ORIGINAL ARTICLE

Perception of Research Education among Medical Students of the University of the Philippines College of Medicine: A Mixed-Methods Study

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ABSTRACT

Background. The University of the Philippines College of Medicine has been lauded for its research output, especially among faculty members. Research is also integrated in its curriculum for medical students in pursuit of "six-star physicians." However, there has been no consolidated analysis on the outcomes of feedback collected from students.

Objectives. The study aims to describe the perception of research education among medical students in Learning Units III to VII (LU III-VII) from academic year 2017-2018 to 2019-2020 in the University of the Philippines College of Medicine (UPCM).

Methods. Through a mixed-method descriptive design, students enrolled in the MD and MD-PHD program from LU III-VII of the UPCM were invited to participate in a survey. Furthermore, a review of the student research database and course evaluations were conducted.

Results. A total of 197 student-initiated studies were conducted according to the college database, varying in types and approaches. However, only 4% of the registered research was published. Research-oriented courses were also rated highly among the medical students. This was consistent with positive attitudes towards research among the majority of participants. However, only 32.2% of the target sample size participated in the survey.

Conclusion. Participants of the survey had positive perceptions regarding their research education. However, there are several areas for improvement such as provision of grants, publication assistance, compliance with research registration, and mentorship in data analysis.

Keywords: medical education, student research, research education

INTRODUCTION

Research has been an integral part of the medical education in the UPCM, integrating research-related competencies within every level of its curriculum. Its research courses build the competencies needed by the students to develop, implement, and disseminate research projects and outputs that are technically sound while adhering to ethical standards. These outcomes are formalized in courses such as IDC 211-213 that introduce students to basic health research and methods, as well as department-based research electives which expose students to clinical research. The curriculum also aims for the students to be able to make clinical decisions based on appraisal of literature collected. These outcomes are integrated in the clinical rotations of the medical students.

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Republic Act 9500 specified in the Charter of 2008 the mandate of the University of the Philippines to serve as a research university in various fields of expertise and specialization, at the same time to set academic standards and initiate innovations in teaching research and faculty development.[1]

In view of the university mandate, the UPCM envisions itself as a community of scholars highly competent in the field of medicine with a heightened social consciousness; imbued with moral, ethical, and spiritual vigor dedicated to a life of learning, and committed to the development of the Philippine Society. Its mission is to commit itself in excellence and leadership in community-oriented medical education, research, and service using the Primary Health Care Approach intended especially for the underserved.[2]

Globally however, there has been limited experience among medical students in implementing research.[3] A study by Moraes et al.[4] showed that only 4.7% medical school graduates expressed that research is of top importance in their training despite a majority declaring interest. Additionally, AlGhamdi[3] found similar results citing lack of professional supervisors, training courses, and funding to be barriers in research engagement.

It is valuable to evaluate medical students' ability in research. A university in the Netherlands found that 14.5% of their medical students had at least one publication during their medical education. Citations for these publications were above average compared to studies in their respective fields.[5] In developing countries, Obad et al.[6] also saw that only 19% of accomplished studies were published, most being in the clinical and basic sciences while community-oriented and medical education-related research were unpublished. Furthermore in 2005-2014, 57.3% of medical colleges in India did not produce any publications while only 4.3% of medical institutions published more than 100 studies per year.[7] A review of Pubmed and Scopus revealed that in between 1980-2010, research by medical students has significantly grown, 48.6% of which has a medical student as first author. It was also found that common studies published by medical students were systematic reviews, cross-sectional studies, and case reports. However, the majority of the publications have no citations.[8]

Local studies regarding attitudes of university constituents towards research have investigated both its faculty and students. In a state university in Laguna,[9] research attitudes and competencies of its teaching personnel were evaluated. Results showed that the faculty were generally interested in carrying out research activities and tasks, and perceived their ability to complete, utilize, and involve themselves in research was high. These factors significantly correlated the university's instructional quality, publication outputs, institutional qualification, and the strength of its extension programs and linkages. Among nursing students in a Philippine Higher Education Institution, Oducado[10] also saw a positive attitude towards research citing graduates of a public high school, previous experience in research, and self-rated research competence as positive influences in the students' positive attitudes. However, a study by Memarpour et al.[11] found that although nursing professoriates in a Philippine comprehensive university had positive attitudes toward research, the lack of protected time for research and research support structure was a barrier in conducting research which emphasize the need to reformulate efforts of the university to motivate its constituents to conduct research.

Despite research being integrated in the UPCM curriculum, there has been no consolidated analysis of the outcomes and feedback collected from students particularly on research outputs, student feedback, and attitudes towards research. The pursuit of this study can provide valuable insight in designing courses toward research in the medical degree curriculum of the UPCM.

OBJECTIVES

General Objective

The main purpose of the present study is to characterize the perceptions of medical students in the University of the Philippines College of Medicine (UPCM) on their research education from Academic Year (AY) 2017-2018 to 2019-2020.

Specific Objectives

1. To establish baseline outcomes of student research in the UPCM in terms of research registration and output.
2. To identify factors that influence the research methodology among medical students.
3. To describe the perceived research experience of the medical students.

METHODS

Study Design

The present study utilized a mixed-method exploratory descriptive research design to characterize the research landscape among medical students in the UPCM. This serves as a benchmark of the research education in the college. Quantitative and qualitative data were used to evaluate study outcomes.

Participants

Purposive sampling was utilized in the current study. Participants included students enrolled in the MD and MD-PhD program of the UPCM from Learning Units III to VII. The total population of these students were invited to participate in a survey. Survey sample size aims for at least 100 students per learning unit.

Inclusion Criteria

The study includes students enrolled in the MD and MD-PhD program of the UPCM from Learning Units III

to VII who have passed IDC 211 from AY 2017-2018 to 2019-2020.

Exclusion Criteria

The study excludes students enrolled in the graduate programs and Learning Units I-II, and those who did not pass IDC 211 as it is a prerequisite to IDC211.1 where medical students implement their proposed studies. Not passing this course precludes them from experiencing other research facilities of the college. However, no student enrolled in the second semester of AY 2019-2020 failed the subject.

Withdrawal Criteria

1. The participant is uncomfortable with the parameters of data collection.
2. The participant develops disinterest in the research.

Study Site

The current study was conducted at the University of the Philippines College of Medicine, however, a secure online platform (Google Forms) was used to collect data remotely from August to October 2021.

Data Collection

This study utilizes multiple data sources to increase validity and decrease bias of research findings. Upon ethical approval of the protocol, a letter of request was sent to the Office of the Secretary of the UPCM to gain access to the Research Implementation and Development Office (RIDO) registry, Course Evaluation results, and contact information of the eligible students from the Student Records Office. Support from the Medical Student Council was requested to inform the medical students regarding the study. All participants were given an informed consent form, and implications of participation and non-participation in the survey was discussed. The following methods were used to collect the data from each source.

Registry Database Review

To be able to establish a baseline outcome in student research in the UPCM, the study utilized the research database from the RIDO of the UPCM. RIDO maintains a registry database of research initiated by its faculty, staff, and students. The database records with principal investigators labeled Medical Student and MD-PhD from AY 2017-2018 to 2020-2021 was used and categorized according to Type of Study, Category of Studies, Type of Basic Research, and Project Output.

Course Evaluations

The Curriculum Committee of the UPCM keeps records of the Course Evaluation By Students (CEBS). Investigators collected the aggregate results of the CEBS for IDC 211, IDC 211.1, IDC 212, and IDC 213 from AY 2017-2018 to 2019-2020. Relevance of the evaluated areas was reviewed by the investigators for inclusion in the study. This includes overall evaluation, reflections, and contribution as a researcher. Collection of course evaluations was also used to describe student research experience in the UPCM. Overall student evaluation was decided to be included in the analysis. Appendix A shows a sample CEBS form.

Survey

A structured five-point Likert scale (1-strongly disagree to 5-strongly agree) questionnaire was developed by adapting and integrating the attitudes toward research and barriers to research questionnaires utilized by Memarpour, et al.[11] The questionnaire was standardized with 167 medical students enrolled outside of the UPCM. Reliability and validity of the questionnaire and items were determined via Item total correlation and oblique exploratory factor analysis, respectively. This yielded three factors (based on an Eigenwelt value of 1 with a total of 45 items (λ>0.5). Table 1 shows the factor loadings of the items, and the composite reliability (CR) and average variance extracted (AVE) of the three factors extracted. Cronbach's Alpha of the questionnaire is 0.96 which suggests strong overall internal consistency of the questionnaire. Composite reliability also suggested strong internal consistency among individual factors. Average variance extracted of the identified factors were also at acceptable levels (AVE >0.5). The survey provided further context in describing the student research experience in the UPCM as well as cite reasons for pursuing certain research topics.

Alongside the attitudes toward research and barriers scale, the questionnaire contains a five-point Likert scale (1 – never/not important to 5 – always/very important) evaluating their use of research facilities throughout the semester, and importance of processes and research exposure. A checklist was used to assess the research interests of the participants. Finally, the participants were asked to enumerate their experiences in research dissemination. These sections include open-ended questions as well. The questionnaire was answered through a secure online platform and was sent via email. The survey aims to recruit at least 100 participants per learning unit.

Data Analysis

Due to the nature of the mixed-methods design used, the study aims to triangulate the results through data, investigator, and methodological triangulation. Multiple data sources were utilized to triangulate results towards describing the research trends of the medical students enrolled in the UPCM.

Titles of the student research from the RIDO database underwent a content analysis searching for common phrases, and coding them according to RIDO-defined types and categories of study, Department of Science and Technology-defined types of basic research (Free basic vs Oriented Basic Research), and project outputs (publication, patents, products, people services, places and partnerships, and

Table 1. Psychometric Properties of the Adapted Attitudes to Research Scale

Item	λ	CR	AVE
Perceived Benefit/Value of Research (21 Items)		0.959	0.536
Science gives us a better understanding of the world	0.704		
Knowledge on the scientific method is necessary to interpret results from scientific papers	0.905		
We have a healthier life with science	0.721		
I trust the research results reported in journals	0.526		
Reflection on research plays an important role in my life	0.414		
Research should be offered in training to all students	0.768		
Research is beneficial in critical thinking	0.984		
Research has many applications in daily life	0.717		
I can learn from my mistakes in conducting research	0.597		
Every physician should be familiar with the scientific method	0.875		
Clinical research is important to my career	0.837		
Laboratory research is important to my career	0.650		
Research is important for me to become a specialist	0.583		
Skills that I gain during research is useful in my career	0.681		
Research is useful in informing policies	0.827		
Research should have high impact factor	0.580		
I believe research can advance my chosen field	0.835		
I believe research can improve my clinical practice	0.816		
Research can improve how I manage my patients	0.671		
Education on research should be compulsory in medical curricula	0.591		
Medical students should be involved in research during their education	0.799		
Perceived Research Capacity (16 Items)		0.922	0.647
Thinking about scientific methods is exciting and interesting	0.638		
I like to participate in research classes	0.797		
I should do research even if it's not in the training program	0.656		
Conducting research helps me understand lectures better	0.482		
I plan to pursue research as my professional work	0.862		
I plan to pursue higher studies to improve my research skill	0.804		
I can manage resources to conduct research	0.479		
I can design and conduct a research project	0.549		
I feel productive when taking time to do research	0.597		
I can give time for research	0.838		
I have adequate research skills	0.474		
I have adequate writing skills	0.617		
I can write effective proposals	0.560		
I can write a publishable manuscript	0.713		
My research ideas are valuable	0.471		
I am interested in conducting my own research	0.808		
Perceived Institutional Support (8 Items)		0.893	0.516
There is timely funding for research in my university	0.781		
There are appropriate databases available for research in my university	0.625		
There are adequate laboratory equipment for my research in my university	0.800		
The university prioritizes research output	0.647		
Research administration is well coordinated in my university	0.893		
There is sufficient guidance given in writing proposals	0.612		
The university has a clear research agenda for us to follow	0.747		
My research can get funded	0.585		

Table 2. Types of Studies across Academic Years

Academic Year/Type of Study	2017-2018	2018-2019	2019-2020	Total (%)
Research Involving Human Participants	25	20	11	56 (28.43)
Research Involving Non-Human Living Invertebrates	12	31	10	53 (26.90)
Research Involving Non-Human Living Vertebrates	19	17	14	50 (25.38)
Research Involving Plants	4	15	2	21 (10.66)
Others	1	3	7	11 (5.58)
Review of Medical Records	0	3	3	6 (3.05)
Total	**61**	**89**	**47**	**197**

Table 3. Category of Studies across Academic Years

Academic Year/Category of Study	2017-2018	2018-2019	2019-2020	Total (%)
In-Vitro Study	32	30	11	73 (37.06)
Herbal Medicine Research	3	25	11	39 (19.80)
Genetic or Genomic Research, Metabolomics, Transcriptomics	5	9	4	18 (9.14)
Epidemiological Study	6	5	6	17 (8.63)
Socio-Behavioral Research	6	8	3	17 (8.63)
Diagnostics	3	7	3	13 (6.60)
Operations/Health Systems Research	4	1	6	11 (5.58)
Complementary and Alternative Medicine	0	1	2	3 (1.52)
Quality Improvement Study	1	0	1	2 (1.06)
Research on Indigenous Materials	0	2	0	2 (1.06)
Health Informatics	0	1	0	1 (0.51)
Economic Evaluation	1	0	0	1 (0.51)
Total	**61**	**89**	**47**	**197**

policies). Additionally, they were coded according to impact. Appendix B shows the categories and their definitions.

Descriptive statistics and measures of central tendency (averages) were used as statistical treatment for the quantitative data collected from CEBS. Qualitative data in the comments section of CEBS forms were collected and underwent thematic analysis using a qualitative data analysis software (NVIVO 12). Themes were identified as positive or negative attitudes towards the course and its implementation by the investigators.

RESULTS

In order to characterize the research education in the UP College of Medicine, the investigators triangulated data from the college research registry, course evaluations, survey, and focus group discussions.

Registry Database Review

There were 197 RIDO-registered, student-initiated studies from AY 2017-2018 to 2019-2020, 42 are from the MD-PhD program, while 155 are by medical students. From the 155 medical student-initiated studies, most of the studies involved human participants, non-human living vertebrates, and invertebrates. Studies involving human participants were seen to typically be community-based, while those involving non-human living vertebrates and invertebrates were in-vitro studies or herbal medicine research. Table 2 summarizes the types of student-initiated studies from AY 2017-2018 to 2019-2020. Table 3 shows the categories of student-initiated studies across academic years.

Table 4. Type of Basic Research across Academic Years

Academic Year	Free Basic	Oriented Basic	Total
2017-2018	10	51	61
2018-2019	5	84	89
2019-2020	4	43	47
Total	**19**	**178**	**197**

Interestingly, most student-led published research came from regular medical students. However, this can be attributed to lack of reporting.

Across the academic years and types of studies, the majority of the studies are considered to be Oriented Basic, while a minority of studies were able to conform with DOST Project Outcomes. Table 4 shows the types of basic research across academic years.

In accordance with DOST Project Outcomes, students were only able to produce publications as their research output. Moreover, only eight medical student-initiated

Table 5. Summary of Course Evaluations by Students

Course	Number of Respondents	Academic Year	Overall Student Evaluation	Agreed Course Helped in the Development as Researcher (%)
IDC 211: Research Methods 1 (Introduction to Basic Health Research)	152	2017-2018	3.22	76.97
IDC 211.1: Research Methods 1 (Laboratory Research)	116	2017-2018	3.33	69.83
IDC 212: Research Methods 2 (Introduction to Clinical Epidemiology)	146	2017-2018	2.99	69.86
IDC 212: Research Methods 2 (Introduction to Clinical Epidemiology)	177	2018-2019	3.18	61.58
IDC 213: Research Methods (Introduction to Evidence Based Medicine)	132	2017-2018	3.44	64.39
IDC 213: Research Methods (Introduction to Evidence Based Medicine)	97	2018-2019	3.19	71.13

research was seen to be published and none from the MD-PhD program.

Course Evaluations by Students

The CEBS was collected from the Office of the Associate Dean for Academic Development. However, results of the CEBS were not available for the IDC 211, IDC 211.1, IDC 212, and IDC 213 across all academic years to be included in the study. Overall, the research courses were rated positively from 2017-2018 to 2018-2019. Over half of participants also agreed that the course helped them to develop as researchers. This was most robust with IDC 211 and IDC 213. Table 5 shows a summary of the collected CEBS.

Survey Results

The student survey was made available for students to answer from August 11, 2021. A reminder to answer the survey was sent in the last week of September to increase the number of participants. The survey was closed in November 2021 yielding 165 respondents in which only 161 consented to participate. This equated to only 32.2% of the target sample size. Notably, more than half of participants are from LU IV. Table 6 summarizes the demographics of the respondents.

Most participants scored an average score on overall attitude towards research, as well as the perceived benefit/value of research, and the perceived capability to engage in research factors based on normative values (Appendix C). No participants however had "poor" scores, with nearly 25% of participants scoring higher than average on attitudes toward research. Table 7 shows the distribution of participant scores on the attitude towards research scale.

Participants were also asked to rate the university facilities and services based on frequency of use since the start of the medical school, importance, satisfaction, and confidence to access. Among the least used overall was the Student Research Grant while the most used was the faculty adviser. However, for Learning Units V-VII, their most used facility/service was the campus internet, while least used was the publication assistance services. The computer laboratory was cited as the university facility with least importance and satisfaction while faculty mentors were the most important and most satisfied service. LUs III and VI, however, said that physical library facilities were the least important facility, but still receiving an above average rating. Results also showed that participants were not confident in accessing university research facilities and services with every option receiving a rating of less than 3. Table 8 shows a summary of participant use of university research facilities and services.

Table 6. Summary of Participant Demographics (n=161)

	n (%)
Sex at Birth	
Male	72 (44.72)
Female	89 (55.28)
Learning Unit	
III	14 (8.70)
IV	103 (63.98)
V	16 (9.94)
VI	5 (3.11)
VII	23 (14.29)
Pre-Medicine Course	
Intarmed	39 (24.22)
Health Sciences (Public Health, Nursing, Medical Technology, Physical Therapy, etc.)	49 (30.44)
Natural Sciences (Biology, Chemistry, Physics, etc.)	52 (32.30)
Social Sciences (Sociology, Psychology, Behavioral Science, etc.)	16 (9.94)
Others	5 (3.11)
Had a Thesis Prior to Medical School	
Yes	97 (60.25)
No	64 (39.75)
Is an MD-PhD Student	
Yes	9 (5.59)
No	152 (94.41)

Table 7. Summary of Student Attitudes towards Research (n=161)

	n (%)
Excellent	19 (11.80)
Above Average	21 (13.04)
Average	108 (67.08)
Below Average	13 (8.08)
Poor	0 (0.00)

Table 8. Overall Student Use of University Research Facilities/Services

	Frequency of Use	Importance	Satisfaction	Confidence to Access
Library Services	2.19	3.75	2.24	2.12
Computer Laboratory	1.65	3.48	1.84	1.78
Campus Internet	3.10	4.20	3.20	2.88
Journal Subscription	3.23	4.57	3.55	2.79
Basic Science Laboratory	2.28	4.18	2.34	2.03
Student Research Grant	1.57	4.41	2.40	1.94
Faculty Adviser	3.55	4.78	3.97	–
Technical Review	2.64	4.55	3.32	2.17
Ethical Review	2.71	4.52	3.38	2.21
Publication Assistance	1.66	4.37	2.58	2.01

Table 9. Summary of Perceived Capacity to Execute Research Tasks

	Perceived Capacity
Write a Research Proposal	4.19
Create a Research Question	4.30
Create Research Objectives	4.29
Conduct a Systematic Literature Review	4.12
Write an Informed Consent Form	3.85
Choose the Appropriate Research Design	3.80
Conduct the Appropriate Laboratory Technique	3.54
Develop a Data Collection Tool	3.60
Choose the Appropriate Data Analysis Method	3.53
Interpret Statistical Analysis	3.42
Present Data in Figures/Tables	4.09
Write Research Results	4.10
Write Research Conclusions/Recommendations	4.03
Present Research Findings to an Audience	3.75
Write a Publishable Research Manuscript	3.40

Table 10. Factors Affecting Research Topic Ranked by Mode

	Rank
Prior Skillset	1
Faculty/Adviser Suggestion	2
Time Allotment	3.5
Availability of Resources	3.5
Capacity of Groupmates	5.5
Course Requirement	5.5

Participants perceived themselves to be relatively capable to execute research tasks, however, they were most confident with writing a research proposal, creating a research question, and making research objectives. They were least confident, however, in their ability to choose appropriate data analysis methods, interpreting statistical analysis, and writing a publishable research manuscript. Table 9 shows a summary of participants' perceived capacity to execute research tasks.

When asked on factors that were influential in the research topics they pursued, prior skillset and faculty suggestion were among the most commonly highest ranked. Course requirements and capacity of group members, however, were most commonly ranked as the least influential. Moreover, there were a minority of participants who cited their genuine interest in the research topic as the main driving force behind the pursuit of the study. Table 10 shows a summary of the ranking of factors affecting research topics.

DISCUSSION

The current study aimed to characterize the perceptions of UPCM medical students towards the institution's research education through registry database review, CEBS, and a survey. Research registry outcomes show that the majority of student-led research is in the basic sciences utilizing in-vitro study designs. Moreover, the majority of research projects pursued by medical students are considered as *oriented basic* research being aligned with the NUHRA. Registered publication output, however, can be improved with less than 10% of studies conducted being published. This is also in contrast with the MD-PhD program's 2021 report having over 100 publications with an MD-PhD student as an author. This may be reflective of the lack of awareness and/or incentives among medical students to register research proposals and outputs.

The CEBS revealed that medical students perceive IDC 211, IDC 211.1, IDC 212, and IDC 213 to adequately

capacitate them as researchers. This is consistent with the survey results wherein there are less than 10% of respondents that had below average attitudes towards research. Furthermore, results showed they were most confident in performing tasks related to preparing a research protocol.

Despite this, the survey revealed that student-led research was highly dependent upon the faculty adviser, being the most frequently utilized research service and the second most influential in choosing a research topic. This can also be attributed to the students' low confidence to access research facilities on their own despite acknowledging their importance. Results of the survey, however, are highly influenced by the composition of the respondents being predominantly from LU IV. Hence, current findings may not be representative of the entire population of medical students in the UPCM.

CONCLUSION AND RECOMMENDATIONS

Overall, the participants have positive perceptions of their research education within the institution. This is evidenced with the volume or registered research and publications produced by the student primary authors and CEBS wherein more than half of participants agreed that IDC 211, IDC 211.1, IDC 212, and IDC 213 contributed to their development as a researcher. Furthermore, none of the participants had poor attitudes towards research with almost 25% having above average to excellent attitudes towards research.

However, research education in the college can be improved by further empowering students with accessible resources (grants, library, publication assistance, and analysis software) and stronger mentorship in data analysis, interpretation, and manuscript writing. Compliance of students to RIDO registration is also recommended to more accurately show the research outputs of UPCM medical students. Moreover, it is recommended for further studies to evaluate and compare the difference in the research outputs of medical students after the declaration of COVID-19 as a worldwide pandemic. It is also recommended to create a strategy to increase response rates among the target populations so appropriate comparisons may be done across learning units. This evaluation may also extend towards the students of the graduate programs offered by the UP College of Medicine and the university as a whole.

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Statement of Authorship

Both authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

Both authors declared no conflicts of interest.

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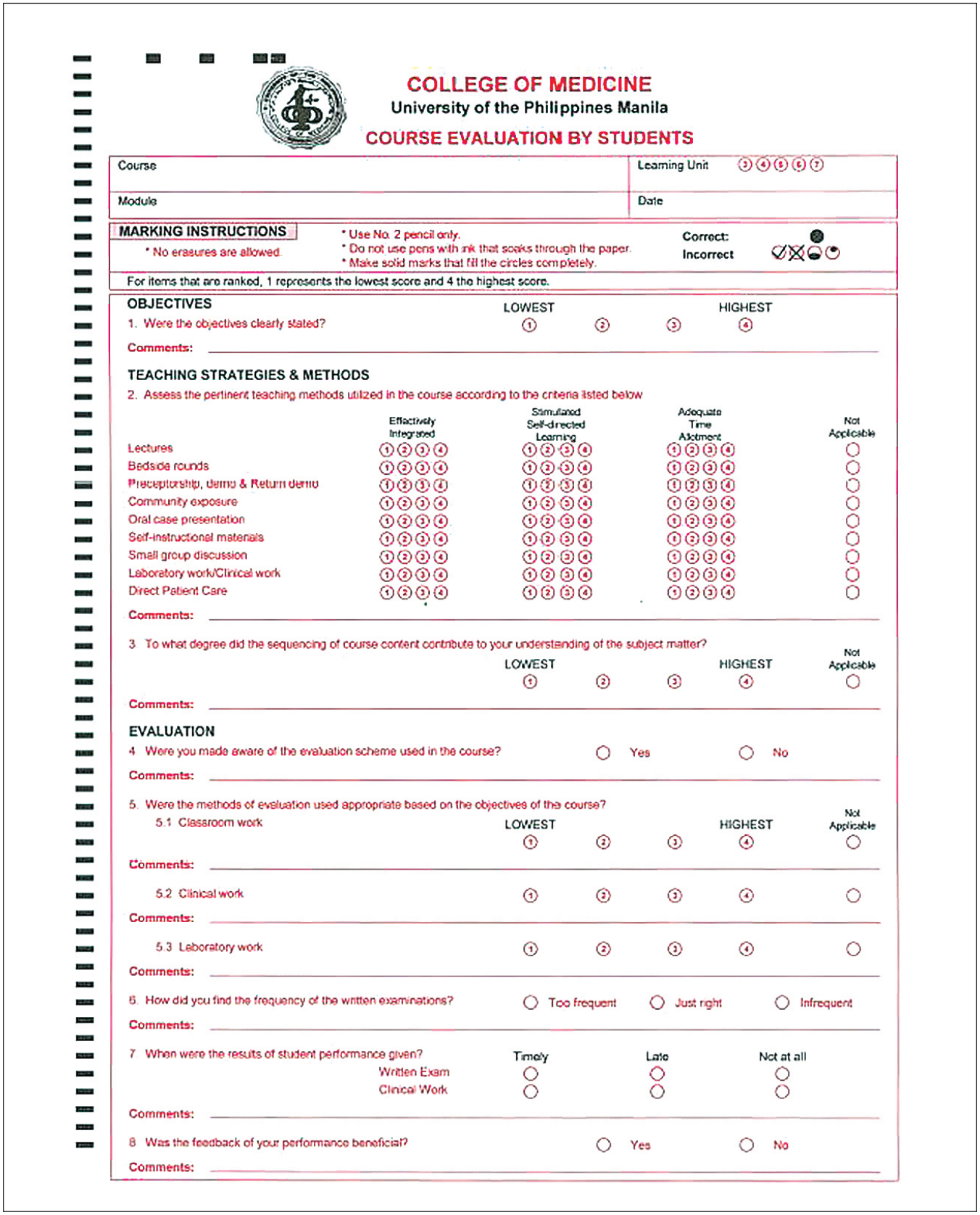
APPENDICES

Appendix A. Course Evaluation by Students Form



COLLEGE OF MEDICINE
University of the Philippines Manila
COURSE EVALUATION BY STUDENTS

Course | Learning Unit ③④⑤⑥⑦
Module | Date

MARKING INSTRUCTIONS
* No erasures are allowed.
* Use No. 2 pencil only.
* Do not use pens with ink that soaks through the paper.
* Make solid marks that fill the circles completely.

Correct: ● Incorrect: ⊘ ⊗ ◒ ◔

For items that are ranked, 1 represents the lowest score and 4 the highest score.

OBJECTIVES
1. Were the objectives clearly stated? LOWEST ① ② ③ HIGHEST ④
Comments: _____

TEACHING STRATEGIES & METHODS
2. Assess the pertinent teaching methods utilized in the course according to the criteria listed below

	Effectively Integrated	Stimulated Self-directed Learning	Adequate Time Allotment	Not Applicable
Lectures	①②③④	①②③④	①②③④	○
Bedside rounds	①②③④	①②③④	①②③④	○
Preceptorship, demo & Return demo	①②③④	①②③④	①②③④	○
Community exposure	①②③④	①②③④	①②③④	○
Oral case presentation	①②③④	①②③④	①②③④	○
Self-instructional materials	①②③④	①②③④	①②③④	○
Small group discussion	①②③④	①②③④	①②③④	○
Laboratory work/Clinical work	①②③④	①②③④	①②③④	○
Direct Patient Care	①②③④	①②③④	①②③④	○

Comments: _____

3. To what degree did the sequencing of course content contribute to your understanding of the subject matter? LOWEST ① ② ③ HIGHEST ④ Not Applicable ○
Comments: _____

EVALUATION
4. Were you made aware of the evaluation scheme used in the course? ○ Yes ○ No
Comments: _____

5. Were the methods of evaluation used appropriate based on the objectives of the course?
5.1 Classroom work LOWEST ① ② ③ HIGHEST ④ Not Applicable ○
Comments: _____
5.2 Clinical work ① ② ③ ④ ○
Comments: _____
5.3 Laboratory work ① ② ③ ④ ○
Comments: _____

6. How did you find the frequency of the written examinations? ○ Too frequent ○ Just right ○ Infrequent
Comments: _____

7. When were the results of student performance given?

	Timely	Late	Not at all
Written Exam	○	○	○
Clinical Work	○	○	○

Comments: _____

8. Was the feedback of your performance beneficial? ○ Yes ○ No
Comments: _____

Appendix A. Course Evaluation by Students Form *(continued)*

FACULTY

9. Indicate your OVERALL ASSESSMENT of the faculty in the department according to the following criteria:

	LOWEST			HIGHEST
Punctuality	1	2	3	4
Utilization of appropriate audiovisuals	1	2	3	4
Organization of subject matter	1	2	3	4
Communication skills	1	2	3	4
Ability to impart knowledge	1	2	3	4
Ability to motivate	1	2	3	4
Availability	1	2	3	4
Approachability	1	2	3	4
Student supervision	1	2	3	4

Comments: _____

LEARNING ENVIRONMENT

10. Assess the following factors as to the degree of enhancement these had on your learning.

		LOWEST			HIGHEST	Not Applicable
10.1 Course Duration		1	2	3	4	○
10.2 Physical plant:	Classroom	1	2	3	4	○
	Wards	1	2	3	4	○
	Quarters	1	2	3	4	○
	Wash room/comfort room	1	2	3	4	○
10.3 Resources						
10.3.1 Human	Faculty	1	2	3	4	○
	Resident/Fellows	1	2	3	4	○
	Interns	1	2	3	4	○
	Paramedical	1	2	3	4	○
10.3.2 Material	Audiovisual	1	2	3	4	○
	Library	1	2	3	4	○
	Internet Access	1	2	3	4	○
	Hospital supplies	1	2	3	4	○
10.4 Administrative support:	Organization of the course	1	2	3	4	○
	Coordination of the course	1	2	3	4	○

Comments: _____

OVERALL EVALUATION

11. Overall student's evaluation of the course 1 2 3 4

Comments: _____

REFLECTIONS

12. What aspect of the course had the GREATEST IMPACT on you?

_____

13. What aspect of the course needs the MOST IMPROVEMENT?

_____

_____

14. Did the course help you develop into the kind of physician that the UP College of Medicine envisions you to be (Reflect on the UPCM vision-mission-goals)? Explain why.

a. Practitioner/Health Care Provider (Y) (N) _____
b. Teacher/Educator (Y) (N) _____
c. Researcher/Basic Scientist (Y) (N) _____
d. Health Manager/Leader (Y) (N) _____
e. Social Mobilizer/Patient Advocate (Y) (N) _____

15. Was the course community-oriented? Explain.

_____

_____

16. Other Comments.

_____

_____

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Appendix B. Categories for Research Database Review

Type of Research (RIDO)

Research involving human participants – Subjects involved in research are human.
Research involving non-human living vertebrates – Subjects involved in research are non-human living vertebrates such as mice.
Research involving non-human living invertebrates – Subjects involved in research are non-human living invertebrates such as nematodes.
Research involving plants – Research involves the characterization of organic material derived from plants.
Review of medical records – Research involves no subject interaction and relies on past medical records.
Others - Research that does not conform to preceding types of research.

Category of Study (RIDO)

In-vitro study – Study was conducted in a controlled environment such as a test tube or petri dish.
Diagnostics – Study involved in the development and evaluation of diagnostic devices and procedures.
Genetic or genomic research, metabolomics, transcriptomics – Study involves the characterization of genetic material.
Stem cell research – Study investigates properties of stem cells and its potential uses.
Herbal medicine research – Study characterizes the medicinal properties of plants and its development for commercialization.
Complementary and alternative medicine – Evaluation of alternative and complementary medical practice.
Research on assisted reproductive technology – Development and evaluation of assisted reproductive technology.
Research on indigenous materials – Study characterizes the use of indigenous materials in the practice of medicine.
Epidemiological study – Evaluates disease prevalence, risk of illness, or death among populations.
Socio-behavioral research – Evaluates the psychosocial aspects of behavior.
Operations/health systems research – A management-oriented research that aims to solve problems in an organization.
Quality improvement study – Systematic evaluation of service delivery data for the purpose of immediate improvement in processes and outcomes of organizations.
Economic evaluation – Evaluation of costs and outcomes of healthcare interventions.
Health policy – Multidisciplinary research evaluating how healthcare services and personnel are accessed.
Clinical trial type 1 – Drug or vaccine trials, diagnostic trials, trials on devices and other therapy trials intended for marketing registration.
Clinical trial type 2 – Drug or vaccine trials, diagnostic trials, trials on devices and other therapy trials not intended for marketing registration.
Post-marketing surveillance – Monitoring and surveillance study on a marketed commercial product.
Medical education – Development, refinement, and evaluation of academic courses related to health sciences and medicine.
Health informatics – Development and evaluation of the use of information technology in organizing and analyzing health records.
Others – Research that does not conform to preceding categories of research.

Type of Basic Research (DOST)

Free Basic – Research studies that are not aligned with the Harmonized National Research and Development Agenda 2017-2022.
Oriented Basic – Research studies that are aligned with the Harmonized National Research and Development Agenda 2017-2022.

Project Outputs (DOST)

Publications – A research manuscript published in a peer reviewed local or international scientific journal.
Patents – Tangible measure of innovation such as completed prior art search, patent applications, utility models, and intellectual property patents.
Products – Commercial value of output. The actual market value of the product is calculated. Examples include prototype produced with valuation by PCIEERD, licensing agreement with a private company, commercialized product.
People Services – Quantifies services provided to people to increase scientific workforce including number of trained personnel, public service as adopted by a national agency or LGU.
Policies – Science-based policies that have been institutionalized in the form of congressional laws, executive and administrative orders, policy guidelines for government agencies, and LGUs.
Partnerships – Facilities and networks that enable increased scientific output.

Appendix C. Normative Values of Attitudes towards Research Scale

Above Average	201 - 225
Average	150 - 200
Below Average	149 - 125
Poor	124 and below