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# Comparative Study on the Performance of 2nd Year and 3rd Year Medical Technology Students in the Clinical Parasitology Course at a University in Manila of the Academic Year 2019-2020

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**Abstract:** The 2nd and 3rd year Medical Technology students at a university in Manila took up the Clinical Parasitology course in the same year due to the adjustments made in accommodating the new curriculum and the full implementation of the new K-12 program. By determining the students' grades, academic workload, stressors present and stress levels, the study aimed to compare the performance of the 2nd and 3rd year BS Medical Technology students on their Clinical Parasitology course based on the shift of the educational system from the old to the new curriculum. A comparative-descriptive research design conducted through an online survey was used, and simple random sampling was implemented to select a total of 383 respondents for the study. SPSS was used for the statistical analysis of the data gathered from the online survey. Based on the results of the study, it was revealed that there was no significant difference between the workload from the old and new curriculum, and that both 2nd and 3rd year students prefer their own level's course lineup better than the other. Furthermore, both year levels have the same course syllabus with the exception of two additional topics in the old curriculum. Moreover, comparing the students' stress level intensity, both 2nd and 3rd year students were stressed while taking the Clinical Parasitology course, with quizzes serving as the most common stressor. Furthermore, it was also revealed that 2nd year BS Medical Technology students from the new curriculum have better academic performance than 3rd year BS Medical Technology students from the old curriculum in the Clinical Parasitology course. Curriculum change was attributed to the higher average grade and better academic performance of 2nd year BS Medical Technology students. However, there is a need for additional studies of the new curriculum since the majority of the students preferred their own course lineup that indicated a lack of information about the new curriculum.

***Keywords*:** clinical parasitology, medical technology, performance, curriculum

## I. INTRODUCTION

In the year 2016, through the approval of the Republic Act 10533 or the Enhanced Basic Education Act of 2013, the full implementation of the new K-12 program occurred, becoming a major milestone in the Philippines' education system. The K-12 program made the previous 11-year basic education cycle into a 13-year cycle, consisting of at least 1 year of kindergarten, 6 years of primary education, 4 years of Junior High School, and the added 2 years of Senior High School. It was aimed to change our previous curriculum to be in accordance with the international standards, promoting global competitiveness, and making the focus more on learner-oriented education. However, this transition introduced significant challenges to the basic education sector,

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affecting the other sectors along with it. The partnership with the Commission on Higher Education (CHED) in harmonizing the basic and tertiary curricula and maximizing the K-12 program's effectiveness naturally led to the college curriculum adjusting in order to accommodate the new curriculum (CHED, 2015; Enhanced Basic Education Act of 2013; Official Gazette, 2015).

The Medical Technology or Medical Laboratory Science program spans for 4 years and offers both general education and professional courses. One of the courses offered in the program is Clinical Parasitology, which was one of the affected courses when the curriculum in the college sector changed. Clinical Parasitology, previously only called Parasitology in the old curriculum, is a 3-unit course in the Medical Technology program that deals with the study of medically significant human parasites, emphasizing on their morphology, pathogenesis, epidemiology, and other relevant information needed for its prevention, control and the diagnosis of the diseases they cause. In the previous curriculum, it was offered in the first semester of the third-year curriculum in Medical Technology; however, due to the adjustments made, it is now being offered in the second semester of the second-year curriculum. Unlike what was written in the CHED memorandum, the new curriculum of a university in Manila offers it in the first semester of the second-year curriculum. Due to this, in the year 2019, the third-year students of the old curriculum and the second-year students of the new curriculum, who were the first batch to experience it, both took up Clinical Parasitology in the same semester of the same academic year. However, their academic workload differs as the third year curriculum has 6 other courses (Biostatistics, Clinical Chemistry, Academic Writing Skills, Clinical Hematology I, Bacteriology, and Marriage and Family) along with Parasitology, while the second year curriculum has 8 other courses (Art Appreciation, Ethics, Elective I, Health Information Systems for Medical Technology, Principles and Strategies of Teaching in Medical Technology, Biochemistry for Medical Technology, Physical Education and Christian Vision of the Church) along with Clinical Parasitology (CHED, 2006; CHED, 2017; UST, 2019).

A lot of people perceive shifting curricula as damaging to student learning. According to Rapetsoa's (2017) study, curriculum change presents challenges for both the students and the professors. The study presented negative results on the performance of the students in reading ability and on the quality of education which may be attributed to curriculum flaws, slow educator response to the changes and other external factors. However, according to the study of Peeraer, et. al (2009), they found that the performance of students from the old and new curricula does not statistically differ; however, the students in the new curriculum felt more confident in their clinical and communication skills as compared to those in the old curriculum. Additionally, the difference in academic loads and the difficulty of courses that go together may directly affect the outcomes of the students, making their level of performance differ from each other. These factors may either show if the shift in the curriculum made the academic load lighter or heavier for the students (Szafran, 2001). In light of this information, the study will be conducted to compare the old and new curricula specifically, the student outcomes or the performance of the Medical Technology program third years in the university, who are still following the old curriculum, and the second years, who are pioneers of the new curriculum, in the Clinical Parasitology course. This will be done by comparing their grades in the Clinical Parasitology course and factors that may affect their student performance, such as the difference in their academic workload, stressors present and their stress levels.

## II. METHODOLOGY

*Research Design*

This study utilized a descriptive-comparative research design in order to analyze, describe, and compare variables, which are not influenced by the researchers, from the two populations of BS Medical Technology students who took the Clinical Parasitology course in their second or third year in the A.Y. 2019-2020. This design describes and interprets the phenomenon in its natural form, without any manipulations (Mertler, 2016). Since there were changes made in the old curriculum to accommodate the new K-12 program, the researchers aim was to compare the old and the new curricula to determine which is better for BS Medical Technology students in terms of their performance in the Clinical Parasitology course. Therefore, comparative research design was also incorporated in the study.

*Sample and Sampling Size*

The study was conducted through an online survey wherein medical technology students who took the Parasitology course for the academic year 2019-2020 were the respondents. The inclusion criteria that was implemented for the subjects for this study were the second and third year students of the academic year 2019-2020, who took the Parasitology course under two different curricula in one university only. The exclusion criteria was non-medical technology students and medical technology students who have not taken any Parasitology course yet. Participants who wished to withdraw from their participation in this study were given the right to do so. The method that was used to select the respondents that participated in this study was simple random sampling where names were chosen randomly from the total number of respondents for both year levels.

The number of respondents that participated in the study was determined through calculating the sample size. Cochran's sample size formula was utilized to calculate the ideal sample size. The computation of the sample size was based on 95% level of confidence and 5% margin of error. In line with this, the final computation for the sampling size is 383 respondents in total, with 301 respondents coming from the second-year students and 82 respondents from the third-year students.

*Data Gathering Procedure*

The research proposal was submitted to the Faculty of Pharmacy Research Ethics Committee (FOPREC) for ethical approval. Certification of approval to conduct the study was provided once it is accepted. Simple random sampling was the sampling method that was used in order to select the subjects of this research study. The respondents were informed of the research study through email and private messaging. The primary tool for data collection was through the deployment of a survey questionnaire, which was done through Google Forms.

Aside from the integrated questionnaire, the letter of consent form was attached at the beginning to ensure that the respondents were well-aware of the study. It was translated in both

English and Filipino. The approval of the respondents was necessary before they were able to proceed with the questionnaire.

The link of the questionnaire was sent to the respondent's email. Once all questionnaires were answered, the data was subjected for analysis. The data obtained from the respondents were numerical and categorical forms which called for statistical methods namely, the Independent T-test. The SPSS software was used to run the mentioned statistical tests and the results that were obtained were represented through visualizations and tables.

*Ethical Consideration*

An approval from the Faculty of Pharmacy Research Ethics Committee (FOPREC) was secured which verified that all the principles stated above were applied in the study. Information given by the participants were only used for research and academic purposes. The purpose, procedure, and benefits of the study were included in the consent form on the first section of the Google form. The participants first agreed with the terms and conditions before proceeding to the survey questions. The terms and conditions included the confidentiality of information, anonymity of the participant, protection of privacy, and voluntary participation. The participants were free to pull out at any stage of this study at their own volition without any consequences. The completed Google form of the participants were given a unique code to easily reference any information needed for the study. This information was strictly confidential and was only used in this study.

Data from the survey can only be accessed by the researchers and no other individuals or group can obtain the given data of the participants by any means. Information that may lead to the participant's identification was removed to protect their anonymity. Participants were not subjected to methods that may cause them psychological and physical harm. The questionnaire did not contain any derogatory and disrespectful words or anything that may cause humiliation to the participants to ensure that their dignity is maintained. The questions did not ask for any private information from the participants for security purposes. The participants can request a copy of their answers by sending an email to the email address provided by the researchers. Incentives or compensation were not given upon participation in the study.

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## III. RESULTS AND DISCUSSION

*Demographics*

The data collection ran for almost three (3) weeks, and a total of three hundred ninety-five (395) responses were gathered as seen in Table 1. There were twenty (20) respondents who did not give their consent, so only three hundred seventy-five (375) responses, which consisted of two hundred ninety-six (296) 2nd Year students and seventy-nine (79) 3rd Year students of A.Y. 2019 - 2020, were analyzed statistically. The respondents came from various sections or blocks per year level, twenty-two (22) blocks for the 2nd Year level and six (6) for the 3rd Year level, wherein at least three (3) students belong to the same block.

Table 1 Summary of total respondents based on year level and consent to the study

| Year Level (A.Y. 2019-2020) | **N (Agree / Gave consent)** | N (Disagree / Did not give consent) | TOTAL |
|---|---|---|---|
| 2nd Year | **296** | 13 | 309 |
| 3rd Year | **79** | 7 | 86 |
| TOTAL | **375** | 20 | 395 |

Apart from the year level and section, no other demographic was used since the study focused mainly on the students' grades, academic workload, present stressors, and stress levels.

*Academic Performance*

The grading system of the university included three grading periods, wherein the students were graded in a 100-Point Scale during the grading periods, then the grades were computed and transmuted into a 5-Point Scale grading system for the final grades. The grades for the third grading period were not collected since those were not posted officially.

The said grades per shifting or grading period for both year levels were 60% from the total percentage of Lecture and 40% from the total percentage of Laboratory. The Lecture and Laboratory had different requirements and breakdowns, wherein the Lecture (60%) consisted of 50% comprehensive examination, 40% summative exams or quizzes, and 10% other learning activities such as recitation, research, and group dynamics. On the other hand, the Laboratory (40%) consisted of 30% practical examination, 25% comprehensive long examination, 20% for quizzes, 20% for laboratory activities such as performance tasks and take home activities, and finally, 5% for laboratory manual worksheets. Overall, the grading system for both year levels are the same, and each grading period accounts for the same percentage of 33.33% of the final grades, since the average of the three grading periods were taken.

Table 2.1 Grading System per Shifting Period for both year levels

| **2nd Year** | | **3rd Year** | |
|---|---|---|---|
| **LECTURE (60%)** | | **LECTURE (60%)** | |
| Summative Exams (Quizzes) | 40% | Summative Exams (Quizzes) | 40% |
| Other Learning Activities | 10% | Other Learning Activities | 10% |
| Comprehensive Long Examination | 50% | Comprehensive Long Examination | 50% |
| **TOTAL LECTURE COMPONENT** | **100%** | **TOTAL LECTURE COMPONENT** | **100 %** |
| **LABORATORY (40%)** | | **LABORATORY (40%)** | |
| Summative Exams (Quizzes) | 20% | Summative Exams (Quizzes) | 20% |
| Moving Practical Examinations | 30% | Moving Practical Examinations | 30% |
| Laboratory Activities | 20% | Laboratory Activities | 20% |
| Comprehensive Long Examination | 25% | Comprehensive Long Examination | 25% |
| Laboratory Manual Worksheets | 5% | Laboratory Manual Worksheets | 5% |
| **TOTAL LAB COMPONENT** | **100%** | **TOTAL LAB COMPONENT** | **100 %** |

Table 2.1 shows the grading system per shifting period for the 2nd and 3rd year levels based on their respective course syllabus. The two course syllabi were the same, including the grading components and the list of topics.

The grades of the students for each grading period were collected as seen in Table 2.2, but there were some students whose grades were not given during the first two grading periods, reflected as INP or in progress which has no numerical value. The final grades, which was reflected on the student's Transcript of Records, were the average of the three grading periods, about 33.33% each, for both year levels.

Table 2.2 Group statistics of the grades per year level

| **First Shifting Period (100-Point Scale)** | | | | |
|---|---|---|---|---|
| **Year Level** | **N** | **X** | **SD** | **N of INP*** |
| 2nd Year | 235* | **79.4468** | 6.95224 | 61 |
| 3rd Year | 78* | 74.1090 | 14.10228 | 1 |
| **Second Shifting Period (100-Point Scale)** | | | | |
| **Year Level** | **N** | **X** | **SD** | **N of INP*** |
| 2nd Year | 238* | **83.5042** | 9.67303 | 58 |
| 3rd Year | 77* | 76.6948 | 14.55483 | 2 |
| **Final Grades (Average of Three Shifting Periods, 5-Point Scale**)** | | | | |
| **Year Level** | **N** | **X** | **SD** | **N of INP*** |
| 2nd Year | 296 | **2.2407** | 0.47848 | 0 |
| 3rd Year | 79 | 2.3924 | 0.53661 | 0 |

* Some students were not given their grades (INP)
** 1.00 as the highest grade, 3.00 as passing, and 5.00 as failed
N, sample size; X, mean; SD, standard deviation

Table 2.2 shows the number of grades collected and its average and standard deviation. It shows that the average grade of the students under the new curriculum (2nd year students) is higher than the average grade of the students under the old curriculum (3rd year students).

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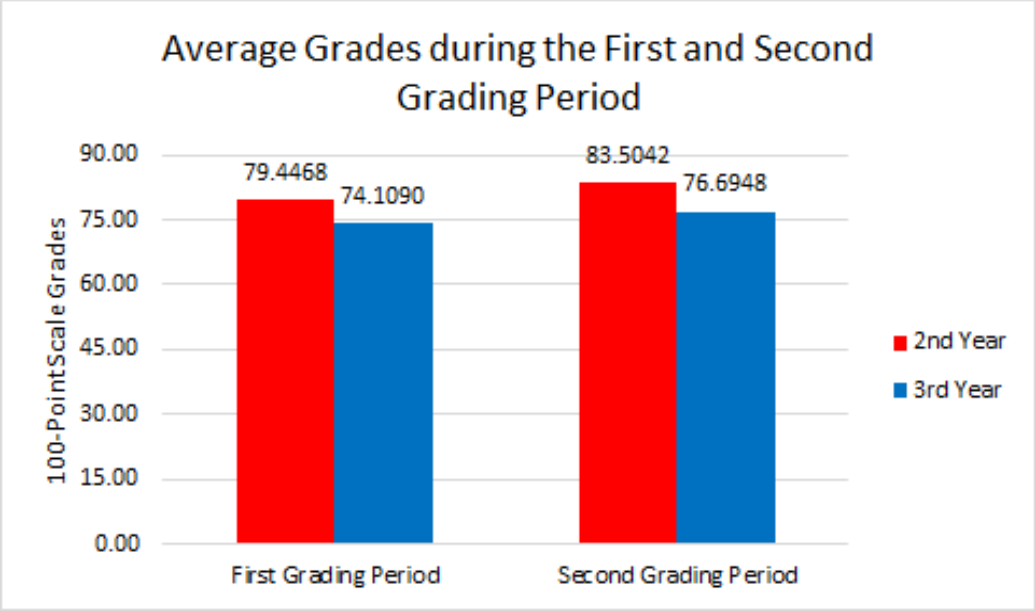


Figure 5.1 Average grades of the 2nd year and 3rd year students during the First and Second Grading Period

As seen in Figure 5.1, the average grade of students from the 2nd year level was five (5) points higher than the average grade of students from the 3rd year level during the first grading period, while the difference between the two average grades was almost seven (7) points during the second grading period. The data for these two grading periods were incomplete as stated above, which lessened the accuracy of the average grades.

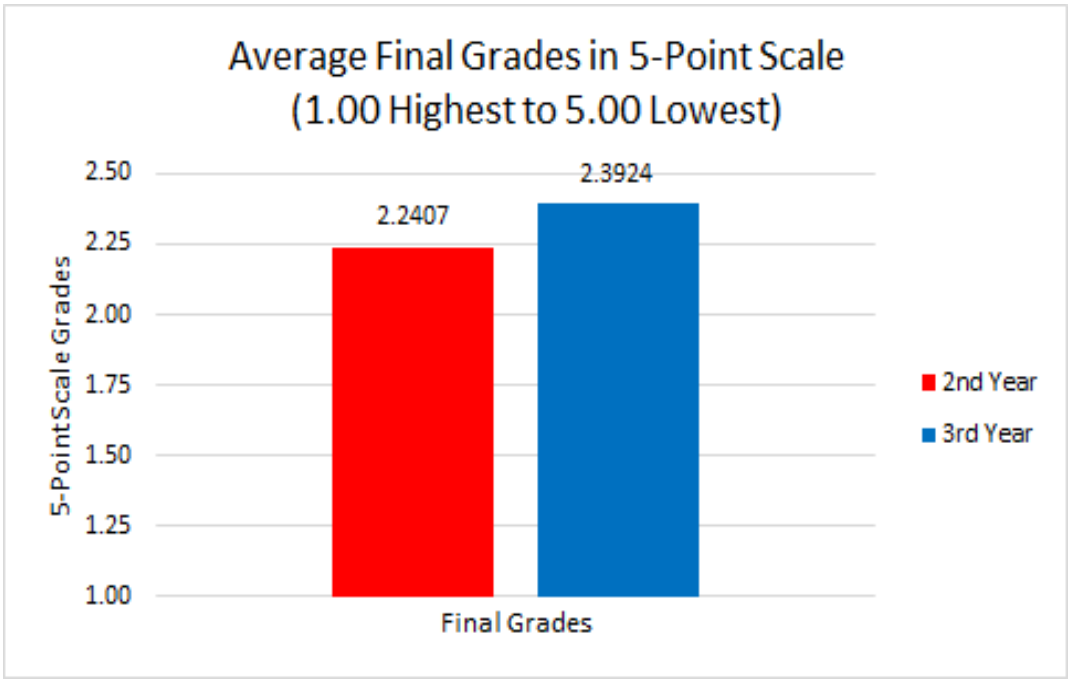

Figure 5.2 Average Final Grades in 5-Point Scale, wherein 1.00 is the highest grade and 5.00 is the lowest grade, of the 2nd and 3rd year students

As seen in Figure 5.2, the average final grade of the 2nd year level was higher than the average final grade of the 3rd year level, since the values are 2.24 and 2.39, respectively. These average grades were more accurate since these were reflected in the official records of the students, and were used in computing for the General Weighted Average of the students.

Table 2.3 Independent samples test assuming unequal variances

| Grading Period | T-test for Equality of Means | | | |
|---|---|---|---|---|
| | t | df | p-value | Mean Difference |
| First Grading | 3.216 | 89.732 | 0.002 | 5.33783 |
| Second Grading | 3.840 | 98.626 | 0.000 | 6.80940 |
| Final Grades | -2.282 | 113.266 | 0.024 | -0.15170 |

$\alpha = 0.05$

Table 2.3 shows the independent samples test assuming unequal variances using the t-test for equality of means was performed. The p-value is 0.002 for the first grading period, 0.000 for the second grading period, and 0.024 for the final grades, while the alpha value is 0.05. There is a significant difference between the academic performance of students from the old and new curriculum based on their Clinical Parasitology grades since the p-value is less than 0.05 (p-value < 0.05) for each grading period. Since there is a significant difference, it means that the students from the new curriculum had better academic performance based on the Clinical Parasitology grades than the students from the old curriculum. Similarly, the 2nd year students, who had 28 units in total, had higher grades than those in the 3rd year level, who only had a total of 26 units for that semester. The number of courses based on the course lineup differ since the 2nd year level had 10 courses, while the 3rd year level had 7 courses. The quizzes and teaching methods vary per professor, which contributed to the difference in grades among the students, especially between the two-year levels.

*Corresponding author:*

*Stressors*

Table 3.1 Comparison of stressors between 2nd and 3rd year students

| **STRESSORS** | **2nd year** | | | **3rd year** | | |
|---|---|---|---|---|---|---|
| | **N** | **X** | **SD** | **N** | **X** | **SD** |
| **REQS** | 296 | 2.9088 | 0.74683 | 79 | 2.7722 | 0.81570 |
| **METHODS** | 296 | 2.3007 | 0.84028 | 79 | 2.2532 | 0.94011 |
| **QUIZZES** | 296 | 3.2432 | 0.75124 | 79 | 3.1392 | 0.87316 |
| **ASSESSMENTS** | 296 | 3.2196 | 0.78271 | 79 | 3.0506 | 0.91845 |
| **PEERS** | 296 | 2.4291 | 0.96815 | 79 | 2.3165 | 1.13842 |
| **GOALS** | 296 | 3.1824 | 0.81957 | 79 | 2.8987 | 1.12768 |
| | | | | **N** | **X** | **SD** |
| **CUT-OFF (2nd year only)** | | | | 296 | 1.3345 | 0.65325 |
| **NO CUT-OFF (3rd year only)** | | | | 79 | 1.7215 | 0.50476 |

Table 3.1 compares the stressors between 2nd and 3rd year students when they took the Clinical Parasitology course. It shows that the most common stressor for both 2nd and 3rd year students is quizzes (X=3.2432 and X=3.1392, respectively). However, the other stressors, namely assessments and goals, are not significantly far apart in mean values.

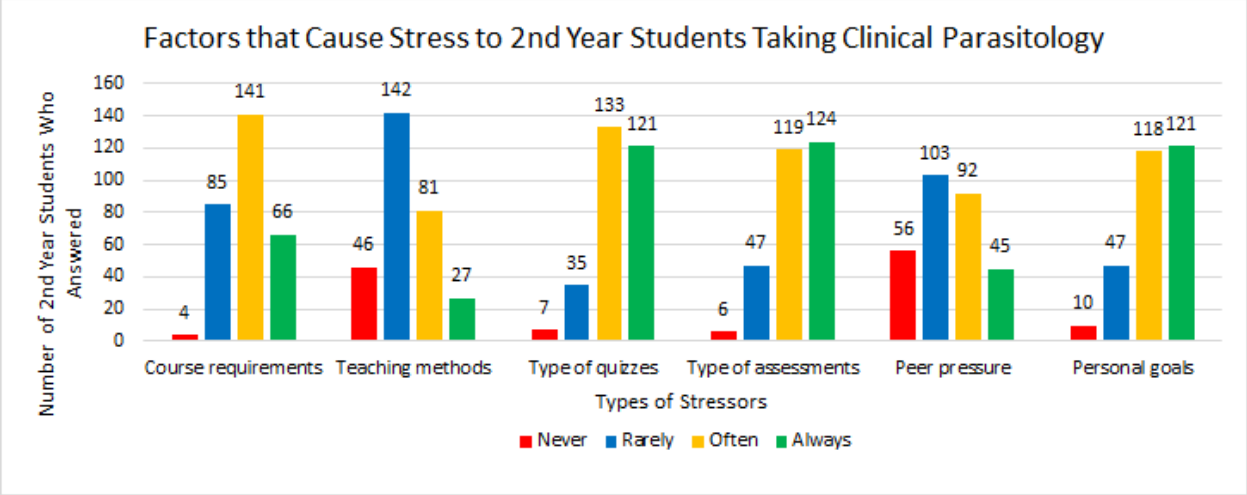


Figure 6.1 Factors that Cause Stress to 2nd Year Students Taking Clinical Parasitology Course

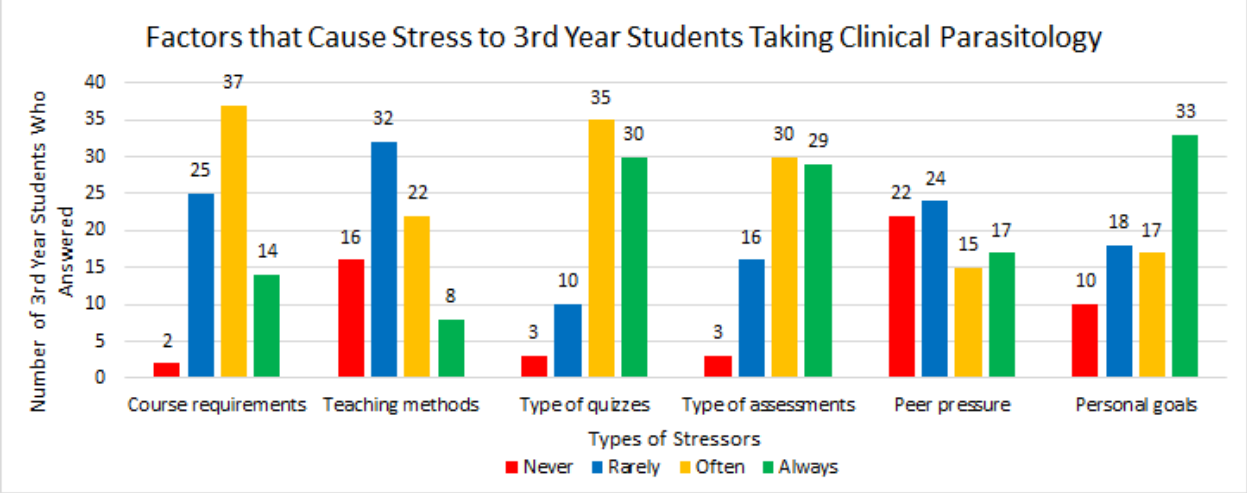


Figure 6.2 Factors that Cause Stress to 3rd Year Students Taking Clinical Parasitology Course

Comparing the factors that cause stress to both 2nd year and 3rd year students, there are varying opinions as to the degree of stress each stressor caused. However, both year levels voted similarly in all stressors mentioned, and chose quizzes as the most common stressor. Along with this, an additional option of inputting their own answer on what other factors cause them stress was added. According to the answers of the 2nd year and 3rd year students, both mentioned factors such as assessments, workload which includes 2nd year students taking Parasitology with general subjects and 3rd year students taking Parasitology with other professional subjects, the amount of information needed to be studied or memorized within a short time frame, and professor attendance. However, some 2nd year students additionally mentioned other factors such as obtaining laboratory materials, laboratory activities, organization or home commitments while some of the 3rd year students mentioned factors such as the grade distribution, commute time and distance, group projects, as well as family and financial pressure.

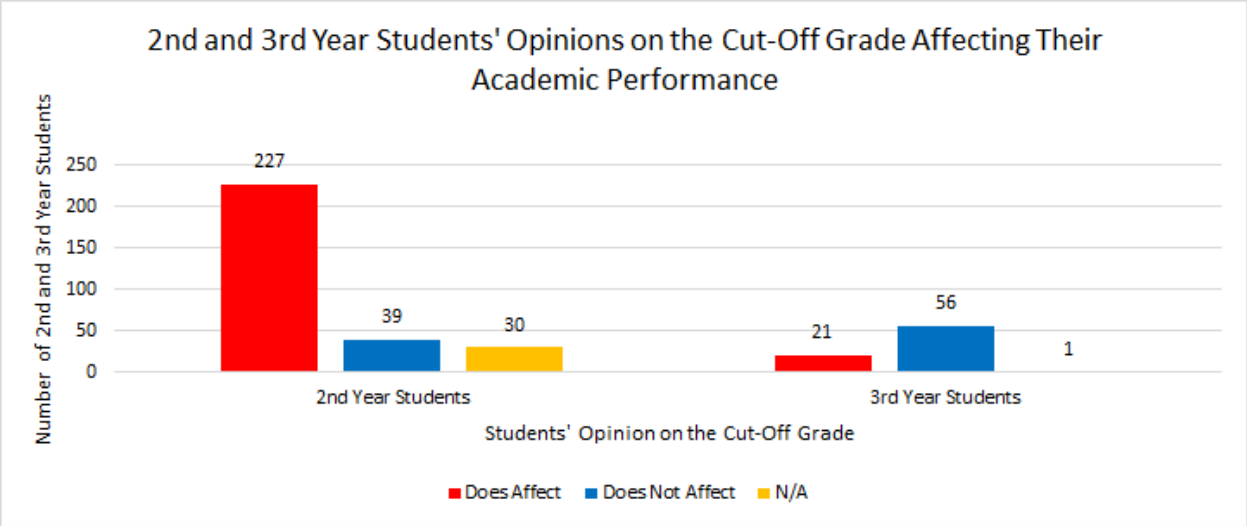


Figure 6.3 2nd and 3rd Year Students' Opinions on the Cut-Off Grade Affecting Their Academic Performance

Regarding the stressor for cut-off grade, the 2nd year students were asked whether or not having a cut-off grade affected their academic performance. Majority of the 2nd year students (227) voted that having a cut-off grade affected their academic performance, while the rest answered it did not affect their academic performance (39), or it does not apply to them (30). The 3rd year students, on the other hand, were asked whether or not the absence of a cut-off grade affected their academic performance. Most students (56) answered that it did not affect their academic performance, and only a few students (21) said otherwise, while the rest answered that it does not apply to them (1).

Corresponding to this, the students were asked through an open-ended question about how the presence or absence of cut-off grade affected their academic performance. In 2nd year students, although the answers varied, the most common answer was that having a cut-off grade pressured them to do better, and to maintain their grades in all courses. Some students also answered that having a cut-off grade took a toll on their mental health, while some answered that they would have done their best regardless of having a cut-off grade or not. Likewise, the majority of the 3rd year students also answered the same, saying that they still would have done their best with or without the cut-off grade. Moreover, some 3rd year students also said that not having a cut-off grade enabled them to focus more on studying and learning, instead of just passing their courses. Some, however, stated that they felt less pressured, and sometimes even lenient and complacent towards their academic performance. Based on the students' opinions, the cut-off grade served as either a stressor or motivator.

Table 3.2 Stress level rating of 2nd and 3rd year students

| STRESS LEVEL | 3rd Year Students | 2nd Year Students | Total |
|---|---|---|---|
| **BLANK** | 1 | 0 | 1 |
| **1 (Very Unstressed)** | 2 | 3 | 5 |

| | | | |
|---|---|---|---|
| **2 (Unstressed)** | 6 | 18 | 24 |
| **3 (Neutral)** | 23 | 58 | 81 |
| **4 (Stressed)** | 32 | 134 | 166 |
| **5 (Very Stressed)** | 15 | 83 | 98 |
| **Total Number of Votes** | 79 | 296 | 375 |

Table 3.2 shows the intensity of stress level that both 2nd and 3rd year students experienced when they were taking the Clinical Parasitology course. Both 2nd and 3rd year students (166) mostly voted level 4 (stressed). Meanwhile, 98 students voted level 5 (very stressed), followed by level 3 (neutral), level 2 (unstressed), and level 1 (very unstressed), with 81, 24, and 5 votes, respectively. Furthermore, 1 out of 375 respondents did not leave an answer regarding the stress level.

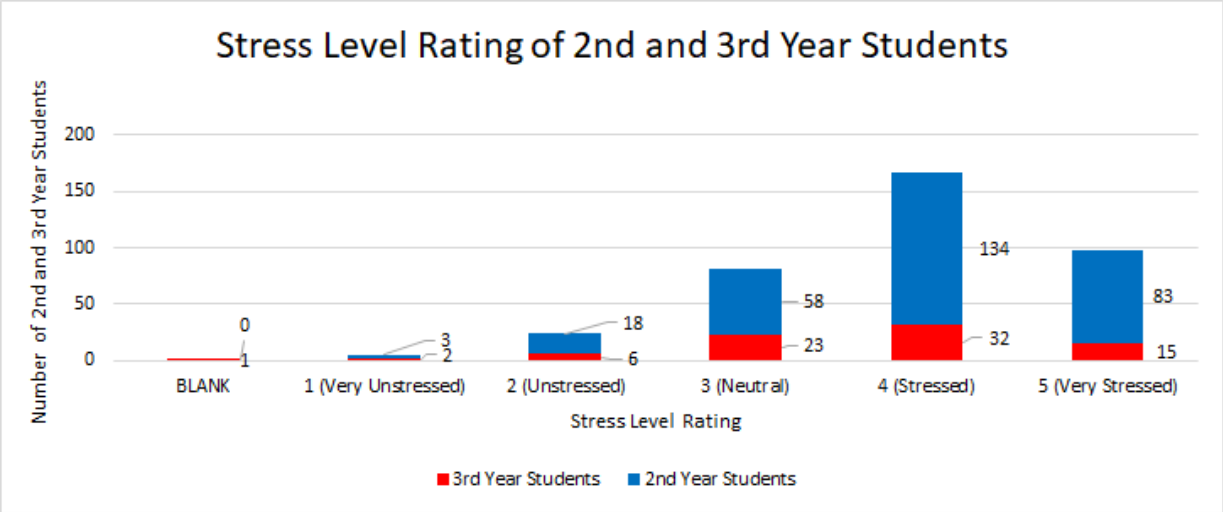


Figure 6.4 Stress Level Rating of 2nd and 3rd Year Students

Figure 6.4 shows that among the stress level intensities, a majority of both 2nd and 3rd year students felt stressed to very stressed while they were taking their Clinical Parasitology course.

Table 3.3 Stress comparison between 2nd and 3rd year students

| STRESS | N | X | SD | Int | t | df | p-value |
|---|---|---|---|---|---|---|---|
| **2nd year** | 296 | 3.9324 | 0.8994 | STRESSED | 2.648 | 373 | 0.008 |
| **3rd year** | 79 | 3.6203 | 1.04150 | STRESSED | | | |

Interpretation: 1.00-1.80 Very Unstressed; 1.81-2.60 Unstressed; 2.61-3.40 Neutral; 3.41-4.20 Stressed; 4.21-5.00 Very Stressed

Table 3.3 displays the significant difference of stress between the 2nd and 3rd year students when they took the Clinical Parasitology course. It shows that there is a significant difference in stress since the p-value of 0.008 is less than 0.05 at t(373) = 2.648. Based on the mean values, they can both be interpreted as stressed. However, the 2nd year students are significantly more stressed than the 3rd year students. The interpretation range was calculated to determine the minimum and maximum length of the 5-point Likert scale (Mohammed, 2016). In order to establish the range, the total number of points is subtracted by one (5 - 1 = 4) and then it is divided by five since it is the greatest value of the scale (4 ÷ 5 = 0.80). Subsequently, the number which has the least value, one in the scale, was added with 0.80 in order to identify the maximum of the cell of the lowest interpretation, which is Very Unstressed. The proceeding values were added with 0.80 until it reached the greatest value of 5.00.

*Curriculum*

Table 4.1 Comparison of the new and old curriculum in terms of course lineup and academic workload

| **CURRICULUM** | | **N** | **X** | **SD** | **t** | **df** | **p-value** |
|---|---|---|---|---|---|---|---|
| **LINEUP** | New | 296 | 1.2230 | 0.41695 | -12.347 | 128.256 | 0.000 |
| | Old | 79 | 1.8481 | 0.39512 | | | |
| **ACADEMIC WORKLOAD** | New | 296 | 2.8807 | 0.52604 | 1.728 | 104.263 | 0.087 |
| | Old | 79 | 2.7385 | 0.67926 | | | |

$\alpha = 0.05$

Table 4 displays the significant difference of the old and new curriculum based only on their course lineup and academic workload using independent t-test. Based on the results, it can be concluded that there is a significant difference between the course lineup of the 2nd and 3rd year BS Medical Technology students in their Clinical Parasitology course since the p-value of 0.000 is less than 0.05 at t(128.256) = -12.347. However, there is no significant difference between the academic workload of the 2nd and 3rd year BS Medical Technology students in their Clinical Parasitology course since the p-value of 0.087 is greater than 0.05 at t(104.263)= 1.728. Hence, the new and old curriculum differ in terms of their course lineup, although the academic workload or activities done for both of the curriculum are almost the same. However, since only the course lineup and academic workload were used as a basis for differentiating the two curricula due to the

limitations in data collection, significant differences between the two curricula may or may not be observed when other curriculum aspects are considered.

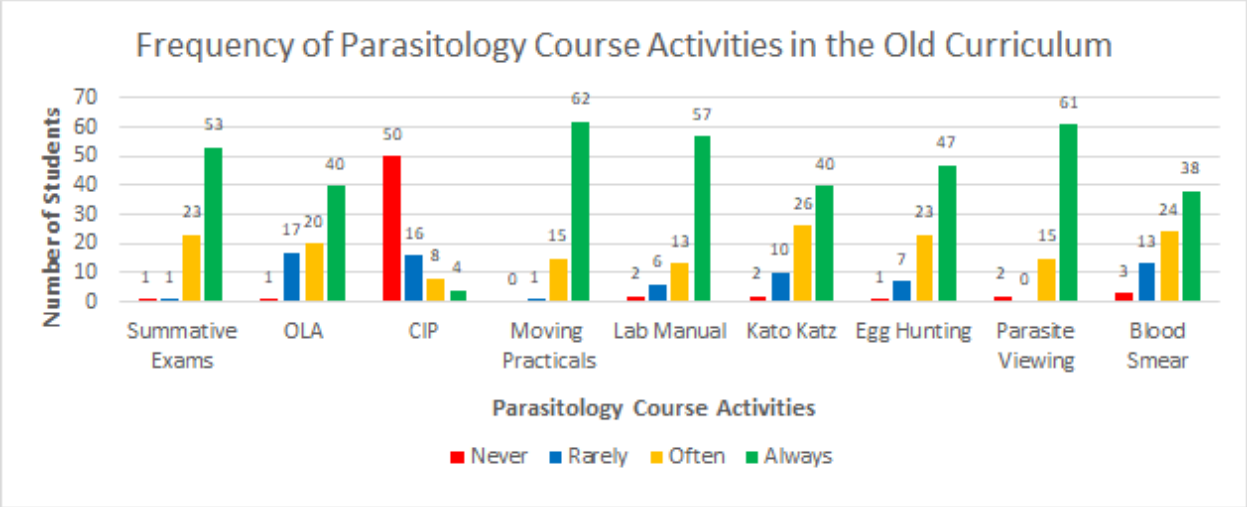


Figure 7.1 Frequency of Parasitology Course Activities in the Old Curriculum based on 3rd Year Medical Technology Students

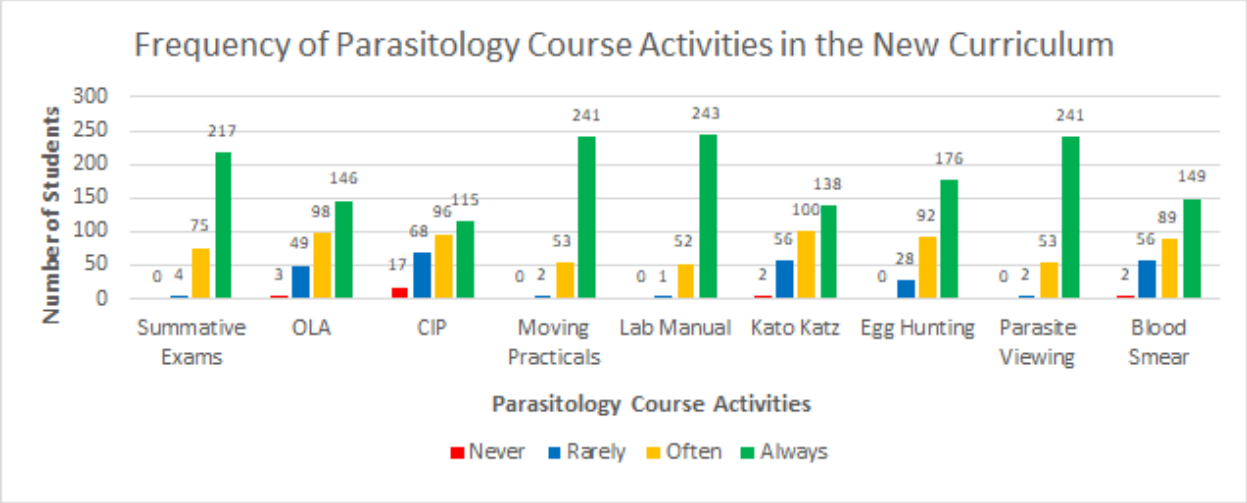


Figure 7.2 Frequency of Parasitology Course Activities in the New Curriculum based on 2nd Year Medical Technology Students

The academic workload was analyzed using the frequency of the Parasitology course activities done by both the 2nd year and 3rd year Medical Technology students, which can be seen in tables 7.1 and 7.2. Comparing the activities done between the old and new curriculum, it can be observed that the majority of the students from both 2nd and 3rd year levels chose ‘always’ on almost all of the given activities listed on the questionnaire. However, they differ in the frequency of having Course Inquiry Projects (CIP) as the majority (50) of the 3rd year students or those from the old curriculum chose ‘never’ while the majority (115) of 2nd year students or those from the new curriculum have chosen ‘always’ as the frequency in doing CIPs.

A factor that may have influenced their similarity in academic workload in terms of their activities in the Parasitology course is that the listed activities were generally required for the

course, in order for the students to hone their skills and knowledge in Parasitology and its laboratory work. This is why even with the change in the curriculum, the frequency of the activities done were mostly the same. Additionally, the 2nd year students in the A.Y. 2019-2020 were the first batch to experience the transition from the old curriculum to the new curriculum. In line with this, according to a case study by Lizer (2013), the perception and understanding of teachers on the curriculum change affects their implementation of the new changes. Some viewed that their insufficient training, understanding and knowledge on the new curriculum either gave them no reason to change their teaching methods or that it made them unable to notice if their changes were in accordance or not to the needed changes to be done for the new curriculum, while others resist the change to the indicated new teaching methods. Consequently, this might also be the reason why there were no significant differences found in their Parasitology course workload, since the role of teachers in the classroom, who are considered as the course implementers (Lizer, 2013), are to facilitate knowledge application through instruction and presentation (Kazi and Aziz, 2018), which includes preparation of lessons and implementation of activities and assessments.

*Course Lineup Preference*

Table 5.1 Course Lineup for the two curricula

| **2nd year course lineup - 28 units (New Curriculum)** | **3rd year course lineup - 26 units (Old curriculum)** |
|---|---|
| 1. The Contemporary World<br>2. Elective II<br>3. The Great Works<br>4. Community Health in Medical Technology<br>5. Medical Technology Laws and Professional Ethics<br>6. Pharmacology and Toxicology<br>7. Cytogenetics<br>8. Laboratory Management<br>9. PATH-PE4<br>10. Living the Christian Vision in the Contemporary World | 1. Biostatistics including Prevention and Community Nutrition<br>2. Clinical Chemistry I<br>3. Academic Writing Skills<br>4. Clinical Hematology I<br>5. Bacteriology<br>6. Parasitology<br>7. Marriage and Family |

Table 5.1 shows the course lineup for the 2nd and 3rd year level or the new and old curriculum, respectively. General education courses were taken together with the Clinical Parasitology course in the 2nd year level or the new curriculum. On the contrary, the 3rd year level or the old curriculum took professional courses together with the Parasitology course. Furthermore, the course name of Parasitology is different in the new and old curriculum, with the new curriculum having Clinical Parasitology as the course name while the old curriculum retained

the course name Parasitology. It can also be noted that the new curriculum has more units than the old curriculum which is 28 units and 26 units, respectively.

Table 5.2 Preferred course lineup of 2nd year and 3rd year BS Medical Technology students

| **LINEUP** | **2nd year students** | | **3rd year students** | |
|---|---|---|---|---|
| | **N** | **%** | **N** | **%** |
| 2nd year course lineup | **230** | **77.7** | 10 | 12.7 |
| 3rd year course lineup | 66 | 22.3 | **68** | **86.1** |
| Blank | 0 | 0 | 1 | 1.3 |
| Total | 296 | 100 | 79 | 100 |

Table 5 displays the preferred course lineup of the 2nd and 3rd year BS Medical Technology students using frequency distribution. It shows that 77.7% (230 out of 296) of 2nd year BS Medical Technology students still prefer the 2nd year course lineup and only 22.3% (66 out of 296) of 2nd year BS Medical Technology prefer the 3rd year course lineup. On the contrary, it shows that 86.1% (68 out of 79) of 3rd year BS Medical Technology students prefer the 3rd year course lineup while 12.7% (10 out of 79) of 3rd year BS Medical Technology students prefer the 2nd year course lineup, and 1.3% (1 out of 79) of 3rd year BS Medical Technology students did not give an answer regarding their preferred course lineup. Majority of the 2nd year and 3rd year BS Medical Technology students still prefer their own course lineup taken together with the Clinical Parasitology course. Bias is present in this case since the 2nd year and 3rd year BS Medical Technology students did not experience undergoing the course lineup for each curriculum.

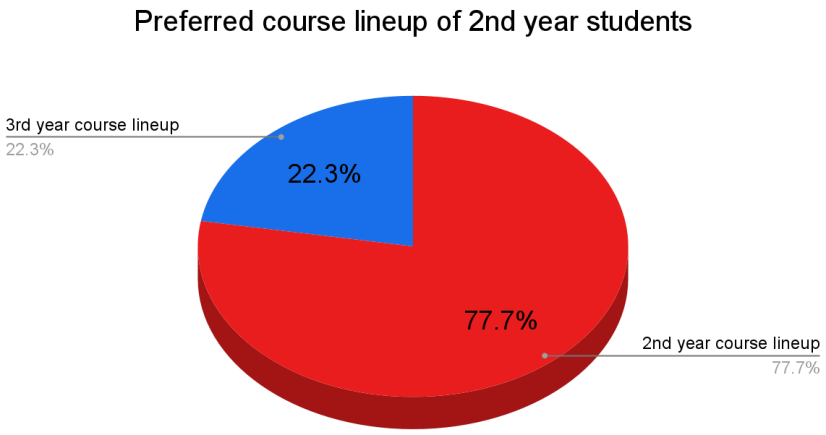


Figure 8.1 Preferred course lineup of 2nd year students

Figure 8.1 displays the preferred course lineup of 2nd year students wherein 77.7% or majority of the total respondents chose the 2nd year course lineup, while the remaining 22.3% of the total respondents chose the 3rd year course lineup.

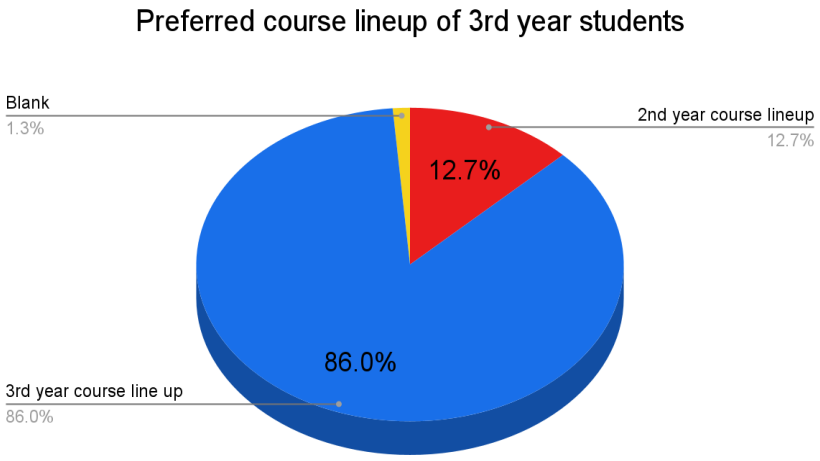


Figure 8.2 Preferred course line up of 3rd year students

Figure 8.2 displays the preferred course lineup of 3rd year students wherein 86.0% or majority of the total respondents chose the 3rd year course lineup, while 12.7% of the total respondents chose the 2nd year course lineup, and the remaining 1.3% had no answer.

## DISCUSSION

The study compares the performance of 2nd year and 3rd year BS Medical Technology Students in the Clinical Parasitology course at a university in Manila of the academic year 2019-2020. The shift in curriculum has introduced changes in the students' academic load. The Clinical Parasitology course was previously taken in the first semester of the third year, however it is now being taken in the first semester of the second year in the university due to the implementation of the new K-12 program. The curriculum change has brought about significant differences in the students' performance in clinical parasitology. Through determining factors such as grades, academic workload, stressors present, and stress level, the researchers are able to ascertain the similarities and differences of the two-year levels in taking the course. The change in curriculum resulted in Clinical Parasitology being taken by both 2nd year and 3rd year BS Medical Technology students in a university in Manila in the same academic year with the 2nd year students coming from the newly implemented curriculum and the 3rd year students coming from the old curriculum.

Performance wise, the 2nd year students have higher average grades than the 3rd year students. The results were similar to that of a study conducted by R. Szafran in 2001, which showed that the students with a heavier academic load in terms of units had higher grades than the students with a smaller number of units. However, upon asking what their preferred course lineup (old or new curriculum) was, both year levels stated that they prefer their own year level's course lineup. Grimes, Medway, Foos, and Goatman (2017) revealed that student's experience, memory,

and affective forecasts are interconnected with each other that creates impact bias in the context of higher education. Impact bias affects the students decision-making abilities, timing, comparison of course evaluations, and the nature and influence of oral communication. A student is most likely to have bias based on what they experienced in the past and their views in the future that can affect their perception and understanding in higher education.

In terms of academic workload, the 2nd year and 3rd year students have almost the same workload with no significant difference. Both have chosen quizzes as their most common stressor, with the other stressors having no significant difference between the two. Othman, Farooqui, Yusoff, and Adawiyah (2013) determined the nature of stress among health science students and similar to the results found in this study, their results showed that academic related stressors such as quizzes and assessments cause the highest stress towards the students.

It was also found that both year levels were stressed while taking the Clinical Parasitology course. Styles (1993, as cited by Abdulghani et al., 2011), stated that the stress level of medical students is highest during their undergraduate courses. Correspondingly, Muhammad, Ahmad, and Usman (2019) revealed that majority of the allied health students who were part of the study showed moderate to high level of stress, with academic related stress being cited as the most common stressor. Upon further analysis of the study results however, it was found that the 2nd year students have higher stress levels than 3rd year students.

Additionally, 2nd year students have a cut-off grade that contributed to their stress levels and affected their academic performance, whereas 3rd year students were not affected by it as they have no cut-off grade. Most of the 2nd year students commented that the cut-off grade's effects were positive as the pressure allowed them to do better, although some also thought that it made school more stressful. Whereas most of the 3rd year students commented that they would have done their best regardless, although some thought that not having a cut-off grade made it easier to focus on studying as there is less pressure. Kotter et al. (2017, as cited by Tus, 2020) stated that stress is negatively correlated with the students' academic performance, while academic motivation was deemed to have a positive effect. However, in the same study, the findings revealed that there was no correlation between the academic performance of the students, and their stress and motivation. In contrast, because the cut-off grade was seen as either a stressor or motivator, the 2nd year BS Medical Technology students stated that the presence of a cut-off grade affected their academic performance, while the 3rd year BS Medical Technology students stated that the absence of the cut-off grade did not affect theirs.

Therefore, based on the results found, it shows that there is a significant difference between the academic performance and stress levels in the Clinical Parasitology course, curriculum course lineup, and the preferred course lineup of the 2nd and 3rd year BS Medical Technology students in the A.Y. 2019-2020. However, there is no significant difference in their academic workload in the Clinical Parasitology course.

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## IV. CONCLUSION AND RECOMMENDATION

In conclusion, although the new and old curricula differ in terms of course lineup with no significant difference in their academic workload, basing from their grades from A.Y. 2019-2020, the 2nd year students, who are from the new curriculum, have better academic performance in the Clinical Parasitology course than the 3rd year students, who are from the old curriculum. This means that the change in curricula has fulfilled its goal of providing better student outcomes, at least in terms of academic performance. For better comparison, factors affecting academic performance such as stressors and stress levels were also considered. It was found that although they both experience stress, 2nd year students are significantly more stressed than 3rd year students which means that the change in course lineup or other differences between the two curricula that was not covered in the study may have largely contributed to inducing more stress to the 2nd year students since the other factors and differences between the two curricula that was considered in the study was found to have no significant difference. The two-year level's views on cut-off grades however, differ from each other. Both year levels have some who saw the presence of the cut-off grade positively, some negatively and some who thought that it didn't matter. This just means that the effects of the cut-off grade depend on the student, whether they perceive it either as a stressor or a motivator. Additionally, the fact that the majority of the students from each year level preferred their own course lineup may mean that the advantages and disadvantages of the change in course lineup is still not well-established. This means that there is a need for more studies, more information dissemination or to establish more on exactly how the students will benefit from the curricula change.

## REFERENCES

Abdulghani, H., AlKanhal, A., Mahmoud, E., Ponnamperuma, G., & Alfaris, E. (2011). Stress and Its Effects on Medical Students: A Cross-sectional Study at a College of Medicine in Saudi Arabia. *Journal of Health, Population and Nutrition, 29*(5), 516-522. Retrieved from http://www.jstor.org/stable/23500244

Abulencia, A. (2015). *The Unraveling of K-12 Program as an Education Reform in the Philippines*. Retrieved from http://www.journals.mindamas.com/index.php/sipatahoenan/article/view/689%20https://doi.org/10.2121/sip.v1i2.689.g674

Aktar, I. (2016). Research Design. *Research in Social Science: Interdisciplinary Perspectives (1st edition)*. Retrieved from https://www.researchgate.net/publication/308915548_Research_Design

Amira, R., & Jelas, Z. (2010). Teaching and Learning Styles in Higher Education Institutions: Do They Match?. *Procedia - Social And Behavioral Sciences, 7, 680-684.* doi: 10.1016/j.sbspro.2010.10.092

Andrew, M., Taylorson, J., Langille, D.J., Grange, A., and Williams, N. (2018). Student Attitudes Towards Technology and Their Preferences for Learning Tools/Devices at Two Universities in the UAE. Journal of Information Technology Education: Research

Aziz, F. and Kazi, A.S. (2018). Role of Teachers in Students' Classroom Participation in Universities. *International Journal of Educational Enquiry and Reflection, 4(1), 46-57.* Retrieved from

https://www.researchgate.net/publication/330712579_Role_of_Teachers_in_Students_Classroom_Participation_at_University_Level

Bachman, L., and Bachman, C. (2006). Student Perceptions of Academic Workload in Architectural Education. *Journal of Architectural and Planning Research, 23(4), 271-304*. Retrieved from https://www.jstor.org/stable/43030781?seq=1

Barrow, J., Brannan, G., and Khandhar, P. (2020). *Research Ethics.* Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK459281/

Brush, T., and Saye J. (2000). *Implementation and Evaluation of a Student-Centered Learning Unit: A Case Study.* Retrieved from https://www.jstor.org/stable/30220269

Bonquin, M., Castillo, R., De Guzman, J., Delos Reyes, D., De Torres, B., & Flores, K. et al. (2017). Assessment for the Preparedness of Senior High School Students Under Academic Strands for College (Senior High School). Anselmo A. Sandoval Memorial National High School.

Boumová, V. (2008). *Traditional vs. Modern Teaching Methods: Advantages and Disadvantages of Each* (Master's Diploma Thesis). Masaryk University Faculty of Arts.

Centers of Disease Control and Prevention (CDC) (2018). *Diagnosis of Parasitic Diseases.* Retrieved from https://www.cdc.gov/parasites/references_resources/diagnosis.html

Church, M.A., Elliot, A.J., & Gable, S.L. (2001). Perceptions of Classroom Environment, Achievement Goals, and Achievement Outcomes. *Journal of Educational Psychology, 93(1), 43-54.* DOI: 10.1037/0022-0663.93.1.43

Cohen, L., Manion, L., & Morrison, K. (2009). What is complexity theory?. *Research Methods in Education*. London: Routledge.

Commission on Higher Education (CHED) (2017). *CHED:Historical Background*. Retrieved from https://ched.gov.ph/ched/

Commission on Higher Education (CHED) (2015). *CHED K to 12 Transition Program*. Retrieved from https://ched.gov.ph/k-12-project-management-unit/

Commission on Higher Education (CHED) (2017). *CHED Memorandum Order 13 Series of 2017*. Retrieved from https://ched.gov.ph/wp-content/uploads/2017/10/CMO-13-s-2017.pdf

Commission on Higher Education (CHED) (2006). *CHED Memorandum Order 14 Series of 2006*. Retrieved from https://ched.gov.ph/wp-content/uploads/2017/10/CMO-No.14-s2006.pdf

Dagar, Vishal & Yadav, Aarti. (2016). Constructivism: A Paradigm for Teaching and Learning. Arts and Social Sciences Journal. 7. 10.4172/2151-6200.1000200.

De Jong, T. (2010). Cognitive Load Theory, Educational Research, and Instructional Design: Some Food For Thought. Springer. Retrieved from http://www.jstor.com/stable/23372530

Dimitrios, B., Lambros, S., Kakkos, N., Maria, K., & Athanasios, K. (2013). Traditional Teaching Methods Vs. Teaching Through The Application Of Information And Communication Technologies In The Accounting Field: Quo Vadis?. *European Scientific Journal. 9. 73-101*.

Dy, M., Santo, K., Ferido, M., & Sanchez, R. (2013). *Stress and Stress Responses of Filipino College Students*. [University of the Philippines, Los Banos].

Faculty of Pharmacy - Department of Medical Technology (FOP-MT). (2019). MT639 Course Specifications. University of Santo Tomas, Manila.

Frasco, J., Jackson, C., Kimoto, D., & Mulder, L. (2012). *Outcome-Driven Learning: Creating Opportunities for Change.* Retrieved from https://www.jstor.org/stable/23208655

*Corresponding author:*

Glen, S. (2020). *Independent Samples T Test (Unpaired Samples): Definition, Running*. Retrieved from https://www.statisticshowto.com/independent-samples-t-test/

Glen, S. (2020). *Sample Size in Statistics (How to Find it): Excel, Cochran's Formula, General Tips*. Retrieved from https://www.statisticshowto.com/probability-and-statistics/find-sample-size/

Grimes, A., Medway, D., Food, A., & Goatman, A. (2017). Impact bias in student evaluations of higher education. *Studies in Higher Education,* 42:6, 945-962. doi: 10.1080/03075079.2015.1071345.

Hagos, L. C., & Dejarme, E. G. (2008). *Enhancing Curriculum in Philippine Schools in Response to Global Community Challenges*. Retrieved from https://ro.ecu.edu.au/ceducom/21

Jones, M., & Brader-Araje, L. (2002). The Impact of Constructivism on Education: Language, Discourse, and Meaning. *American Communication Journal, 5(3), 1-10.*

Karimkhanlooei, G. & Mazloomzadeh, S. (2015). Learner-Centered or Teacher-Centered? Medical Teachers' Preferences: a Pilot Study. *Journal of medical education. 14. 39-44.*

Khan, M.J. (2013). Effect of Perceived Academic Stress on Students' Performance. *FWU Journal of Social Sciences Winter 2013, 7(2), 146-151.*

Kıncal, R., & Ozan, C. (2018). Effects of Formative Assessment on Prospective Teachers' Achievement, Attitude and Self-Regulation Skills. *International Journal Of Progressive Education, 14(2).* doi: 10.29329/ijpe.2018.139.6

Kinsinger, F. (2010). *Beneficence and the professional's moral imperative.* Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3342811/

Nelson Laird, T.F., Niskode-Dossett, A., and Kuh, G. (2009). *What General Education Courses Contribute to Essential Learning Outcomes*. Retrieved from https://www.jstor.org/stable/27798126

Lani, J. (n.d.). *Sample Size Formula*. Retrieved from https://www.statisticssolutions.com/sample-size-formula/

Louvel, S. (2013). Understanding change in higher education as bricolage: How academics engage is curriculum change. *Higher Education. 66:669-691.* Retrieved from : https://www.jstor.org/stable/43650120

Mason, M. (2013). What Is Complexity Theory and What Are Its Implications for Educational Change?. *Educational Philosophy and Theory,* 40(1), 35-49. doi:10.1111/j.1469-5812.2007.00413.

Magbojos, C. (2016). Health Risk Behaviors and Life Stressors of the Paramedical Students as Determinants of College Retention in One Asian Private Higher Education Institution. *Asia Pacific Journal Of Education, Arts And Sciences, 3(2), 58, 72*. Retrieved from http://ww.apjeas.apjmr.com

Mertler, C.A. (2016). Quantitative Research Methods. *Introduction to Educational Research.* Retrieved from https://us.sagepub.com/sites/default/files/upm-binaries/70019_Mertler_Chapter_7.pdf

Mohammad, N. (2017). *The Perception of the Parents and Students on K-12 Basic Education Program in the Philippines.* Retrieved from https://www.semanticscholar.org/paper/THE-PERCEPTION-OF-THE-PARENTS-AND-STUDENTS-ON-THE-K-Mohammad/d68d724f826d15dc1d3f6ff3898fcfb375da924d

Mohammed, A. (14 December 2016) Mean of a 5-point Likert scale. Retrieved from https://www.researchgate.net/post/Which-method-should-I-use-to-present-the-Mean-of-a-5-point-Likert-scale

Muhammad, D., Ahmad, A. and Usman, J., 2019. Assessment of Level and Sources of Stress Among Allied Health Sciences Students of Bayero University Kano: A Comparison Between Clinical and Pre-Clinical Students. Education in Medicine Journal, 11(1), pp.11-19.

Nassaji, Hossein. (2015). Qualitative and descriptive research: Data type versus data analysis. *Language Teaching Research. 19. 129-132.* doi: 10.1177/1362168815572747.

Nuas, A., Mercado, C., Matanguihan, C., Ropero, M., Dumaoal, O., & Flores, M. (2015). Stressors and Coping Mechanism of Physical Therapy Students of Lyceum of the Philippines University- Batangas. *The Steth, 9, 94, 96.*

Nurjannah, I., Husniyah, F., & Harjanto, T. (2017). Teacher-Centered Learning and Student-Centered Learning Approaches in Nursing School: Which One is Better?. *Belitung Nursing Journal, 3(2), 65-72.* doi: 10.33546/bnj.59

Official Gazette (2013). *Republic Act No. 10533.* Retrieved from https://www.officialgazette.gov.ph/2013/05/15/republic-act-no-10533/

Official Gazette (2015). *What is K to 12 Program?*. Retrieved on August 24, 2020 from https://www.officialgazette.gov.ph/k-12/

Othman, C., Farooqui, M., Yusoff, M., & Adawiyah, R. (2013). Nature of Stress among Health Science Students in a Malaysian University. *Procedia - Social And Behavioral Sciences, 105, 249-257*. doi: 10.1016/j.sbspro.2013.11.026

Oxford Business Group (2017). *Education reform in the Philippines aims for better quality and more access*. Retrieved from https://oxfordbusinessgroup.com/overview/thorough-examination-substantial-reform-has-brought-it-variety-challenges

Peeraer, G., De Winter, B.Y., Muijtjens, A.M.M, Bossaert, l. And Scherpbier, A.J.J.A (2009). Evaluating the effectiveness of curriculum change. Is there a difference between graduating student outcomes from two different curricula?. *Medical Teacher, 31:3, e64-e88.* DOI: 10.1080/01421590802512920

Philippine Medical Technology Act of 1969 (RA 5227). Retrieved from https://www.prc.gov.ph/sites/default/files/Medical%20Technology%20-%20Board%20Law_0.PDF

Rapetsoa, J.M. (2017). *The Effect of Curriculum Change on the Reading Ability of English First Additional Language (EFAL) Learners in Grade Ten: A Case Study*. Retrieved from http://ulspace.ul.ac.za/bitstream/handle/10386/1888/rapetsoa_jm_2017.pdf?sequence=1&isAllowed=y

Reddy, S. (2015). Integrating User Experience Development with Agile Software Practices: A Survey. 10.13140/RG.2.1.4307.7204.

Reif, F. (2010). Applying Cognitive Science to Education. Thinking and Learning in Scientific and Other Complex Domains. Cambridge, MA: The MIT Press. Retrieved from https://www.semanticscholar.org/paper/Applying-Cognitive-Science-to-Education%3A-Thinking-Reif/7a988c35518c3be82d40e257ed193a6d8ca47be5

Richardson, H. (2019). *Characteristics of a Comparative Research Design | Synonym.* Retrieved from https://classroom.synonym.com/characteristics-comparative-research-design-8274567.html

*Corresponding author:*

Roskos, K., & Neuman, S. (2012). Formative Assessment: Simply, No Additives. *The Reading Teacher, 65(8), 534-538.* doi: 10.1002/trtr.01079

Sergio, M. (2012). *K-12 Education Reform: Problems and Prospects*. Retrieved from https://www.adnu.edu.ph/urc/download/p070p080.pdf

Schroder-Back, P., Duncan, P., Sherlaw, W., Brall, C., and Czabanowska, C. (2014). *Teaching seven principles for public health ethics: towards a curriculum for a short course on ethics in public health programmes.* Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4196023/

Shibli, D., and West., R. (2018). Cognitive Load Theory And Its Application In the Classroom. Impact. Journal of the Chartered College of Teaching. Retrieved from https://impact.chartered.college/issue/issue-2-science-of-learning/

Szafran, R.F. (2001). The Effect of Academic Load on Success for New College Students: Is Lighter Better?. *Research in Higher Education 2001 42(1): 27-50.* Springer

TEAL Center Staff (2010). Student-Centered Learning. *Teaching Excellence in Adult Literacy.* Retrieved from https://lincs.ed.gov/sites/default/files/6%20_TEAL_Student-Centered.pdf

Torrance, H. (2012). Formative assessment at the crossroads: conformative, deformative and transformative assessment. Oxford Review Of Education, 38(3), 323-342. doi: 10.1080/03054985.2012.689693

Tshiredo, L.L. (2013). *The Impact of the Curriculum Change in the Teaching and Learning of Science: A Case Study in Under-resourced Schools in Vhembe District (Master's dissertation, University of South Africa).* Retrieved from http://uir.unisa.ac.za/bitstream/handle/10500/11893/dissertation_tshiredo_ll.pdf?sequence=1

Tus, Jhoselle. (2020). Academic Stress, Academic Motivation, and Its Relationship on the Academic Performance of the Senior High School Students. 8. 29-37. 10.6084/m9.figshare.13174952.v1.

University of Santo Tomas (UST) (2019). *Bachelor of Science in Medical Technology (4 years).* Retrieved from http://www.ust.edu.ph/academics/programs/bachelor-of-science-in-medical-technology/

Valdez, A. (2010). Competencies of Career-Entry Medical Technology Graduates of Lyceum of Batangas: Basis for Enhancement of the Internship Training Program. *JPAIR Multidisciplinary Research, 4(1).* doi: 10.7719/jpair.v4i1.98

Vine, S.J., Moore, L.J., & Wilson, M.R. (2016). Vine, S. J., Moore, L. J., & Wilson, M. R. (2016). An Integrative Framework of Stress, Attention, and Visuomotor Performance. *Frontiers in Psychology*, 7, 1671. DOI: 10.3389/fpsyg.2016.01671

What Is Constructivism?. (2020). Retrieved from https://www.wgu.edu/blog/what-constructivism2005.html

Wanger, A., Chavez, V., Huang, R.S.P., Wahed, A., Actor, J.K., and Dasgupta, A. (2017). *Microbiology and Molecular Diagnosis in Pathology.* doi: https://doi.org/10.1016/B978-0-12-805351-5.00010-7

Western Australian Center for Health Promotion Research. (2010). *Ethical considerations*. Retrieved from http://mypeer.org.au/monitoring-evaluation/ethical-considerations/

Yusoff, Muhamad Saiful Bahri & Fuad, Ahmad. (2010). *The Medical Student Stressor Questionnaire (MSSQ) Manual.*

*Corresponding author:*