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Restructuring an internal medicine rotation to take on a fully virtual experience in a resource-limited setting: A mixed-methods study

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Abstract:

BACKGROUND: During the coronavirus disease 2019 (COVID-19) pandemic, medical schools in the Philippines accelerated the adoption of virtual learning. Course developers were challenged to provide equal opportunities for clinical exposure given the differential access of students to technology. This study describes the modifications in the course design of an internal medicine rotation for third-year medical students and the perceptions of the faculty and students toward these changes.

MATERIALS AND METHODS: Course evaluations by students and faculty were reviewed. Using a concurrent mixed-methods approach, we analyzed the quantitative and qualitative responses and triangulated the results of the faculty and student surveys.

RESULTS: Shifting to a virtual learning platform decreased the number of student–patient interactions. Observing a telemedicine consultation done by faculty substituted for real patient encounters. In consideration of students with limited Internet access, synchronous activities were made nongraded. The survey response rate was 51% (93/181) for students and 34% (32/94) for faculty. Survey participants indicated high overall satisfaction toward the virtual course with a general agreement between students and faculty respondents in most domains. Recurrent themes were the demand for more patient encounters, more synchronous activities, and better evaluation tools. Only the faculty were critical of technical issues, such as audibility and Internet connectivity.

CONCLUSION: The experiences of a single institution in redesigning and implementing an undergraduate medical course in internal medicine for a fully virtual platform were described. Strategies for augmenting patient exposure and tailored clinical assessment tools are needed to improve stakeholder satisfaction. In resource-limited settings, access to appropriate technology must be considered to ensure equitable learning.

Keywords:

Distance education, virtual learning, satisfaction, undergraduate medical education

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Introduction

Virtual learning platforms have been invariably used in medical schools for years before the coronavirus disease 2019 (COVID-19) pandemic. Early virtual campuses were developed to provide distant and asynchronous courses to large student populations at a lower

cost.^[1] Additionally, the use of simulated clinical cases offered increasingly dynamic learning systems with no apparent risks to actual patients.^[2] In one university in the Philippines, the transition to a blended form of learning, which incorporated both virtual and face-to-face modalities, was required so that students and faculty may be ready for an increasingly volatile, uncertain, complex,

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and ambiguous world.^[3] The university's constituent medical school had already implemented blended learning in its internal medicine rotation for third-year medical students, but was forced to adopt a fully virtual learning strategy during the height of the pandemic following the university's directive.^[4]

Curriculum changes were similarly employed in medical schools globally. These include the use of virtual lectures and online small group discussions,^[5] virtual patient rounds,^[6] high-stakes remote examinations,^[7] and objective structured clinical examinations (OSCE) modified in varying degrees.^[8-10] Majority of these changes were reported in resource-rich settings. Meanwhile, the experiences of lower-middle-income countries in the implementation of these activities, which are heavily reliant on technology, are less documented.^[5,11]

In this study, we describe the redesign of an internal medicine rotation of third-year medical students at an urban medical school and training hospital in the Philippines during the COVID-19 pandemic, analyze the perceptions of the students and faculty toward the redesigned course, and outline the challenges and opportunities encountered during the implementation of the course.

Materials and Methods

Study design and setting

We conducted a descriptive cross-sectional study through a review of records and a mixed-methods approach. Instructional designs, course materials, and course evaluations for an internal medicine rotation offered to third-year medical students during the second semester of the academic year 2020–2021 were evaluated.

Study participants and sampling

A total of 181 students were divided into six blocks, and their course evaluations were collected at the end of each three-week course. Faculty course evaluations were collected at the end of the semester from all faculty members who were involved in the course throughout the entire semester.

Data collection tools and technique

Teaching–learning activities and assessment methods before and during the pandemic were compared. Post-course survey results from students and faculty were collected. For the student evaluation, two sources were used. The first one is an online survey form with a Likert scale, yes/no, and open-ended questions routinely administered by the medical school for all clinical and nonclinical courses (from here on referred to as the generic survey). Given that the questionnaire items from the generic survey were not validated to evaluate

a virtual undergraduate medical course, a second online questionnaire comprising three open-ended questions was designed by the course coordinators for the internal medicine rotation (subsequently referred to as the course-specific survey). For the faculty evaluation, the electronic survey form developed by course coordinators comprised both close-ended and open-ended questions paralleled to the student evaluation forms. Survey participants were given the option to answer “not applicable” to any of the question items. Similarly, free-text comments were not required fields. The response rate was calculated by determining the percentage of completed forms out of the total number of individuals to whom the forms were sent. Contacting nonresponders could not be done since the results were collected anonymously.

Qualitative data, which were the free-text responses from the surveys, were processed using thematic analysis. An open-coding process was performed using Microsoft Excel. Three investigators independently reviewed feedback from both students and faculty and used the entire data set to generate initial codes. Codes were then compared and modified as necessary before identifying common themes. The initial themes were reviewed by the rest of the investigators. Upon reaching a consensus, definitions for each of the themes were generated.

Quantitative data consisted of responses from the Likert scale and yes/no questions on different but related topics as outlined in Appendix 1. Four-point Likert scale responses were converted into binary responses as negative (1 and 2) and positive (3 and 4) to more succinctly present and interpret results along with other yes/no questions. Each questionnaire item was reviewed by three investigators and then grouped into similar domains. Responses for each domain were initially tallied per individual, and domains with at least 50% positive responses from an individual were interpreted as favorable. The proportions of respondents who rated each domain as favorable and unfavorable were then presented as percentages.

Further analysis was conducted using a concurrent triangulation design following the good reporting of a mixed-methods study (GRAMMS) framework.^[12] While quantitative data gave the general direction of favorability among respondents, qualitative data were used to supplement these findings. This is especially useful since the cross-sectional study design and anonymity of survey responses would preclude further elaboration of feedback. Both quantitative and qualitative data were collected from the same individuals and were analyzed simultaneously. Integration of data sets occurred after the generation of themes and domains. Commonalities between responses from students and

faculty were also used to triangulate themes and validate the research findings.

Ethical considerations

This study was conducted in accordance with the ethical standards set by the institutional review board and with the Helsinki Declaration of 1975. Given the low risk of breach of confidentiality from the anonymous online survey, the requirement for informed consent was waived.

Results

Changes in instructional design

The redesigned virtual internal medicine rotation was able to address the following expected learning outcomes for third-year medical students: 1) formulating a diagnosis based on the application of clinical skills; 2) implementing a holistic evidence-based plan of management; 3) screening patients at risk for disease; 4) formulating a plan for patient education based on perceived need; 5) demonstrating professionalism and humanism; and 6) properly documenting all patient encounters and clinical data. Before the pandemic, another crucial learning outcome is the development of effective communication skills with patients, caregivers, and colleagues. However, the shift to virtual learning

during the pandemic presented inherent challenges that limited the ability to fully address this outcome.

While the specific activities were changed, the general learning process still employed a mix of traditional and problem-based teaching methods as summarized in Table 1. Students had the opportunity to learn from actual patients through telemedicine observership, although the number of patient encounters was severely reduced. This gave way for more self-directed learning through dedicated study periods, where students were provided with a reading list relevant to their scheduled topics for the week. Each student was asked to formulate five multiple-choice questions based on their assigned readings, and items for their weekly quizzes were chosen from this pool. Clinical knowledge and competence were assessed through written examinations and simulated case discussions. However, the evaluation of clinical performance, which was previously done using an OSCE, was not performed in the current virtual setup.

All synchronous activities were redesigned to be formative and nongraded in consideration of students residing in areas with limited Internet access. Moreover, the university implemented a no-fail policy^[13] amid difficulties in implementing remote learning, therefore

Table 1: Teaching–learning activities and assessment methods before (2019–2020) and during (2020–2021) the pandemic

Activity/assessment	2019–2020	2020–2021
I. Teaching and learning activities		
Traditional learning		
Lectures	Face-to-face lectures: Rational approach to diagnosis Problem list Antibiotic stewardship Health maintenance strategies Approach to the geriatric patient	Prerecorded lectures and live online lectures: Problem list Medication review in the outpatient setting Telemedicine Clinical concept mapping
Independent study	Dedicated unstructured study time	Scheduled weekly textbook reading list Formulating multiple-choice questions
Problem-based learning		
Clinical simulation	Paper-based case scenario with face-to-face faculty-guided small group discussion (10 simulated patients)	Paper-based case scenario with online faculty-guided formative small group discussion (three simulated patients) Asynchronous paper-based case scenario with written management plan (six simulated patients)
Real patient encounter	Supervised outpatient consult with faculty-guided discussion and debriefing (10 real patients)	Telemedicine observership (three-way videoconferencing call with attending physician and consenting patient) (one real patient)
II. Assessment methods		
Written examination	One 100-point multiple-choice written exam	Three 20-point multiple-choice weekly online examination
Rating scales with comments	Feedback from faculty on case discussions (simulated and real patients) Written peer evaluation	Feedback from faculty on written output for paper-based case discussions Online peer evaluation
Clinical performance examination	Objective structured clinical examination (OSCE)	-
Essay questions	Reflective assessment on the state of health financing in the country	Reflective assessment on social determinants of health affecting individuals and populations

diminishing the relevance of summative assessment for promotion and certification.

Course evaluation surveys

A total of 183 survey forms were analyzed. The student response rate was 32% (58/181) for the generic survey and 51% (93/181) for the course-specific survey. Meanwhile, 32 of 94 (34%) faculty members involved in the course completed the survey. All student respondents and the majority of the faculty respondents (29/32) gave a positive overall rating for the virtual course. Four themes emerged from the course evaluation feedback. These are presented in Table 2. In the succeeding sections, the emergent themes will be interpreted alongside the corresponding quantitative survey results, which are summarized in Table 3.

Course competencies

Most student respondents (55/58) agree that the course helped them develop into the physician the college envisions them to be. While almost all students reported that the course is community-oriented (56/58), one person disagreed stating that the activities “centered toward patient care in the hospital setting.” Learning telemedicine was frequently highlighted, and it was the most-liked activity of 51% of student respondents. Despite the lack of face-to-face patient encounters, respondents were able to reflect on their perceived roles as compassionate physician and lifelong learner.

Course design

Students who participated in the survey gave mostly positive ratings on the appropriateness (57/58), integration (57/58), and sequence (58/58) of activities. This was supported by a comment that “synchronous small group discussions (SGD) were helpful in reinforcing and clarifying the stuff I read from the assigned readings.” The frequency of activities was rated favorably by most students (56/58), and time allotments for the activities were reported to be adequate by both students (57/58) and faculty (30/32). However, both groups consistently asked for more synchronous sessions. One student suggested to have “more nongraded SGDs (maybe twice/thrice a week) and less paper cases,” while one faculty wanted “more SGDs with smaller groups.”

Course resources

Whereas all student respondents rated their faculty preceptors favorably, two respondents wanted to have “more opportunities to have a discussion with a consultant.” All of the students and faculty respondents gave favorable feedback on the administrative support, which encompassed course organization, course coordination, and technical support. Meanwhile, ratings on material resources were mixed from both faculty

and students. A minority of faculty respondents (3/32) were critical of technical issues with the online platform. One faculty wanted “more stable connection and better microphones so students can be heard more easily,” while another wrote “if possible, have camera on for all students.” Students were asked in the survey how Internet access contributed to enhancing learning. All 16 respondents rated Internet access favorably without any reported concern regarding the Internet and technology.

Course evaluation and feedback

Among all the domains, the appropriateness of evaluation tools received the lowest rating from faculty respondents (28/31). This was evident from several comments asking to “have better evaluation rubric,” “improve the rating scale,” and “shift to oral exam.” For student respondents, timeliness of feedback received the lowest rating (53/58), yet almost all who received feedback on their written outputs found them to be useful (57/58).

Discussion

Key findings

In the restructured course, all in-person activities including the OSCE were suspended, telemedicine observership and simulated cases were used in place of real patient exposures, and synchronous activities were made nongraded to address potential disparities in Internet access. Despite these changes, the course was met with generally favorable feedback with students and faculty respondents exhibiting agreement in both the quantitative and qualitative data sets. Both faculty and students raised concerns about the lack of patient interaction and the limited number of synchronous sessions. Consequently, increasing the number of asynchronous activities may have caused delays in grading written outputs and providing feedback to students. Students and faculty called for better grading rubrics, and one faculty requested a shift from written to oral examinations, reflecting the need for improved appropriateness of evaluation tools in the virtual setup.

Challenges and opportunities

In other medical schools, the lack of patient interactions was approached by employing virtual patient simulators and having students observe virtual patient rounds.^[11,14] In our case, a three-way telemedicine consult with the patient, faculty, and students was an attempt to fill this gap. The same method has been previously conducted to teach medical students in dermatology and palliative care.^[15,16] It is difficult to determine how these approaches compare to real patient encounters in improving students’ clinical performance due to, in part, the challenge of performing formal assessments remotely.^[11]

Table 2: Thematic analysis and excerpts from post-course surveys among students and faculty

Themes and codes	Favorable responses*	Negative feedback and suggestions*
I. Course competencies: Knowledge concepts, abilities, and attitudes expected from students after completing the course		
Knowledge		
Systematic approach to diagnosis and management	"A systematic approach is essential to diagnosis and management of a patient."	-
Common diseases in the community	"It introduced me to the most common cases in the outpatient setting and taught me how to manage each."	"A lot of the things in the textbook are difficult to apply in our context."
Community-oriented patient care	"It taught us to be aware of the different factors involved in patient care, thus fulfilling the goal of making us more community oriented."	"The module carried out its goal of developing clinicians, but not a community-oriented physician. The SGDs and readings centered toward patient care in the hospital setting."
Patient-centered and cost-effective management	"A lot of emphasis was put at patient-centered care to not only provide the best management but also in the most efficient and cost-effective way."	-
Holistic and integrated care	"We were always used to the modular or systems-based approach. In this module, we were taught how to process the patient's cases right from the chief complaint up to the treatment plan."	"More cases please! I felt like I still lacked knowledge on Nephrology, Neurology, Hematology, Endocrinology, and Immunology."
Learning from textbook knowledge	"Readings help direct my learning."	"I tend to get overwhelmed with the information I read in the textbook."
Skills		
Application of knowledge into practice	"It tests me to tackle cases on my own by applying what I've learned over the past three years."	"I hope there would be some telemedicine practice or opportunities so that we can be able to apply our learnings"
Practice of telemedicine	"It was my first time to witness the whole process of a consultation, from the preparation to the documentation after the session."	"More live teleconsultations would be very beneficial as an alternative to the actual clinics."
Writing paper cases	"I made the most progress in this course learning how to write a good paper."	"They should have a former lecture on how to write a paper."
Writing test questions	"I liked how we were assigned to create our own quiz questions because it really gave us motivation to read the book and see things in the perspective of those who make the exam questions."	"I think I would prefer questions coming from the faculty instead of the students."
Attitudes		
Reflection on the role as a compassionate physician	"The course inspired me more to give my best in getting a medical degree so as to help my countrymen." "I learned the importance of being passionate about providing the best care for my patients and building friendships with them as well."	-
Reflection on the role as a lifelong learner	"There's so much to learn in Medicine." "Practicing Medicine requires in-depth knowledge. I should read more."	-
II. Course design: Structure and delivery of activities and how they impact teaching and learning		
Teaching and learning strategies		
Online supplementary materials	"I really liked some of the video lectures posted in the virtual learning environment."	"Include a short video/audio clip highlighting pertinent physical examination techniques." (faculty)
Structured reading list	"This allowed for structured learning done at our own pace"	"Might be good to implement weekly sessions for clarifications regarding the assigned readings"
Patient encounters	"The preceptorial showed us how an expert handles a case. From that session, we learned the do's and don'ts in a patient encounter."	"Students can be grouped and try their own telemed consult with supervision from a consultant."
Integration and sequence of activities	"Formative SGDs were effectively integrated with the necessary reading materials and scheduled appropriately in time for the SGDs." "I appreciate that the MCQs were formative and became the basis of our quiz."	"Integrate the case paper discussion with the preceptorial in order to complete the experience of seeing an interview with a patient and then forming the problem list and treatment plan."
Balance of synchronous and asynchronous activities	"I appreciate that they allowed us a lot of time to read the textbook and made the course mostly asynchronous. It also had good decisions as to	It was kinda hard going through the week with only one synchronous session to look forward to at the end of the week.

Contd...

Table 2: Contd...

Themes and codes	Favorable responses*	Negative feedback and suggestions*
II. Course design: Structure and delivery of activities and how they impact teaching and learning		
	which activities were synchronous, like SGDs and preceptorials.”	“If more people can do live preceptorials” (faculty)
Formative nongraded activities	“I really love nongraded SGDs. The atmosphere is more relaxed, and the discussion is more free flowing!”	-
	“Formative nature of the activity—no pressure from the faculty to evaluate each student” (faculty)	
Working with and learning from peers	“Concept mapping with my groupmates became our weekly bonding session and sharing our ideas was very helpful in our learning process!”	“It’s also a very lonely rotation with almost no interaction with blockmates.”
Challenges and opportunities		
Virtual platform	“Engaging and the platform is accessible” (faculty)	-
Patient encounters	-	“I know the learning experience will be really different if I encountered patients face to face”
Academic integrity	-	“Maybe the questions for the quizzes should come from the faculty. You can’t rule out the fact that some students might share their questions to others.”
		“The limitation is we cannot assess whether the students copied straight off journals, books, and from their blockmates.” (faculty)
Student participation	“Good student participation despite the type of interaction being virtual.” (faculty)	“Students were prepared to tackle certain parts of the history so they did not bother to study the other aspects of the case.” (faculty)
III. Course resources: Human resources, material resources, and administrative support		
Human resources	“Faculty and resident coordinator were very accommodating” “The online approach is well-managed and coordinated” (faculty)	-
Internet connectivity and technical issues	-	“More stable connection and better microphones so students can be heard more easily” (faculty) “If possible, camera on for all students” (faculty)
Student guide	-	“Maybe expectations can be set at the start on what the outputs should look like.” “Give the students a standard format when writing their report” (faculty)
Faculty guide	“Very objective and with a faculty guide” (faculty)	“There seemed to be differences in expectations between the consultants who would grade the paper cases, and so perhaps a rubric can be provided to facilitate more uniform expectations.”
IV. Course evaluation and feedback: Usefulness of evaluation tools and promptness of feedback		
Appropriateness of evaluation tools	-	“The assignments felt like they took up too much time to make to only count as 5% of the grade” “Improve rating scale” (faculty)
Timeliness of feedback	-	“More timely feedback on the paper” “Better coordination on timing of sending the paper cases and submission of grades” (faculty)

*Responses quoted are from students unless otherwise indicated from faculty in parenthesis. MCQ, multiple-choice question; SGD, small group discussion

Some educators argue that it would be unfair to test students virtually for skills that they should have been taught at the bedside.^[17] Other authors propose that skills demonstration may still be reasonably assessed through videoconferencing platforms.^[18] The experiences from high-income countries have been varied in this regard. Virtual OSCEs have been utilized, employing media-rich simulated environments to deliver test case scenarios.^[19] Meanwhile, teleOSCEs involve adapting and delivering in-person standardized cases

via teleconferencing platforms.^[20] However, concerns regarding the compromised reliability and validity of the modified OSCEs, along with the logistical challenges of adhering to strict physical distancing regulations, have led other institutions to completely eliminate the clinical exam altogether.^[21-23] Consequently, the absence of an evaluation tool to measure clinical performance in these settings underlines the importance of developing virtual clinical assessment tools.^[24] Similarly, in our experience, course developers were compelled to

Table 3: Summary of course ratings from students and faculty

Domains*	No. of observations†	Percentage of favorable responses (%)
Course objectives and competencies		
Clarity of objectives (students)	58/58	100.0
Clarity of objectives (faculty)	32/32	100.0
Community-oriented course	56/58	96.6
Development as a five-star physician	55/58	94.8
Course design		
Appropriateness of activities	57/58	98.3
Integration of activities	57/58	98.3
Sequence of activities	58/58	100.0
Frequency of activities	56/58	96.6
Time allotment for activities (student)	57/58	98.3
Time allotment for activities (faculty)	30/32	93.8
Course duration	58/58	100.0
Stimulation of self-directed learning	58/58	100.0
Course resources		
Human resources (student)	57/57	100.0
Human resources (faculty)	32/32	100.0
Audiovisual and virtual resources	55/55	100.0
Faculty guide	29/31	93.5
Course evaluation and feedback		
Appropriateness of evaluation tools (student)	54/58	93.1
Appropriateness of evaluation tools (faculty)	28/31	90.3
Usefulness of feedback	57/58	98.3
Timeliness of feedback	53/58	91.4

*Domains presented are composed of similar questions expounded in Appendix 1. †Survey questions were not required fields; hence, the number of question responses did not always total to the number of survey participants

suspend all in-person activities, including the OSCE. However, modified OSCEs were not considered because technology and Internet access were potentially limiting factors in conducting the OSCE to the same standards as before the pandemic.

Surprisingly, the anticipated challenge of Internet access was limited only to a few faculty respondents who encountered audiovisual issues during their synchronous discussions. Notably, certain aspects of the course were restructured to address these foreseen issues for students. Based on experiences from other lower-middle-income countries, Internet access has been a major barrier in delivering virtual clinical courses during the COVID-19 pandemic.^[25,26] In one institution in India, Internet connectivity was associated with online visibility and audibility.^[25] Consequently, students living in remote areas who face frequent Internet issues tend to prefer conventional teaching methods over online learning. In Nepal, Internet bandwidth is acknowledged to affect the usage of virtual courses for both students and faculty.^[26]

Limitation and recommendation

We did a retrospective analysis of anonymized data with the advantage of providing quick feedback to the course coordinators for implementation. However, the small sample of responses limits the reliability and generalizability of our findings even among the

study population.^[27] Sampling and nonresponse biases may have influenced the overwhelmingly positive feedback toward the restructured course. The observed low response rate is consistent with response rates for online course evaluations among medical students and faculty in various countries such as Canada (45%), Saudi Arabia (23%), and Sri Lanka (44%).^[28-30] The main strength of the study is its mixed-methods design, where the qualitative data corroborated and explained the quantitative results. The study also provided information from both the faculty and student perspectives, who are both key stakeholders in any course.

Future research directions

Adding another layer of analysis from the perspective of school administrators may reveal uncaptured issues related to logistics and costs. Additionally, designing activities and evaluation tools for virtual clinical courses applicable to resource-limited settings is essential. This is necessary because online learning offers the opportunity to reach remote regions where healthcare professionals are inequitably distributed,^[31] but which also suffer the most from Internet access constraints.^[25,26]

Conclusion

We described the experiences of a single institution during the process of redesigning and implementing

a fully virtual internal medical course for third-year medical students. In our experience, the same course objectives pre-pandemic were achieved with the restructured virtual course, with the exception of patient and caregiver communication, which presented notable challenges. The lack of patient encounters was addressed through telemedicine observership and paper-based case scenarios. Synchronous activities were made nongraded to accommodate students with unstable Internet connection, and this also facilitated more free-flowing discussions. There is a need to develop better assessment tools appropriate to virtual courses. Lastly, access to appropriate technology must be considered, especially in low-resource settings.

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Conflicts of interest

There are no conflicts of interest.

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Appendix 1: Grouping of survey questions into domains for quantitative analysis

Domains	Included survey questions
Clarity of objectives (students)	Were the objectives clearly stated? (4-point scale)
Clarity of objectives (faculty)	The objectives of the activity were clear to the faculty preceptor/evaluator. (4-point scale)
Community-oriented course	Was the course community-oriented? (yes/no)
Development as a five-star physician	Did the course help you develop into the kind of physician that the college envisions you to be? Practitioner/healthcare provider (yes/no) Teacher/educator (yes/no) Researcher/basic scientist (yes/no) Health manager/leader (yes/no) Social mobilizer/patient advocate (yes/no)
Appropriateness of activities	Were the quizzes appropriate based on the objectives of the course? (4-point scale) Were the written assignments appropriate based on the objectives of the course? (4-point scale) Were the synchronous SGDs appropriate based on the objectives of the course? (4-point scale)
Integration of activities	Assess the pertinent teaching methods utilized in the course according to the following criteria: Effectively integrated synchronous lectures (4-point scale) Effectively integrated asynchronous lectures (4-point scale) Effectively integrated assigned readings (4-point scale) Effectively integrated online discussion boards/fora (4-point scale) Effectively integrated online small group discussions (4-point scale) Effectively integrated preceptorship (4-point scale)
Sequence of activities	To what degree did the sequencing of course content contribute to your understanding of the subject matter? (4-point scale)
Frequency of activities	Assess the following factors as to the degree of enhancement these had on your learning: How did you find the frequency of the quizzes? (4-point scale) How did you find the frequency of written assignments? (4-point scale) How did you find the frequency of synchronous SGDs? (4-point scale)
Time allotment for activities (student)	Assess the pertinent teaching methods utilized in the course according to the following criteria: Adequate time allotment for synchronous lectures (4-point scale) Adequate time allotment for asynchronous lectures (4-point scale) Adequate time allotment for assigned readings (4-point scale) Adequate time allotment for online discussion boards/fora (4-point scale) Adequate time allotment for online small group discussions (4-point scale) Adequate time allotment for preceptorship (4-point scale)
Time allotment for activities (faculty)	The time allotted for the activity was adequate. (4-point scale)
Course duration	To what degree did the course duration contribute to the enhancement of your learning? (4-point scale)
Stimulation of self-directed learning	Assess the pertinent teaching methods utilized in the course according to the following criteria: Synchronous lectures stimulated self-directed learning (4-point scale) Asynchronous lectures stimulated self-directed learning (4-point scale) Assigned readings stimulated self-directed learning (4-point scale) Online discussion boards/fora stimulated self-directed learning (4-point scale) Online small group discussions stimulated self-directed learning (4-point scale) Preceptorship stimulated self-directed learning (4-point scale)
Human resources (student)	Assess the following factors as to the degree of enhancement these had on your learning: Faculty (4-point scale) Resident/fellows (4-point scale)
Human resources (faculty)	The activity was well coordinated by the course coordinators. (4-point scale) The technical support provided by the course coordinators was adequate. (4-point scale)
Audiovisual and virtual resources	Assess the following factors as to the degree of enhancement these had on your learning: Audiovisual (4-point scale) Learning management system (VLE) (4-point scale) Synchronous meeting platforms (Zoom) (4-point scale)
Faculty guide	The tutor's guide/answer key was helpful (4-point scale)
Appropriateness of evaluation tools (faculty)	Were the methods of evaluation used appropriate based on the objectives of the course? Quizzes (4-point scale)

Contd...

Appendix 1: Contd...

Domains	Included survey questions
	Written assignments (4-point scale)
	SGDs (4-point scale)
Appropriateness of evaluation tools (students)	The evaluation tool for the activity was appropriate. (4-point scale)
Usefulness of feedback	Was the feedback of your performance beneficial? (4-point scale)
Timeliness of feedback	When were the results of the quizzes given? (4-point scale)
	When were the results of the written assignments given? (4-point scale)
	When were the results of the synchronous SGDs given? (4-point scale)
