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Knowledge, Attitude, and Practices of College of Medicine Gross Anatomy Students towards the Anatomy Collaborative-Cooperative Learning (ACOOL) Strategy

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ABSTRACT

Background: The section of Gross Anatomy of a College of Medicine (CM) has implemented a learning strategy, the Anatomy Collaborative and Cooperative Learning (ACOOL).

Objectives: The general objective of this study is to determine the knowledge, attitude, and practice (KAP) of students towards ACOOL.

Methodology: This study is a descriptive cross-sectional study. Subjects included CM first year students, who have completed Gross Anatomy. A questionnaire asking on sociodemographic information and evaluation on KAP was answered.

Results: The mean age of respondents is 23.62 years. Most of them took the following pre-medical courses: Biology, Medical Technology, and Nursing. They agree on the compliance of the faculty in its specified procedure for ACOOL strategy. They agree that they have knowledge improvement from the ACOOL-driven classroom activities. Majority enjoy Gross Anatomy and express gaining positive behavior change in their education.

Conclusion: The results of the study reflect positive acceptance/agreement of the respondents on ACOOL strategy. Cooperation and collaboration are part of the competencies the Commission on Higher Education directs medical schools to develop among medical students. Students should demonstrate these competencies early in their education, since these are important in their future practice.

Keywords: Anatomy, Cooperation, Collaboration, Education, Medicine

INTRODUCTION

The section of Gross Anatomy in a College of Medicine (CM) in Manila, Philippines has implemented a learning strategy for the school year 2024-2025, called the Anatomy Collaborative and Cooperative Learning (ACOOL). The strategy involves the principles of collaboration and cooperation.

Collaborative and cooperative learning approaches share the thought that learning is “not an individual construction, but rather social co-construction of knowledge, taking place within ever-changing historical and cultural contexts (Sawyer and Obeid, 2017)”. They both involve group work, active participation, shared responsibility, and accountability (Cooperative vs. Collaborative: Key Differences, 2023).

Cooperation, however, occurs when each member of a group of learners does their assigned parts separately. The members assemble these parts to produce a collective result or output. In collaboration, members of the group interact and contribute among each other to produce an output. The process involves "negotiations, discussions, and accommodating other's perspectives (Kozar, 2010)". Group reporting and plenary discussions exemplify collaboration and cooperation.

ACOOL is primarily employed during lecture or didactic sessions. A class is divided into groups with at least four members. Each group has been assigned to report on a certain topic. The topics, and the related reporting guides/lecture objectives, and clinical cases for each semester are shared to the class more than a week before the official opening of school year. The whole class is reminded that these documents should be reviewed by everyone, whether reporting or not. The groups are instructed to conduct meetings several weeks before their assigned schedule of presentation. The class, including the faculty-in-charge (FIC) convene face-to-face during the appointed lecture hours. The assigned reporters deliver their presentation, and lead case discussion. FIC moderates and manages the classroom activities and discussions. The FIC and the reporting group formulate questions that stimulate sharing of perspectives and generation of learning insights from non-reporting students.

Review of Related Literatures

A local descriptive cross-sectional study done in a premiere Open University in the Philippines reveals that group activity/ reporting in Information and Communication Studies had facilitated quality learning. Majority of the respondents admit to a positive change in behavior. Furthermore, they enjoy group reporting and are motivated to learn using this approach (Crisanto, 2018). A study in South Africa shows that students perceive that group work is a valuable skill that will be needed in future career. Group work develops communication, active listening (listening with intent), and problem-solving skills (Malan, 2021). Collaboration, as practiced in ACOOL, is found to have positive outcomes. Students who experienced collaboration outperform those inexperienced group cognitively (Zambrano et al., 2019). In another study that involves anatomy students however, neither collaborative learning nor self-organization learning had an influence on academic performance (Knof et al., 2024).

Significance of Study

The different findings of literatures stated above are dependent on the locality, circumstances, practices, and subject matter being discussed. This present study investigates how ACOOL is being taken by gross anatomy students in a CM in Manila. Somehow like the research in the abovementioned Open University, we discover the perception of students to our own version of collaborative and cooperative learning strategies called, the ACOOL.

Objectives

The general objective of this study is to determine the knowledge, attitude, and practice (KAP) of gross anatomy students towards ACOOL during the school year 2024-2025. The specific objectives are to (1) describe the socio-demographic characteristics of the respondents, and (2) evaluate qualitatively KAP of students.

METHODOLOGY

This study is a descriptive cross-sectional study. Subjects included the whole population of first year students in the university, who have completed the Gross Anatomy subject in school year 2024-2025 and consented to their inclusion. A self-administered questionnaire (Appendix 1) asking on sociodemographic information and evaluation on knowledge, attitude, and practice (KAP) towards the Anatomy

Collaborative-Cooperative Learning (ACOOL) Strategy was distributed and answered onsite, upon supervision of the investigators. For the KAP part a Likert scale was utilized. Respondents were instructed to put a check on their evaluation of each Likert statement as how they agree/ relate with the statement personally, with (5) as Strongly Agree and (1) as Strongly Disagree. Information gathered was analyzed to come up with descriptive results. The questionnaire was validated by three experts (Appendix II) and was piloted to 12 individuals from the target population.

Ethical Consideration

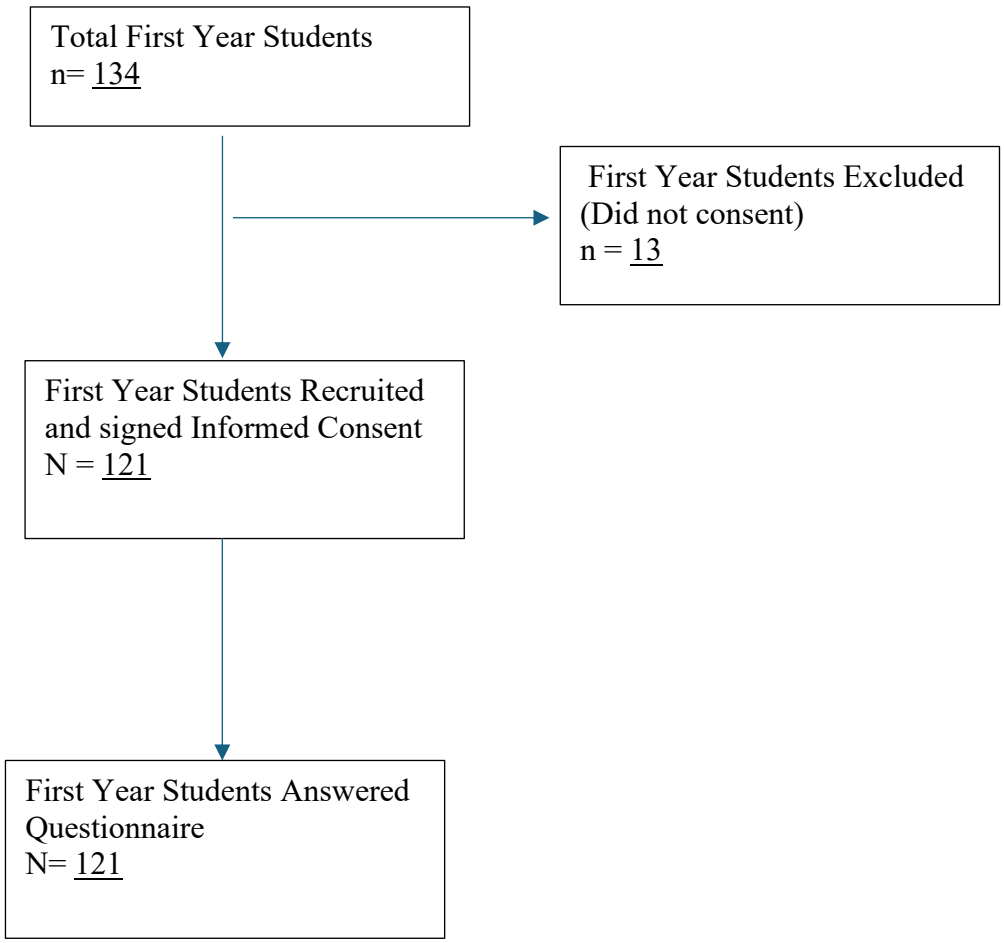
The research involves negligible risk protocol, that seeks to survey the behavior of participants to a learning strategy. Nevertheless, informed consent form was given to the concerned. Information that can directly identify a certain participant was kept confidential and was not included in the presentation of the results of this study. It was emphasized that the participation or non-participation, and responses will not affect their grades in any subject during their stay in the College of Medicine.

RESULTS AND DISCUSSION

Subjects

There were 134 first year students who completed Gross Anatomy subject in school year 2024-2025. Thirteen (13) students did not sign informed consent, making them ineligible to be included in the study. All 121 students who consented for their inclusion in the study, answered the questionnaire.

Figure 1. Subject Recruitment Process Flowchart



Questionnaire

The tool used (Appendix I) was validated by three research experts (Appendix II). It aims to elicit information on sociodemography (Part 1) and evaluation on knowledge, attitude, and practice (KAP) towards the Anatomy Collaborative-Cooperative Learning (ACOOL) Strategy (Part 2). Part 2 is comprised of 22 statements/ sentences. Evaluation was done by asking a respondent to read each sentence and choose the level of agreement by checking an appropriate Likert scale (with 5 representing strongly agree and 1 as strongly disagree). Statement numbers 1 to 10 evaluate on the practice of the strategy. This shows how the procedures in ACOOL are being complied during the school year. Statement numbers 11 to 17 aim to discover the perceived level of awareness and gained knowledge of the respondents with the use of ACOOL strategy. Statement numbers 18 to 22 evaluate the respondents' attitude/ behavior towards the strategy.

Sociodemographic Profile

Table 1 shows that the mean age of respondents is 23.62 years. The age range is from 22 to 27 years old. There are more females (53.72%) than males. All respondents are single in terms of marital status. Most of them (78%) took the following pre-medical courses: Biology, Medical Technology, Nursing, Physical Therapy, and Biochemistry. The rest (22%) took Pharmacy, Public Health, Applied Physics, Medical Biology, and others.

Table 1. Sociodemographic Profile of CM PLM First Year Gross Anatomy Students/ Respondents

Sociodemographic Profile	
Age (in years)	Mean 23.62 Median 24 Mode 24 Range 22-27
Sex, n (%)	Male 56 (46.28) Female 65 (53.72)
Marital Status, n (%)	Single 121 (100)
Undergraduate/ Pre-medicine course, n (%)	Biology 57 (47.11) Medical Technology 12 (9.92) Nursing 10 (8.26) Physical Therapy 8 (6.61) Biochemistry 7 (5.79) Other courses 27 (22.31)
Section, n (%)	A 29 (23.97)

	B	29 (23.97)
	C	30 (24.79)
	D	33 (27.27)

Practice

Statement numbers 1 to 10 evaluate on the practice of the strategy. This shows how the procedures in ACOOL are being complied during school year 2024-2025. Table 2 shows the distribution of respondents across all Likert scale per statement. Most of the respondents agree on the compliance of the Department of Anatomy in its specified procedure in implementing ACOOL strategy. It is also notable that more than 50 % strongly agree with statement numbers 1 to 9. However, 42.98% moderately agree with the practice of statement number 10, greater than those who strongly agree (35.54%).

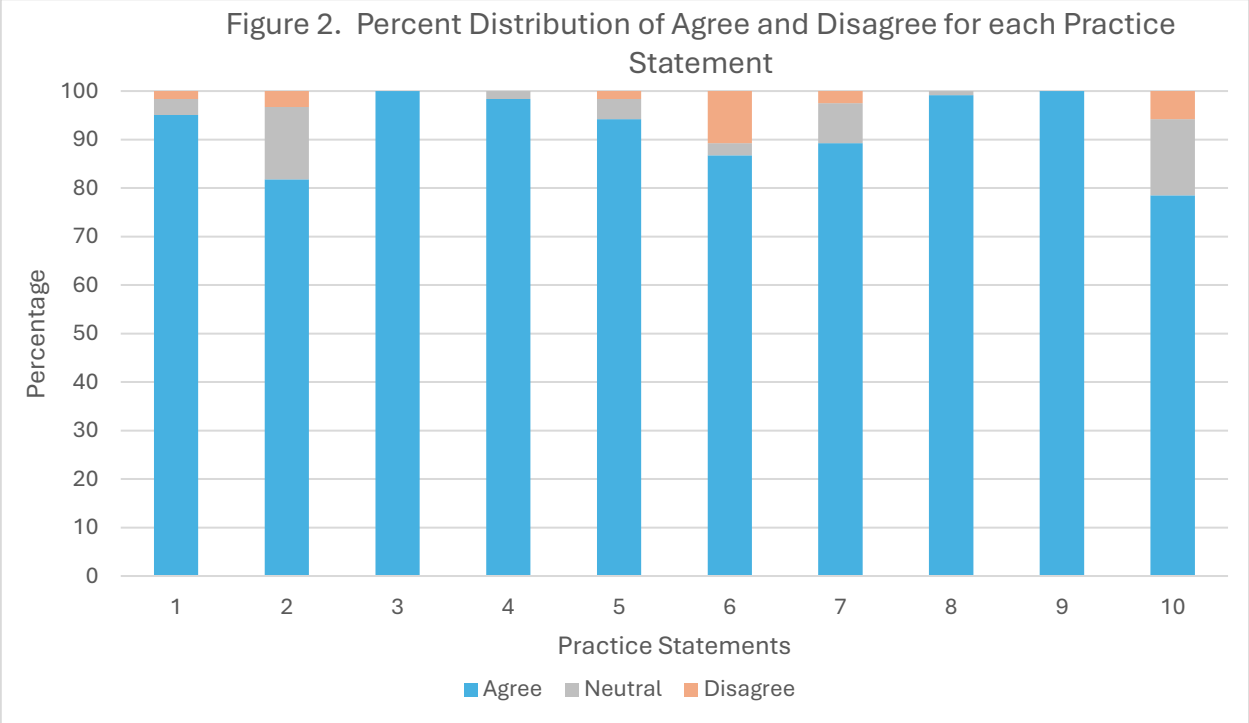
Table 2. Practice Agreement Table showing Percentages in each Likert score per Statement

Statements	n (%) of respondents				
	1	2	3	4	5
1. I receive lecture/ reporting guides shared to students not later than the opening of classes (i.e. during orientation to the course).	0 (0.00)	2 (1.65)	4 (3.31)	26 (21.49)	89 (73.55)
2. I am expected to have read in advance the topic to be discussed, even if I am not the reporter.	0 (0.00)	4 (3.31)	18 (14.88)	32 (26.45)	67 (55.37)
3. As an assigned reporter for a topic, I am instructed to meet among the members of my group.	0 (0.00)	0 (0.00)	0 (0.00)	13 (10.75)	108 (89.26)
4. During group meetings, I am free to suggest and share insights on the topic / concept to be presented.	0 (0.00)	0 (0.00)	2 (1.65)	20 (16.53)	99 (81.82)
5. During group meetings, all arrive at a consensus on how each concept is to be presented.	0 (0.00)	2 (1.65)	5 (4.13)	29 (23.97)	85 (70.25)
6. I am assigned to report orally on a certain topic for a group, but this does not mean that I was alone in preparing for it.	2 (1.65)	11 (9.09)	3 (2.48)	33 (27.27)	72 (59.50)
7. During gross anatomy class, as an audience I am asked by the reporters and faculty to answer related questions to stimulate my interest.	0 (0.00)	3 (2.48)	10 (8.26)	41 (33.88)	67 (55.37)

8. I am corrected by the faculty during class presentations, whenever I relay misleading information.	0 (0.00)	0 (0.00)	1 (0.83)	18 (14.88)	102 (84.30)
9. I listen to clinical experiences shared by faculty, that are related to a certain gross anatomy topic.	0 (0.00)	0 (0.00)	0 (0.00)	8 (6.61)	113 (93.39)
10. I raise questions to the faculty before, during, and after gross anatomy sessions.	1 (0.83)	6 (4.96)	19 (15.70)	52 (42.98)	43 (35.54)

Figure 2 summarizes the agreement-disagreement for each practice statement using a component bar graph. The Likert scores are grouped into three: Disagree (Likert 1 and 2), Neutral (Likert 3), and Agree (Likert 4 and 5). There is overwhelming agreement on the following statements:

- As an assigned reporter for a topic, I am instructed to meet among the members of my group (100%).
- I listen to clinical experiences shared by faculty, that are related to a certain gross anatomy topic (100%).
- I am corrected by the faculty during class presentations, whenever I relay misleading information (99.17%).
- During group meetings, I am free to suggest and share insights on the topic / concept to be presented (98.35%).
- I receive lecture/ reporting guides shared to students not later than the opening of classes (95.04%).
- During group meetings, all arrive at a consensus on how each concept is to be presented (94.21%).



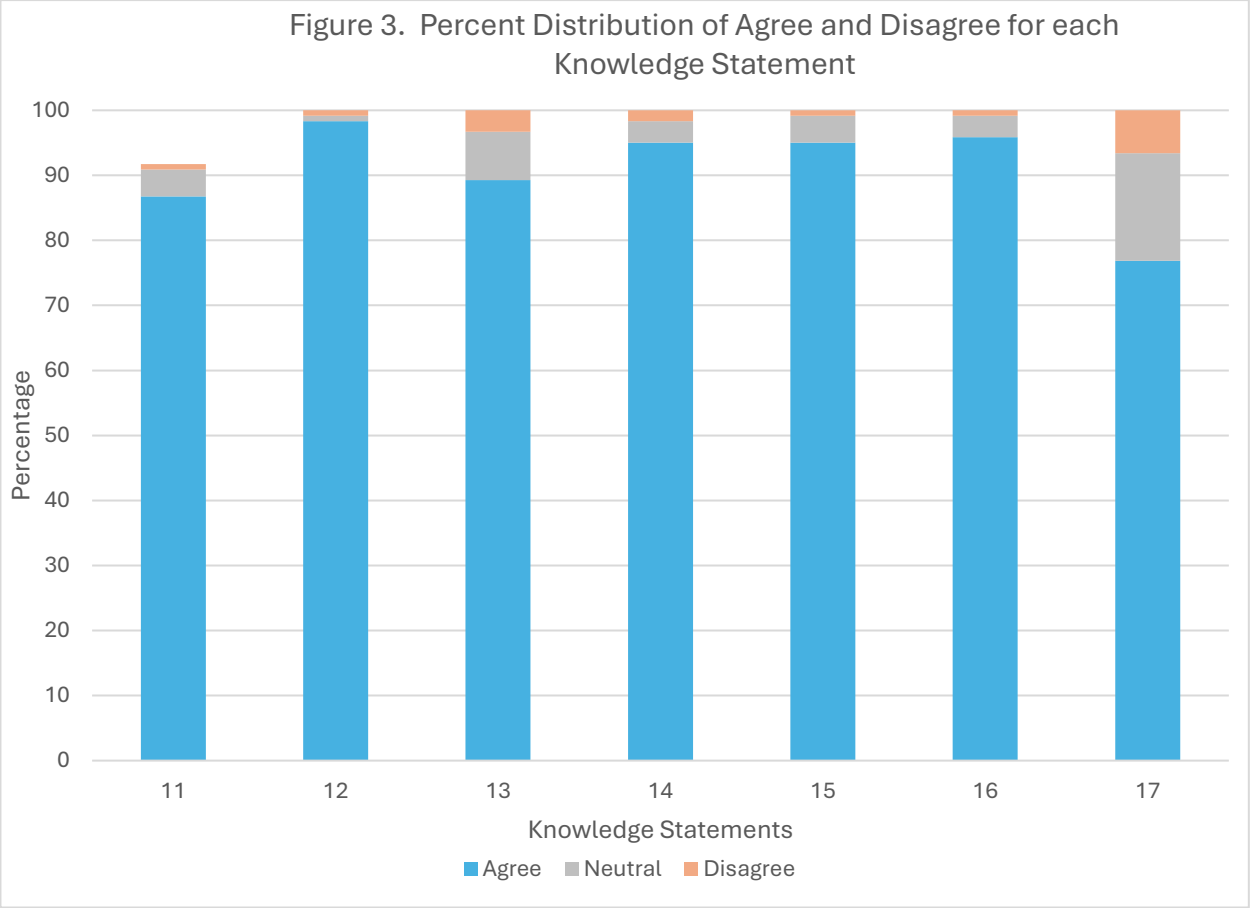
Knowledge

Statement numbers 11 to 17 aim to discover the perceived level of awareness and gained knowledge of the respondents with the use of ACOOL strategy (Table 3). There is 48.76% strong agreement to statement number 17. Other statements gain 61-76 % strong agreement.

Table 3. Knowledge Agreement Table showing Percentages in each Likert score per Statement

Statements	n (%) of Respondents				
	1	2	3	4	5
11. I am aware that this course promotes collaboration (sharing insights regarding specific topic).	1 (0.83)	0 (0)	5 (4.13)	21 (25.62)	84 (69.42)
12. I am aware that this course promotes cooperation (taking on a specifically assigned task for a group).	1 (0.83)	0 (0)	1 (0.83)	27 (22.31)	92 (76.03)
13. I am aware that during class, reporters and non-reporters share ideas on a certain topic.	1 (0.83)	3 (2.48)	9 (7.44)	38 (31.46)	70 (57.85)
14. I learn from my peers/ classmates during a gross anatomy class.	1 (0.83)	1 (0.83)	4 (3.31)	25 (20.66)	90 (74.38)
15. I learn from the faculty during a gross anatomy class.	0 (0)	1 (0.83)	5 (4.13)	28 (23.14)	87 (71.90)
16. After a gross anatomy class, I have improved knowledge on the topics discussed.	0 (0)	1 (0.83)	4 (3.31)	42 (34.71)	74 (61.16)
17. I learn more in gross anatomy using collaborative and cooperative strategy, than studying alone.	3 (2.48)	5 (4.13)	20 (16.53)	34 (28.10)	59 (48.76)

Figure 3 summarizes the agreement-disagreement for each knowledge statement using a component bar graph. The Likert scores are grouped into three: Disagree (Likert 1 and 2), Neutral (Likert 3), and Agree (Likert 4 and 5). Statement number 17 elicits 76.86 % agree, 16.53% neutral and 6.61% disagree responses. Despite of this, neutral (0.83 to 16.53%) and disagree (0.83 to 6.61%) responses across all knowledge statements are low.



Attitude

Statement numbers 18 to 22 evaluate the respondents' attitude/ behavior towards the strategy (Table 4). There is more than 50% strong agreement with attitude statements except, statement number 18 (47.93%). Moderate disagreement is from 0 to almost 3%, while strong disagreement is from 0 to almost 1%. Neutral response is from 5 to 14%.

Table 4. Attitude Agreement Table showing Percentages in each Likert score per Statement

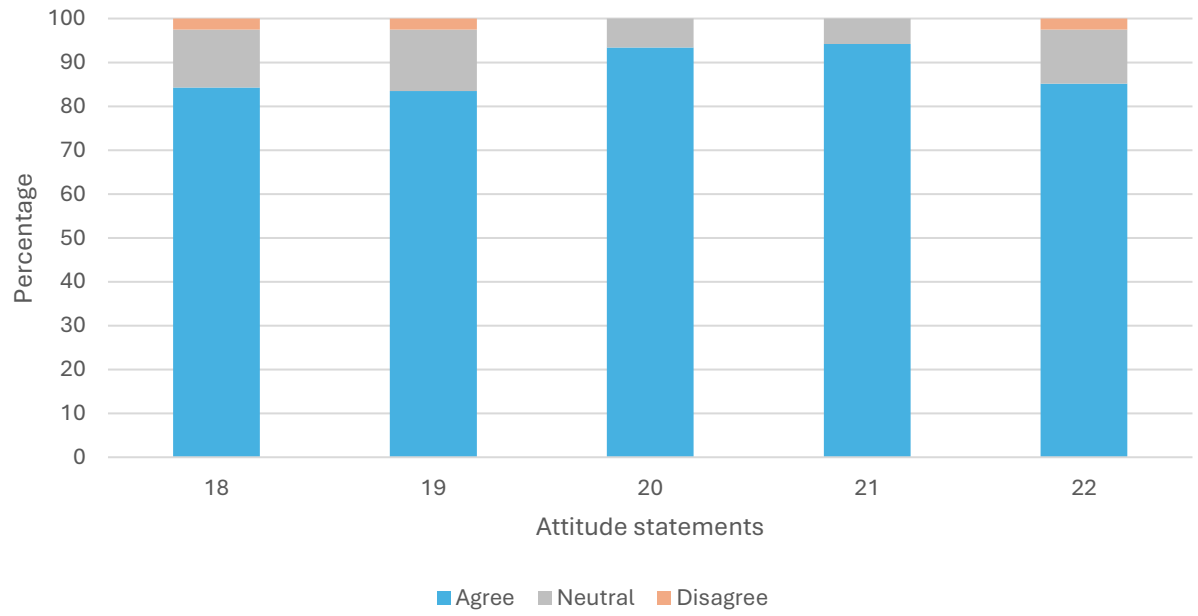
Statements	n (%) of Respondents				
	1	2	3	4	5
18. I like and enjoy the group activities in gross anatomy using collaborative and cooperative learning.	0 (0)	3 (2.48)	16 (13.22)	44 (36.36)	58 (47.93)
19. I am motivated to learn through collaborative and cooperative learning strategies in gross anatomy.	0 (0)	3 (2.48)	17 (14.05)	40 (33.06)	61 (50.41)
20. I appreciate interacting with my peers and sharing my work with them.	0 (0)	0 (0)	8 (6.61)	38 (31.40)	75 (61.98)

21. I see positive impact in my behavior in terms of collaboration and cooperation.	0 (0)	0 (0)	7 (5.79)	34 (28.10)	80 (66.12)
22. I perform better if I work in gross anatomy in groups with collaboration and cooperation.	1 (0.83)	2 (1.65)	15 (12.40)	39 (32.23)	64 (52.89)

Figure 4 summarizes the agreement-disagreement for each attitude statement using a component bar graph. The Likert scores are grouped into three: Disagree (Likert 1 and 2), Neutral (Likert 3), and Agree (Likert 4 and 5). There is no disagreement with the following statements:

- I appreciate interacting with my peers and sharing my work with them.
- I see positive impact in my behavior in terms of collaboration and cooperation.

Figure 4. Percent Distribution of Agree and Disagree for each Attitude Statement



CONCLUSION

The results of the study generally reflect the positive acceptance/agreement of the respondents on the ACOOL strategy. The respondents are aware of the cooperative and collaborative methods implemented and agree that they have knowledge improvement from the ACOOL-driven classroom activities. They agree that the practice of the faculty staff on the implementation of instructions and the classroom activities comply to principles of cooperation and collaboration. Majority enjoy Gross Anatomy and express gaining positive behavior change in their education.

These observations reflect almost the same results as the studies mentioned in the review of literature. In addition, cooperation and collaboration are part of the competencies the Commission on Higher Education (CHED) directs medical schools to develop among students (Commission on Higher Education, 2016). Medical students should demonstrate these competencies early in their education, since these are important

in their future practice. As Philippines gears to full implementation of the Universal Health Care, medical professionals are expected to demonstrate interprofessional collaboration (Universal Healthcare Act, 2019). Indeed, the literatures are accurate when they showed that cooperation and collaboration in group works, as done in Gross Anatomy, will be valuable in future career. ACOOL enhances social skills, improves motivation, and develops cooperative and collaborative approach to problem solving.

Future research however is recommended to focus on the analysis of the relationship between KAP results on ACOOL and Gross Anatomy grades. A comparison of effectiveness of ACOOL and traditional lecture strategy in terms of learning outcomes is also worth investigating.

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