use of MCQ and PBQ rather than SAQ (FR6: "Case based and problem based MCQs and PBQs would be better for better understanding."; FR60: "It would be better if the conceptual questions were asked rather than rote questions.") (v) timely feedback (FR3: "When students get result and timely feedback on exam they have chance for improvement in next block but in our case we had received result late. If we had got early then it would been better for us."), (vi) improvement in proctoring (SR23: "Observers were there but students are cleverer too. I don't know how observers used to observe but it was not enough, only one observer used to be there, I think if we had a group of 6 or 7 students rather than all students in one group, there would be more close observation to each group and it would be difficult for cheating."; FR35: "During the online platform the teacher would speak in the microphone when suspicious activities were observed in one students. This distracted other students who were writing the exams that added a pressure in completing the exam on time.)

Despite these suggestions many students had agreed that online assessment was a good alternative during pandemic time but not the substitute of in-person exam at campus.

(SR37: "It is good to have online assessment if the offline is not possible. However, as long as offline assessment is possible, online assessment should not the replacement of offline assessment."; SR28: "Everything that our faculty and administration did was perfect and I think there's no room for improvement. It's just the issues with stable net and electricity").

DISCUSSION

There was a high level of satisfaction of students in online learning i.e. PBL performance (84%) and online lecture (79%) which was similar to the study by Chakraborthy et al. but was different to the study done by Sharma et al. in the Nepalese population which found 53.3%.[12,13] Studies have found that students' satisfaction on online learning varies from 14% to 93.3%.[14,15] The differences in students' satisfaction could be due to differences in the online learning environment and conducive infrastructure. In our case, it possibly could be because of acceptance of online teaching as a good alternative to prevent academic loss during pandemic time and this has been observed in other study also.[12] Even some students stated that online teaching should not replace the in-person classroom learning although they had a high satisfaction to online classes and PBL.

The students' high satisfaction in online learning was associated with a higher pass percentage (75%) of students in online exam. This was indicated by the positive association with PBL performance, PBL attendance, and online lecture with the passing of students. But such association was not observed with online lecture attendance which perhaps could be due to the provision of lecture recording and lecture notes in PDF which sufficiently covered missed lecture as reflected by some students in this study. Although 41% of the students reported a lack of textbooks, some were able to recompense it with e-books, online learning resources and lecture recording and lecture notes. But, students from the rural area appeared to suffer more as they had limited textbooks and lacked accessibility to e-books/online resources, lecture recording and lecture notes in PDFs due to poor internet connection. But despite these extreme challenges, efforts put forth from the students in rural area were indeed highly appreciable and some were even able to pass the exam overcoming these challenges. Moreover, the students who have passed the exam stated that their hard work, regular and deep study, regularity to class and PBL has enabled them to overcome the limitations and challenges during online learning. This was also reflected by the lack of association of inadequate textbooks with the failing in exam. Other studies have shown the importance of students' perseverance in the learning, hence the diligence of students could have played a significant role in passing the exam.[16,17] This indeed gives us a positive notion that online platform is able to create a learning environment during pandemic time particularly among students those who have good infrastructure at home with stable internet, uninterrupted power supply and a computer. But to those students especially belonging to rural areas of Nepal who lacked good infrastructure it was challenging and students had to struggle a lot to achieve desirable academic outcome. Unfortunately some of these students were unable to get through the exam.

There is a mixed perception on the benefit of students learning with the sharing of online lecture to the students, O'Callaghan et al concluded that the benefits of lecture recordings outweigh the negatives.[18] A recent study also showed benefits of lecture recording and notes.[19] Similarly, in this study students perceived that provision of lecture recording and lecture notes helped them performing well in the online assessment as it gave them more opportunity to revise during the time of confusion as noted in other studies also.[20]

The technical problems have been pointed as a major impediment in online assessment by both the passed and failed students in this study. It included unstable internet, electricity disruption and device problem or lack of suitable device such as laptop/computer. Such technical problems have been pointed in other studies also.[21,22] It is important to note that all the students who have failed in exam had technical problems and this was even worse in rural areas as illustrated in the narrative notes. Other Asian countries have also faced similar challenges and highlighted the importance of stable internet, particularly in rural areas, in promoting the online education.[5,6] Hence, it is important to address the technical problems especially of the rural areas to promote the educational equity in online learning. Some students have confessed that the lack of computer skill especially slow typing had limited them to complete answering on time and they pleaded for an increase in exam time duration. On contrary, others mentioned that the time was sufficient and they cautioned that increasing exam time will only give more time to those who have cheating tendency. Amidst such mixed responses of students on examination time limit, more appropriate way to address this issue could be to promote students in developing computer skill and proper orientation of online exam.

Although students had been oriented to exam.net platform through mock session for online assessment, some students stated that they were unfamiliar to the online platform. It could be that the given orientation is still insufficient. Osuji et al. stated the importance of orientation to student before implementing the new assessment methods.[22] A students' perception on the lack of orientation to online exam was further substantiated by a higher rate of passing in the IBE exam that was given second time compared to the first one.

Other significant limitation that the students had repeatedly raised was about academic dishonesty in online

exam. Cheating indeed is a significant threat in the exams that are conducted on-campus or online.[23,24] Recent survey by Wiley showed that over 95% of students believes that cheating happens both in-person and online assessment.[25] The rate of cheating has been found to vary from 30% to 96%.[26] In this study, compared to in-person exam, 32% of the students stated that cheating is easy in online that contrasted with the recent survey which found it very high (93%).[25] Other 30% reported that the cheating in online exam was difficult and 38% stated that it was similar to offline assessment. A majority of students (77%) reported that they are not satisfied with the online proctoring despite the use of exam.net platform with Zoom video surveillance. Some students also reported that one of the reasons for easy cheating was being able to copy paste answers by online search which was also observed in other study.[27] However, some students in this study mentioned that online proctoring did impart a fear and restricted the cheating tendency. Likewise, studies had found that the use of remote online proctoring decreases instances of student cheating.[28,29] In our setting the online surveillance need to be more stringent, as suggested by students it could be improved with close monitoring by creating multiple groups rather than single large group with only one invigilator. Other approach that could be taken is to encourage academic integrity among students which has been stated by other.[30] Some students in this study boldly mentioned that their academic honesty did not allow them to cheat in exam.

PAHS uses MCQs and PBQs for the assessment of theoretical content during in-person exams as MCQ covers more course content and regarded to be reliable and assessing higher level understanding of the students and PBQ promotes problem solving ability using clinical scenario.[31-33] Interestingly, these advantageous attributes were perceived by students in this study and the majority of students (84%) preferred MCQ and PBQ over SAQ, and SAQ alone is not better to assess the theoretical knowledge. Our presumption was that cheating would be relatively difficult with SAQ. As presumed, students perception on time limits showed that it does prevent cheating tendencies to some extent. But to those who do not know answer at all will still have sufficient time during exam to cheat by searching the answer in online resources or books or notes. Students also commented that the use of SAQ alone as an assessment tool is inadequate and suggested to add MCQ and PBQ for theoretical assessment. The most of banks for MCQs have limited questions and could be used multiple times satisfactorily if questions are kept confidential.[34] In our context also the use of MCQ would still be difficult due to limited questions in a bank. Therefore adding PBQ in addition to SAQ would be more plausible option in future online assessment. Contrastingly, some students in this study favored SAQ over PBQ as they found that SAQs are clearly phrased and hence not confusing and easier.

Despite many challenges and limitations in the online assessment, a majority of the students reflected that provision of online assessment motivated them and to be serious to the studies during online learning. This proves that assessment drives learning in online platform as well.[35,36] Students also accepted that the online assessment is a good alternative during pandemic time. As online assessment has been conducted for the first time, there was certain lagging in timely feedback to students after exam and students also reflected that timely feedback would have been useful to identify areas of improvement as in other study that timely feedback helps learning.[37]

Although the present modality of online assessment could be improved to a certain extent, some but important aspect such as accessibility of stable internet and electricity supply in rural area is beyond the capacity of students and academic administration. However, in pandemic time such as this where offline assessment is not possible it does serve a better alternative to motivate students in online learning. Even though the continuity of academic activity without a loss of time during pandemic would require the ability to conduct both low and high stake exam in online platform, given the limitations in conducting an online assessment for a high stake summative exam where a current practice is to conduct in campus under invigilated conditions, at present the online assessment could serve as a tool to motivate students learning by using it in low stake theory exam. Nevertheless it is very important to adequately address the major constraints such as stable internet and electricity supply, suitable device, and stringent online proctoring. Moreover, the conduction of practical exam will not be feasible in online platform as it require in-person presence to assess the skill.

CONCLUSION

A provision of online assessment motivated a majority of students during online learning, however, most of students were unsatisfied with the online assessment modality due to technical problems, cheating possibilities, insufficient examination time and SAQ being inappropriate assessment tool. Technical problems were even worse in the rural areas of the country.

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