A Descriptive Study on Class Size toward Senior High School Students' Evaluation of Robotics Teachers

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Abstract

Class sizes are vital to the conducive learning of students. As this study aimed to identify the difference in robotics teachers' evaluations depending on the class size number. Also, this research is focused on the evaluation of the teachers teaching Robotics at St. Dominic College of Asia. The instrument used is the standard teacher evaluation being used in the same institution, which gathers the mean score of the content knowledge, pedagogical knowledge, technological knowledge, and teachers' attitudes and behavior. The results of each part of the teacher evaluation did not vary significantly from each other as the result only varies from Very Satisfactory to Excellent. Though the class size number changes, the number of the mean scores collected from each category did not show a significant difference. Therefore, the study concludes that the class size number has no significant impact on the teacher evaluation since the number of results did not vary significantly. This implies that teacher evaluation results cannot be directly identified through the number of students in a classroom, but the teacher should be well-trained in the subject matter being taught.

Keywords: class size, teacher evaluation, class ratio

Introduction

Numerous research worldwide has proven that the number of class sizes influences the student learning process. But with the situation of the student-teacher ratio in Public Schools in the Philippines for over decades now, how can schools be ready for face-to-face learning after the pandemic?

Background of the Study

In the Philippines, the average class size is 50, wherein a class should consist of a minimum of 15 students to a maximum of 65 students, according to the Department of Education Order No. 54, series of 2008. However, private schools and public schools' class sizes still vary and sometimes go over the prescribed class size, especially during the pandemic when blended learning is being implemented. In a study conducted by Chingos and Whitehurst (2011), they found that classes with 7-10 students have more meaningful learning. According to research conducted by Laitsch, Nguyen, and Ho-Younghusband (2021), in smaller class sizes, there is a greater chance of student-teacher interaction and engagement that has beneficial effects on the achievements of learners. However, in the same study, they said that it also may cause learning gaps for under-achieving students. They added that teachers in small classes can give individualized attention to learners' progress, also teachers tend to be more hands-on in small classes than the larger ones, and teachers assigned in smaller classes tend to be more satisfied with their jobs as they

have more opportunities for their personal needs (Laitsch, 2021). In a research study by Ayeni and Olowe (2016), it was found that large class sizes have negative effects on learners in terms of poor classroom management, ineffective student control, poor planning and assessment, and heightened stress on educators that may affect teachers' health. As stress on teachers increases, it influences the quality of teaching and student engagement in the classroom (Wong, et.al, 2017). However, in a study conducted by Leuven and Lokken (2020), it was found that there are no significant effects on class size for teachers and students. Another research added that class size has no systematic effect on students' performance This is contrary to the study by Krassel and Heinesen (2014) wherein reducing class size has long-term, beneficial, and positive outcomes. Furthermore, in a study in Japan, teachers with higher student-teacher ratios tend to be more stressed due to spending more on time-consuming tasks because of the larger number of students that they handle (Hojo, 2021). In a study by Navidinia (2021), the researcher stated that the Teacher-Evaluation System is important to understand the importance of teachers and other implications to the school context needs. In addition, in an article written by Oberthur (2021), he emphasized that class size may matter however teacher quality is of utmost importance. Teachers are getting passive engagement and students are having fewer classroom interaction opportunities but more interesting and challenging (Aoumeur, 2017).

In this study, the researchers identified the variance of senior high school students' evaluation of teachers with different class sizes in St. Dominic College of Asia. This study is beneficial to students, school administrators, teachers, and future researchers as this might change the practice of private and public schools nowadays. The study's general objective is to countercheck the variation in students' evaluation of teachers according to class size in St. Dominic College of Asia. Specifically, it aims to determine the class sizes in each section of the institution, determine the teacher's evaluation results in each class, and assess whether evaluation results vary according to class size.

Statement of the Problem
This research would like to determine the variation between students' evaluations of teachers depending on their class size in St. Dominic College of Asia.

Research Questions
Specifically, it aims to answer the following questions:
1. What are the class sizes in each section of the senior high school taking robotics?
2. What are the average evaluation results of teachers teaching robotics in each section according to:
   a. Content Knowledge
   b. Pedagogical Knowledge
   c. Technology Knowledge
   d. Teacher's Attitudes and Behavior
3. Do the evaluation results vary according to class sizes when grouped according to class size group as follows:
   a. 10-19
   b. 20-29
   c. 30-39
   d. 40-49
   e. 50-59
   f. 60-69

Research Hypothesis
The researchers propose a null hypothesis that there is no difference between the teacher's evaluation results based on the class size.

Significance of the Study

This study aims to establish an understanding of the variety of results from the students' evaluation of teachers depending on their class size. Furthermore, the study can be significant for the following:

School Administrators. To improve the quality of teachers and the educational system of schools, effective teacher evaluation programs and assessments should be considered (Kersten and Israel, 2007). By understanding the results of the evaluation for teachers if it varies between class sizes, school administrators will be able to lessen job burnout and stress levels of teachers that can be obtained in large class sizes.

Teachers. The satisfaction of teachers is significant to teaching performance (Baluyos et al, 2019). Through this study, the teachers will identify if class sizes matter in terms of their teaching performance.

Students. Teachers' job satisfaction has an impact on the quality of education, (Michaelowa, 2002). The satisfaction of teachers with their job means that they can comply with their teaching responsibilities (Iqbal et al., 2016). As teachers attain sufficient job satisfaction, the educational objectives and national goals will be achieved too (Ansah –Hughes, (2016). Through the study, teachers and school administrators will obtain an understanding of the reduced class sizes to achieve positive educational outcomes.

Future Researchers. This study will be useful for future researchers who would like to gain an understanding of class sizes and teacher evaluations.

Scope and Delimitations of the Study

This research is focused on identifying the variety of teacher evaluations teaching Robotics from different class sizes at St. Dominic College of Asia Senior High School alone. This is since only Robotics is the subject being taken across all senior high school strands and grade levels. The study does not cover other subjects or courses. The study does not cover teachers teaching in Higher Education, Junior High school, and Elementary. The following operational definitions will be used in this study:

Teacher Evaluation. This is the teacher evaluation results for the Robotics subject from the senior high school students at St. Dominic College of Asia Senior High School, conducted by the student wellness office

Class Size. These are the number of students in each section from St. Dominic College of Asia Senior High School.

Conceptual Framework

Figure 1
Input-Process-Output Model of the Study

Input
Institution's gathered information:
Teacher's Evaluation
    Content
    Knowledge
    Pedagogical
    Technological
    Attitudes and Behavior
Class sizes

Process
Data Treatment
    Difference in evaluation results according to class sizes
Analysis and Interpretation

Output
Propose Instructional class size anchored to quality learning
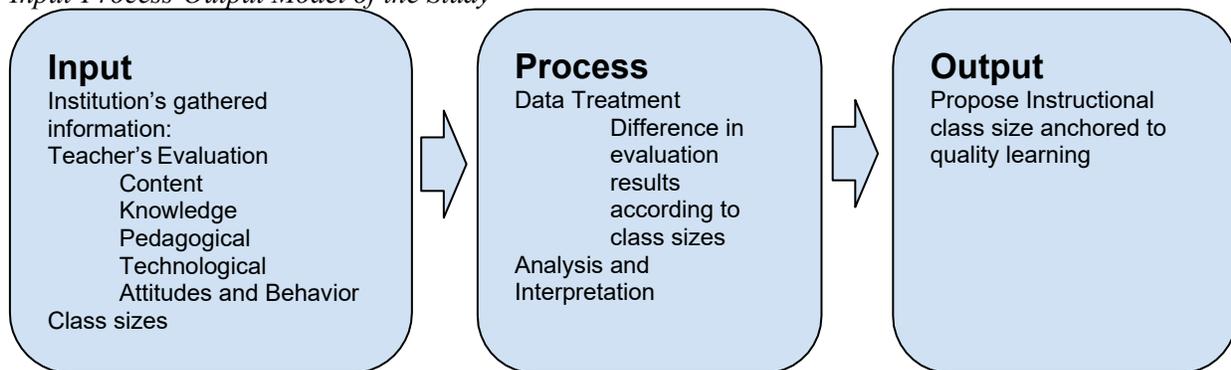
As illustrated in Figure 1, the institution's senior high school teachers' evaluation and the class size were used to test the relationship between the perceived effectiveness and quality of learning. The result will be the baseline of recommendations that would support creating quality learning related to teachers' evaluation and class size that tailors fit the pressing demand of new normal learning.

Literature Review

This provides an in-depth discussion of the supporting studies this study took basis on. The literature review is comprised of both local and international articles and scholarly papers that provide information about teacher evaluation and class sizes.

Teacher Evaluation

Teacher evaluation is one of the most important aspects to identify the actual performance of teachers, this is suggested to be a basis for making decisions (Supriati, 2015) and real work results with the proper outcomes (Tahir, 2013). In a study by Ronfeldt and Campbell (2016), teacher evaluation performance can be improved through training and recruitment programs, they added that teacher evaluation is more efficient than teacher observational ratings. The study concluded that teacher evaluation performances are formative feedback that leads to teacher effectiveness and retention.

The latter is contrary to the study by Navidnia (2021), in which they investigated the Iranian EFL teachers' perception of the impact of the current teaching evaluation system on their teaching performance. In their study, they measured and identified how does teaching evaluation system improve the expertise of teachers. However, their study concluded that the teacher evaluation system cannot help them develop professionally. The respondents of their qualitative research added that for the teacher evaluation system to be effective, it needs to be closely linked with their professional development programs for teachers.
In addition, a study by Steeg and Gerritsen (2016), measured the evaluation scores of teachers regarding pupil achievement scores. They predicted that pupil achievement gains from being assigned to teachers with high evaluation scores. With this study that aims for proper teacher evaluation, they can identify potential problems to address as regards weak teacher quality. In conclusion in their study, there are significant associations between the scores of teachers' evaluation and pupil achievement gains.

Lastly, standard-based teacher evaluation must be a part of the teaching and learning system that supports the teachers for continuous improvement and professional development, this will also assist administrators of schools in understanding the mindset of students towards their teachers (Lang & Townsley, 2021). In conclusion, this study suggests an alignment between grading reform efforts and standard-based teacher evaluation to open doors for great opportunities for institutional growth.

Class Ratio

In an experimental study cited by Solheim and Opheim (2018), wherein there are 150 participating schools, with one treatment and one control class. The treatment class received an additional teacher for their lessons for 38 weeks, while the control group has none. In the study, the class size is no more than six students that are maintained for four to six weeks before pulling out a new group. It concluded that teacher density is of less importance than training and development of teachers' instructional practices. Hence, this is more important than reducing class size to improve the learning experience of students.

Class ratios tend to have a moderate effect on student ranking. This argument is supported by research conducted by Koc and Celik (2015), wherein they found that there is a significant moderate correlation between the cities that have a lower number of students per teacher that has a higher ranking in the transition to higher education examination and classes with a higher number of students generally have low rankings on the said examination. They concluded that hiring more teachers to decrease the ratio will create a positive impact on students' achievement and will also decrease the teachers' burnout and lessen their workload.

In identifying the ideal student-teacher ratio, it is important to consider many factors such as their age and academic needs, like how younger students are requiring more time and individual attention from educators. Lesser class sizes are recommended for younger students (Barrington, 2019). The article by Barrington added a few facts about class sizes, for example, kindergarten to third-grade students are advised to have no more than 18 students per teacher to show academic achievement. in conclusion, the study indicates that the student-teacher ratio has an impact on a child's learning and academic performance.

Also, through a news article written by Montemayor (2018), according to the Department of Education that class size reduction is the key to improving the status of learning of students. In the interview with the planning and field operations Undersecretary Jesus Mateo, he stated that the student-teacher ratio for elementary is 1:31, 1:36 for junior high school students, and 1:31 for senior high school students. The article added that apart from reducing class size, efforts are being made to construct better school buildings and classrooms for learners in the Philippines.

In a study by Wang and Calvano (2022), they investigated as regards how academic and social engagement is influenced by different class sizes. However, the study found that class sizes are not influencing student satisfaction but reveals that there are lower teacher interactions in larger classes.

Lastly, in an investigative study conducted by Ancho et.al (2021), they visited online documents about the student-teacher ratio in classrooms among Southeast Asian countries. They found that countries like Singapore, Malaysia, and Brunei with a class ratio of eight to 11 per teacher scored 408-549 on the PISA Reading Test while the Philippines, Thailand, and Indonesia that is ranging between 15 to 36 students per teacher scored 340-393. The study concluded that the ratio of the least number of students to teachers ranked higher and that the student population impacts the teaching and learning process of students.

Class size

According to the Department of Education Order No. 62 Series of 2004, the minimum number of classes is fifteen (15) and the maximum number is sixty-five (65). However, the average class size should be between forty-five to fifty (45-50) students in a classroom. Since this is not strictly implemented, Department of Education Order No. 54 Series of 2008 proposed the double shift to lessen the number of students in a classroom.

Methodology

This section discusses the available and applicable methods used in response to the research problem in the statement of the problem section, which is directed toward the aim of the study—understanding and identifying the teacher evaluation rating difference towards class sizes. This part of the research provides and presents an outline of the research methodology— the design of the present study, particularly the research methods, techniques, and procedures to be used, how the subjects are chosen, how the sample size is determined, the instrument to be used, and the statistical tool utilized to analyze the data gathered successfully.

Research Design

This study that was done and conducted by the researchers is quantitative in nature. All data was obtained through the administration of the school as mentioned in the scope of the study. The specific type of quantitative research design that was used in this research is non-experimental descriptive research. This approach was chosen because the study's primary objective is to know the levels of teacher evaluation rating in different class sizes. Furthermore, it is non-experimental since no variables was controlled and nor underwent a treatment nor an intervention. This study's independent variables are the class sizes, and the dependent variables are the teacher's evaluation.

Research Locale

The study was conducted at St. Dominic College of Asia- Senior High School located at Emilio Aguinaldo Highway, Bacoor City, in the province of Cavite as this school has workable ten sections that underwent teacher evaluation conducted by the Student Wellness Office and Office of the Academic Affairs. To specify the sample size, the teachers who are evaluated in the academic year 2021-2022 was composed 18 teachers. Teacher evaluation among all teachers was collected through the approval of the Office of the Principal.

Research Instrument

The instrument used to collect the data on teacher evaluation came directly from the school administration. This is composed of four categories: content knowledge, pedagogical knowledge, technology knowledge, and teacher's attitude and behavior. The rating includes a 5-point Likert Scale namely excellent, very satisfactory, satisfactory, needs improvement, and poor. The summary of the results was described as excellent - 4.21-5.00, very satisfactory - 3.41-4.20, satisfactory - 2.61-3.40, needs improvement - 1.81-2.60, poor - 1.00-1.80. Lastly, to ensure the instrument's reliability and validity, the researchers only gathered the summary of the numerical responses of each class.

Data Gathering Procedure

By sending communication letters to the school administration, the researchers collated the summary of data collected in numerical format from the teacher evaluation of students and the number of the class sizes. Nevertheless, the communication was handled with utmost confidentiality as part of the data privacy act agreement.

Data Analysis

After the researchers collected all the needed data for the study, the data analysis followed for this provides a valid and reliable database on the teachers' evaluation difference between the class sizes. In this study, the researchers used descriptive statistics by getting the average weighted mean of teachers' evaluations to describe the difference between the evaluation of different class sizes. The summation of overall data or average weighted mean wase useful in analyzing responses from respondents that follow the Likert scale. This is utilized to figure out where the majority of respondents fall on the scale. Furthermore, the results of the analysis was restricted within the scope and limitations mentioned in the study.

Results

This section of the research summarized and synthesized all the data collected using the statistical treatment discussed in the methodology in order to ensure that the conclusion is done scientifically. Also, the statistical treatment used significantly helped in proving or disapproving the hypothesis of the study and in answering the research questions. Lastly, results contain graphical and tabular summaries of the data, while further interpretations between the variables are presented in the discussion.

Table 1
Class Sizes of Sections Taking Robotics

Class	1	2	3	4	5	6	7	8	9	10
Class Size	11	11	16	27	27	31	41	48	53	60

The number of class sizes are spread out from the lowest number of class sizes which is 11 and the highest number is 60. Whereas this class size is still in accordance with the Department of Education Memorandum Order of maximum class size which is 65. These are the numbers of the class size of the sections of senior high school taking up robotics.

Table 2

The Average Evaluation Result of Teachers Teaching Robotics According to Content Knowledge

Class	1	2	3	4	5	6	7	8	9	10
Class Size	*11*	*11*	*16*	*27*	*27*	*31*	*41*	*48*	*53*	*60*
Content Knowledge Average										
Mean Score (x̄)	**4.42**	**4.51**	**4.50**	**4.76**	**4.46**	**4.77**	**4.26**	**4.79**	**4.64**	**4.28**
Relates the lesson to previous and future lessons	4.44	4.64	4.56	4.67	4.48	4.83	4.31	4.75	4.65	4.33
Provides a course outline every beginning of the quarter	4.33	4.45	4.19	4.52	4.32	4.65	4.00	4.58	4.48	4.21
Provides effective examples and illustrations to understand the lesson	4.33	4.55	4.69	4.86	4.48	4.74	4.31	4.85	4.58	4.07
Displays expertise, thorough knowledge, and mastery of the subject	4.33	4.27	4.38	4.81	4.48	4.83	4.38	4.95	4.74	4.21
Integrates Dominican core values of service, dynamism, competence, and accountability	4.56	4.64	4.69	4.86	4.56	4.78	4.31	4.83	4.74	4.56

The lowest mean score for Content Knowledge Average is 4.26 from the 41 students while the highest average was evaluated from 48 students/class size which is 4.79. The average scores results are different for each class size.

Table 3

The Average Evaluation Result of Teachers Teaching Robotics According to Pedagogical Knowledge

Class	1	2	3	4	5	6	7	8	9	10
Class Size	*11*	*11*	*16*	*27*	*27*	*31*	*41*	*48*	*53*	*60*
Pedagogical Knowledge										
Mean Score (x̄)	**4.40**	**4.38**	**4.38**	**4.67**	**4.18**	**4.43**	**4.19**	**4.59**	**4.65**	**4.29**
Is creative in developing activities and lessons	4.44	4.09	4.50	4.76	4.12	4.61	4.15	4.63	4.48	4.26
Presents the lesson in a clear and understandable way	4.33	4.45	4.19	4.76	4.16	4.61	4.15	4.85	4.68	4.14
Consistently gives tasks after each topic discussed to assess learning	4.67	4.73	4.50	4.57	4.36	4.43	4.38	4.38	4.77	4.46
Provides feedback on assignments or performance tasks for the students to improve	4.11	4.27	4.06	4.38	4.00	4.30	4.04	4.23	4.58	4.28
Is clear in giving directions and on explaining what is expected on performance tasks and assignments	4.44	4.36	4.63	4.86	4.28	4.17	4.23	4.85	4.74	4.30

The highest mean score is 4.67 from 27 students/class size for Pedagogical Knowledge, while the lowest average score is 4.18 from a class with the same number of students which is 27. The scores vary for each class size.

Table 4
The Average Evaluation Result of Teachers Teaching Robotics According to Technological Knowledge

Class	1	2	3	4	5	6	7	8	9	10
Class Size	*11*	*11*	*16*	*27*	*27*	*31*	*41*	*48*	*53*	*60*
Technology Knowledge										
Mean Score ($\bar{x}$	**4.44**	**4.36**	**4.36**	**4.76**	**4.41**	**4.59**	**4.25**	**4.68**	**4.66**	**4.24**
Uses various sites or applications to strengthen student learning	4.33	4.27	4.31	4.76	4.40	4.39	4.12	4.50	4.77	4.11
Presents helpful audio-visual material to support lesson organization and major points	4.56	4.36	4.63	4.81	4.44	4.61	4.23	4.78	4.58	4.25
Uses Quipper as primary means of disseminating information (Ex. Lessons, Announcements, etc.)	4.33	4.36	4.31	4.76	4.44	4.65	4.31	4.83	4.68	4.44
Gives additional learning materials (Ex. Online articles, videos) to broaden students' knowledge	4.44	4.18	4.19	4.62	4.24	4.57	4.15	4.55	4.45	3.93
Demonstrates effective use of technology to promote communication and collaboration in class	4.56	4.64	4.38	4.86	4.52	4.74	4.42	4.75	4.81	4.47

The highest mean score is 4.76 evaluated from 27 students/class size while the lowest mean score was garnered from 60 students/class size with a result of 4.24 mean score. Like the first two categories, the scores are also different and did not show a trend in the results of the mean scores.

Table 5
The Average Evaluation Result of Teachers Teaching Robotics According to Teachers' Attitudes and Behavior

Class	1	2	3	4	5	6	7	8	9	10
Class Size	*11*	*11*	*16*	*27*	*27*	*31*	*41*	*48*	*53*	*60*
Teacher's Attitudes and Behavior										
Mean Score ($\bar{x}$	**4.64**	**4.60**	**4.66**	**4.83**	**4.38**	**4.71**	**4.15**	**4.80**	**4.61**	**4.53**
Makes learning fun	4.56	4.18	4.63	4.71	3.88	4.48	4.08	4.63	4.42	4.16
Is sensitive to the needs of his/her students	4.67	4.55	4.63	4.86	4.36	4.65	4.08	4.68	4.55	4.53
Respects the opinions and decision of students	4.78	4.73	4.63	4.86	4.48	4.87	4.27	4.85	4.74	4.61
Is fair and firm in discipline without being too strict	4.56	4.73	4.69	4.81	4.60	4.74	4.15	4.90	4.71	4.67
Is pleasant, presentable, approachable, and patient	4.67	4.82	4.75	4.90	4.60	4.83	4.15	4.93	4.65	4.67

The lowest mean score of 4.15 is garnered from 41 students/class size, while the highest mean score of 4.83 was given by 27 students/class size. Another high mean score of 4.80 was given by 48 students/class size. Like the earlier graphs, the mean scores did not imply a trend in scores.

Table 6
Class Size Group

Class Size	Code
10 – 19	1
20 – 29	2
30 – 39	3
40 – 49	4
50 – 59	5
60 – 69	6

The class size was distributed to different class codes to generate data with proper coding where 10-19 students are coded as 1, 20-29 students are coded as 2, 30-39 students are coded as 3, and 40-49 students are coded as 4, and 50-59 are coded as 5 and 60-69 are coded as 6.

Table 7
Analysis of Variance (ANOVA) for Content Knowledge Difference between Class Size Groups

ANOVA Source of Variation	d.f.	SS	MS	F	p-value	F crit	Omega Sqr.
Between Groups	5	0.1528	0.0306	0.6422	0.6842	6.2561	-0.2179
Within Groups	4	0.1903	0.0476				
Total	9	0.3431					

Model Summary	
R-squared	0.445 3
Adjusted R-squared	0.000 0
Residual Standard Error	0.218 1
Coefficient of Variation	0.048 1

The p-value is 0.6842 for the content knowledge mean scores, which implies that the null hypothesis is accepted and there is no significant difference between the Class Size Groups in the Content Knowledge Scores of the teacher evaluation.

Table 8
Analysis of Variance (ANOVA) for Pedagogical Knowledge Difference between Class Size Group

ANOVA Source of Variation	d.f.	SS	MS	F	p-value	F crit	Omega Sqr.
Between Groups	5	0.0749	0.0150	0.2992	0.8910	6.2561	-0.5394
Within Groups	4	0.2003	0.0501				
Total	9	0.2752					

Model Summary	
R-squared	0.272 2
Adjusted R-squared	0.000 0
Residual Standard Error	0.223 8
Coefficient of Variation	0.050 7

The results showed no significant difference between the mean scores of the Pedagogical Knowledge evaluation results of the teachers. The p-value is 08910 which proves the null hypothesis - that there is no significant difference between the class size group evaluation on Pedagogical Knowledge.

Table 9

Analysis Of Variance (ANOVA) for Technological Knowledge Difference between Class Size Group

ANOVA

Source of Variation	d.f.	SS	MS	F	p-value	F crit	Omega Sqr.
Between Groups	5	0.1505	0.0301	0.7621	0.6209	6.2561	-0.1350
Within Groups	4	0.1580	0.0395				
Total	9	0.3085					

Model Summary

R-squared	0.487 9
Adjusted R-squared	0.000 0
Residual Standard Error	0.198 7
Coefficient of Variation	0.044 4

Like the results on Pedagogical Knowledge and Content Knowledge, the p-value of 0.6209 is stating that there is no significant difference between the teacher evaluation mean scores between the class size groups.

Table 10

Analysis Of Variance (ANOVA) for Teacher's Attitudes and Behavior Difference between Class Size Group

ANOVA

Source of Variation	d.f.	SS	MS	F	p-value	F crit	Omega Sqr.
Between Groups	5	0.0509	0.0102	0.1296	0.9771	6.2561	-0.7706
Within Groups	4	0.3144	0.0786				
Total	9	0.3653					

Model Summary

R-squared	0.139 4
Adjusted R-squared	0.000 0
Residual Standard Error	0.280 3
Coefficient of Variation	0.061 1

The results on teachers' attitudes and behavior have no significant difference between the results on teacher evaluation based on class sizes. The p-value is 0.9771 which indicates that the null hypothesis is accepted.

Discussion

With the figures laid out in the previous section, here are the further discussion and interpretations of all the results gathered.

Figure 2

Scatterplot- Teacher's Evaluation Summary Difference Between Class Size Group

Means plot (95% CI)
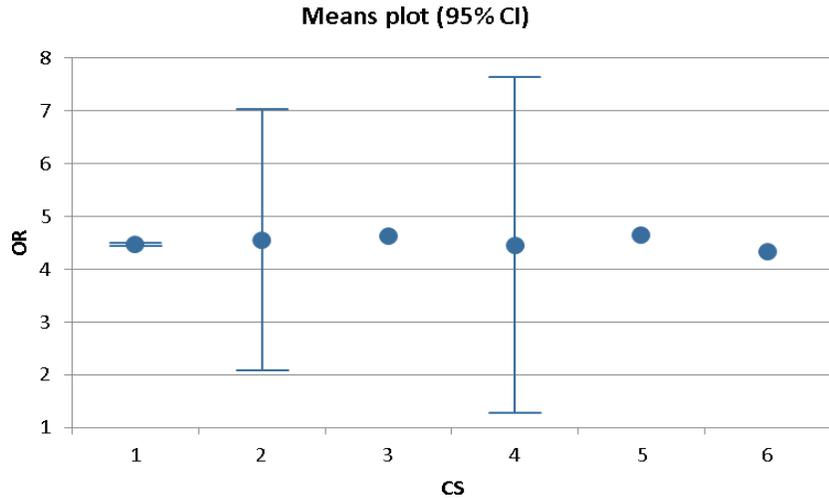
The p-value of the overall results of the teacher's evaluation is 0.8938 which indicates that there is no significant difference between the class sizes group evaluation results. The first research question states that the class sizes in St. Dominic College of Asia Senior High School vary from 11-60 in each class. In research question number two, the results are normally distributed from very satisfactory to excellent as the overall scores range from 4.18 to 4.83 as its mean score for content knowledge, pedagogical knowledge, technological knowledge, and teacher's attitudes and behavior. As a result of scores garnered from the teacher's evaluation, the study's third research question implies that there is no significant difference in the teacher's evaluation scores towards class sizes.

This has supported the study by Solheim and Opheim (2018), that class sizes only have a moderate impact on student learning as the result of this study implies that the scores of the teachers' evaluations did not vary significantly even if the class size changes to a bigger size or a smaller size.

Conclusion

This research determined the variation between students' evaluations of teachers depending on their class size in St. Dominic College of Asia. To identify the variation, the researchers identified the number of each class size, and the result of the evaluation of teachers depending on the content knowledge, pedagogical knowledge, technological knowledge, and teachers' attitudes and behavior. The researchers proposed a null hypothesis that there is no significant difference between the evaluation scores of teachers teaching robotics despite the differences in the class size number. This research is a descriptive-comparative study to identify the variance of the scores depending on the class size number as a main factor. The instrument used to evaluate the teachers is the standard teacher evaluation of the local, St. Dominic College of Asia, as the respondents are also Senior High School students of the same institution to identify the research questions, descriptive statistics and ANOVA are used to see the variety of scores. However, the scores did not vary significantly.

Overall, the data gathered, and the results analyzed in the study indicate that there is no significant difference between the scores of the teachers' evaluation even if the number of students increases or decreases in a class. Most of the students gave a rating of Very Satisfactory to Excellent to teachers handling Robotics, this implies that they are not bothered by the class size number and the teachers still perform inside the classroom for the student's learning. After careful analysis of the data gathered, this study's null hypothesis is accepted as there is no significant difference between class size scores of teachers' evaluations.

However, due to the small sample size and limited subject, the researchers are recommending conducting further research regarding class sizes' impacts on students' learning. Also, the researchers recommend that teacher training is better than reducing class sizes.

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Appendix A
Approved Communication Letter / Permission to Use Data

St.Dominic
COLLEGE OF ASIA
REVOLUTIONIZING EDUCATION

St. Dominic Complex, E. Aguinaldo Highway, City of Bacoor, Cavite, Philippines 4102
0917 625 8222 • 0922 850 9200 • (046) 417 7322 • (046) 417 8161
www.stdominiccollege.edu.ph ❶ stdominiccollege ❷ @sdcapikemen

1BEd-COM-2122-550
May 16, 2022

VALERIE H. INSIGNE
Principal
Basic Education
     THRU: GIORGINA S. BADE
          Guidance Officer
          Basic Education

Dear Ms. Val,

Greetings of Peace!

We are graduate school students from De La Salle University - Dasmariñas and currently enrolled in Research Methods are asking for your permission to conduct our study at St. Dominic College of Asia Senior High School and access certain information from teachers' evaluation, with the instrument used in evaluating, and number of class sizes in order for us to gather data for the research entitled, "A Descriptive Study on Class Size toward Senior High School Students' Evaluation of Teachers" .

This study aims to identify if the evaluation of teachers vary depending on the class size. If approval is granted, we would need the most recent senior high school teachers' evaluation (numerical results) and number of class sizes and sections.

Rest assured that the individual data and results of this study will remain confidential and anonymous. Your approval to conduct the study is greatly appreciated. You may contact us at (+63)915-734-1686 or at (+63)9171424696 or reach us at our email: ktcervantes@sdca.edu.ph or ckt3656@dlsud.edu.ph.

Sincerely,

KAREN T. CERVANTES
Researcher

JOSE MONTO JR.
Researcher

MARITESS T. MAGNO
Researcher

Recommending Approval:

Approved:

GIORGINA S. BADE
Guidance Officer

VALERIE H. INSIGNE
Principal

Appendix B
SDCA Teacher's Evaluation Instrument

St. Dominic Complex, E. Aguinaldo Highway, City of Bacoor, Cavite, Philippines 4102
0998 551 7972 • 0963 169 2014 • (046) 417 7322 • (046) 417 8161
www.stdominiccollege.edu.ph   sdcashs   sdcapikemen

Student Evaluation of Teachers
Second Semester | Academic Year 2021-2022

Name of Teacher:	
Subject:	
Level:	

ITEMS EVALUATED	5	4	3	2	1
CONTENT KNOWLEDGE Knowledge about actual subject matter that is to be learned or taught					
• Relates the lesson to previous and future lessons					
• Provides a course outline every beginning of the quarter					
• Provides effective examples and illustrations to understand the lesson					
• Displays expertise, thorough knowledge, and mastery of the subject matter					
• Integrates Dominican core values of service, dynamism, competence, and accountability					
PEDAGOGICAL KNOWLEDGE Knowledge refers to the methods and processes of teaching and includes knowledge in classroom management, assessment, lesson plan development, and student learning					
• Is creative in developing activities and lessons					
• Presents the lesson in a clear and understandable way					
• Consistently gives tasks after each topic discussed to assess learning					
• Provides feedback on assignments or performance tasks for the students to improve					
• Is clear in giving directions and on explaining what is expected on performance tasks and assignments					
TECHNOLOGY KNOWLEDGE Knowledge about various technologies and its use					
• Uses various sites or applications to strengthen student learning					
• Presents helpful audio-visual material to support lesson organization and major points					
• Uses Quipper as primary means of disseminating information (ex. Lessons, announcements)					
• Gives additional learning materials (ex. Online articles, videos) to broaden students' knowledge					
• Demonstrates effective use of technology to promote communication and collaboration in class					
TEACHER'S ATTITUDES AND BEHAVIOR					
• Makes learning fun					
• Is sensitive to the needs of his/her students					
• Respects the opinions and decisions of students					
• Is fair and firm in discipline without being too strict					
• Is pleasant, presentable, approachable, and patient					
COMMENTS & SUGGESTIONS					

VERBAL DESCRIPTION OF RATING				
Poor	Needs Improvement	Satisfactory	Very Satisfactory	Excellent
1.00 – 1.80	1.81 – 2.60	2.61 – 3.40	3.41 – 4.20	4.21 – 5.00

Appendix C
Coded Data

SUB	CLSZ	CK	PK	TK	TAB	OR
Robotics	60	4.28	4.29	4.24	4.53	4.33
Robotics	53	4.64	4.65	4.66	4.61	4.64
Robotics	48	4.79	4.59	4.68	4.8	4.71
Robotics	41	4.26	4.19	4.25	4.15	4.21
Robotics	31	4.77	4.43	4.59	4.71	4.62
Robotics	27	4.76	4.67	4.76	4.83	4.75
Robotics	27	4.46	4.18	4.41	4.38	4.36
Robotics	16	4.5	4.38	4.36	4.66	4.48
Robotics	11	4.51	4.38	4.36	4.6	4.46
Robotics	11	4.42	4.4	4.44	4.64	4.48

CS	CK	PK	TK	TAB	OR
6	4.28	4.29	4.24	4.53	4.33
5	4.64	4.65	4.66	4.61	4.64
4	4.79	4.59	4.68	4.8	4.71
4	4.26	4.19	4.25	4.15	4.21
3	4.77	4.43	4.59	4.71	4.62
2	4.76	4.67	4.76	4.83	4.75
2	4.46	4.18	4.41	4.38	4.36
1	4.5	4.38	4.36	4.66	4.48
1	4.51	4.38	4.36	4.6	4.46
1	4.42	4.4	4.44	4.64	4.48

Appendix D
Raw Data

CLASS SIZE	CODE
10-19	1
20-29	2
30-39	3
40-49	4
50-59	5
60-69	6

RATING		
Excellent	4.21-5.00	5
Very Satisf	3.41-4.20	4
Satisfactor	2.61-3.40	3
Needs Impr	1.81-2.60	2
Poor	1.00-1.80	1

85

Analysis of Variance (One-Way)

Descriptive Statistics

Groups	Sample size	Sum	Variance	Std Dev	Mean	95% Confidence Interval*	
1	3	13.4300	0.0024	0.0493	4.4767	4.3541	4.5992
2	2	9.2200	0.0450	0.2121	4.6100	2.7041	6.5159
3	1	4.7700	#N/A	#N/A	4.7700	#N/A	#N/A
4	2	9.0500	0.1404	0.3748	4.5250	1.1579	7.8921
5	1	4.6400	#N/A	#N/A	4.6400	#N/A	#N/A
6	1	4.2800	#N/A	#N/A	4.2800	#N/A	#N/A
Total	10		0.0381	0.1952	4.5390		

Confidence intervals are calculated using individual standard deviations.

Means plot (95% CI)

AN0VA

Source of Variation	df	SS	MS	F	p-value	Fcrit	Omega Sqr
Between Groups	5	0.1528	0.0306	0.6422	0.6842	6.2561	-0.2179
Withm Groups	4	0.1903	0.0476				
Total	9	0.3431					

Model summary

A-Squared	0.4453
Adjusted A-Squared	0 0000
Residual standard error	0.2181
Coefficient of Variation	0.0481

Homogeneity of Variances

Hartley Fmax	57.7192 p-va!ue	0.2085
Cochran C	0.7475 p-value	0.1689
Bartlett's Chi-square (d. f. = 5)	3.5778 p-value	0.5100
Levene's F (Based on mean)	213.9702 p-value	8.5758E-5
Brown-Forsythe (Based on median)	35 3872 p-value	0 0029

Analysis of Variance (One-Wayl

Descriptive Statistics

Groups		Sample size	Sum	Variance	Std Dev	Mean	,5% Confidence Interval'	
	1	3	13.1600	0.0001	0.0115	4.3867	4.3580	4.4154
	2	2	8.8500	0.1200	0.3465	4.4250	1.3120	7.5380
	3	1	4.4300	#N/A	#N/A	4.4300	#N/A	#N/A
	4	2	8.7800	0.0800	0.2828	4.3900	1.8488	6.9312
	5	1	4.6500	#N/A	#N/A	4.6500	#N/A	#N/A
	6	1	4.2900	#N/A	#N/A	4.2900	#N/A	#N/A
Total		10		0.0306	0.1749	4.4160		

Confidence intervals are calculated using 1nd1v1dual standard deviations

Means plot (95% CI)

ANOVA

Source of Venation	df	SS	MS	F	p-value	F cnt	Omega Sqr
Between Groups	5	0.0749	0.0150	0.2992	0.8910	6.2561	-0.5394
W1th1n Groups	4	0.2003	0.0501				
Total	g	0 2752					

Model summary

A-Squared	0.2722
AdJusted A-Squared	0 0000
Residual standard error	0.2238
Coefficient of Variation	0 0507

Homogeneity of Variances

Hartley Fmax	900.3750	p-value	0.0151
Cochran C	0.5997	p-value	0.3960
Bartlett's Chi-square (df = 5)	7.6468	p-value	0.1034
Levene's F (Based on mean)	5,416.6964	p-value	1.3623E-7

Analysis of Variance (One-Way)

Descriptive Statistics

Groups		Sample s!Ze	Sum	Variance	Std Dev	Maan	,5% Confidence Interval'	
	1	3	13.1600	0.0021	0.0462	4.3867	4.2719	4.5014
	2	2	9 1700	0.0612	0.2475	4.5850	2.3614	6.8086
	3	1	4.5900	#NIA	#NIA	4.5900	#NIA	#NIA
	4	2	8.9300	0.0925	0.3041	4.4650	1.7332	7.1968
	5	1	4.6600	#NIA	#NIA	4.6600	#NIA	#NIA
	6	1	4.2400	#NIA	#NIA	4.2400	#NIA	#NIA
Total		10		0.0343	0.1851	4.4750		

Confidence intervals are calculated using 1nd1v1dual standard dev1at1ons
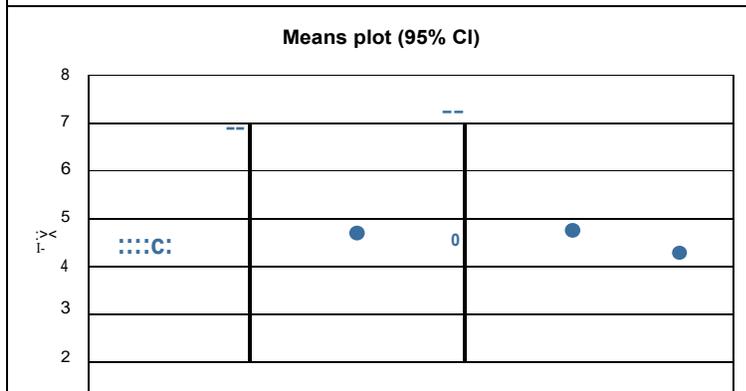
Means plot (95% CI)

ANOVA

Source of Venation	df	SS	MS	F	p-value	Fcrit	Omega Sqr
Between Groups	5	0.1505	0.0301	0.7621	0.6209	6.2561	-0 1350
W1thm Groups	4	0.1580	0.0395				
Total	9	0 3085					

Model summary

R-Squared	0.4879
Adjusted R-Squared	0 0000
Residual standard error	0.1987
Coefficient of Variation	0.0444

Homogeneity of Variances

Hartley Fmax	43.3359 p-value	0.2665
Cochran C	0.5933 p-value	0.4083
Bartlett's Chi-square (d f. = 5)	3.3072 p-value	0.5559
Levene's F (Based on mean)	190.6094 p-value	0.0001
Brown-Forsythe (Based on meo1an)	23 5201 p-value	0 0061

Analysis of Variance (One-Wayl

Descriptive Statistics

Groups	Sample s!Ze	Sum	Vanance	Std Dev	Mean	,5% Confidence Interval'	
	3	13.9000	0.0009	0.0306	4.6333	4.5574	4.7092
2	2	9.2100	0.1012	0.3182	4.6050	1.7461	7.4639
3		4.7100	#N/A	#N/A	4.7100	#N/A	#N/A
4	2	8.9500	0.2113	0.4596	4.4750	0.3455	8.6045
5		4.6100	#N/A	#N/A	4.6100	#N/A	#N/A
6		4.5300	#N/A	#N/A	4.5300	#N/A	#N/A
Total	10		0.0406	0.2015	4.5910		

Confidence Intervals are calculated using 1ndlv!dual standard deviations.
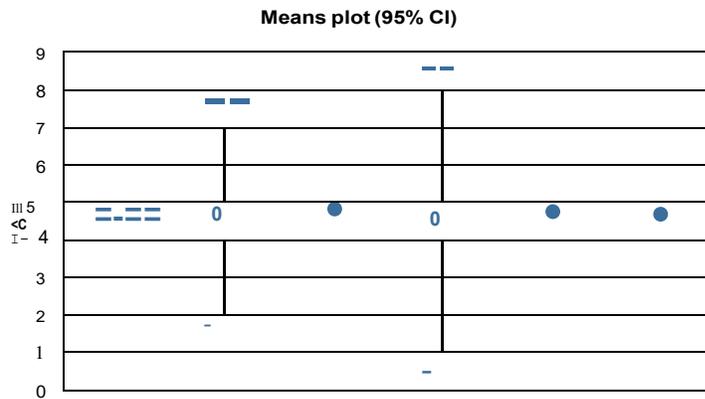
Means plot (95% CI)

ANOVA

Source of Variation	df	SS	MS	F	p-value	Fent	Omega Sqr
Between Groups	5	0.0509	0.0102	0.1296	0.9771	6.2561	-0.7706
Within Groups	4	0.3144	0.0786				
Total	9	0.3653					

Model summary

A-Squared	0.1394
Adjusted A-Squared	0 0000
Residual standard error	0.2803
Coefficient of Variation	0.0611

Homogeneity of Variances

|		
Hartley Fmax	226.3393 p-va!ue	0.0585
Cochran C	0 6740 p-value	0 2691
Bartlett's Chi-square (d f. = 5)	5.5450 p-va!ue	0.2496
Levene's F (Based on mean)	620.6731 p-va!ue	1.0317E-5
Brown-Forsythe (Based on median)	303.6786 p-value	4.2808E-5

Comparisons among groups (Factor 1 - CS)

Scheffe

Group vs. Group (Contrast)	Difference	95% Confidence Interval		Test Statistic	p-value
1 vs 2	0.0283	-1.4030	1.4596	0.1107	1.0000
1 vs 3	-0.0767	-1.8871	1.7338	0.2368	0.9999
1 vs 4	0.1583	-1.2730	1.5896	0.6187	0.9926
1 vs 5	0.0233	-1.7871	1.8338	0.0721	1.0000
1 vs 6	0.1033	-1.7071	1.9138	0.3192	0.9997
')\IC:'	-n 1nc,n	-?n?'i·'	1 R1'i·'	n ,n'iR	∩ aaq7

Analysis of Variance (One-Way)

Descriptive Statistics

Groups	Sample s!Ze	Sum	Vanance	Std Dev	Mean	,5% Confidence Interval'	
	3	13.4200	0.0001	0.0115	4.4733	4.4446	4.5020
2	2	9.1100	0.0761	0.2758	4.5550	2.0773	7.0327
3		4.6200	#N/A	#N/A	4.6200	#N/A	#N/A
4	2	8.9200	0.1250	0.3536	4.4600	1.2834	7.6366
5		4.6400	#N/A	#N/A	4.6400	#N/A	#N/A
6		4.3300	#N/A	#N/A	4.3300	#N/A	#N/A
Total	10		0.0306	0.1749	4.5040		

Confidence intervals are calculated using mdiv1dual standard deviations

Means plot (95% Cl)
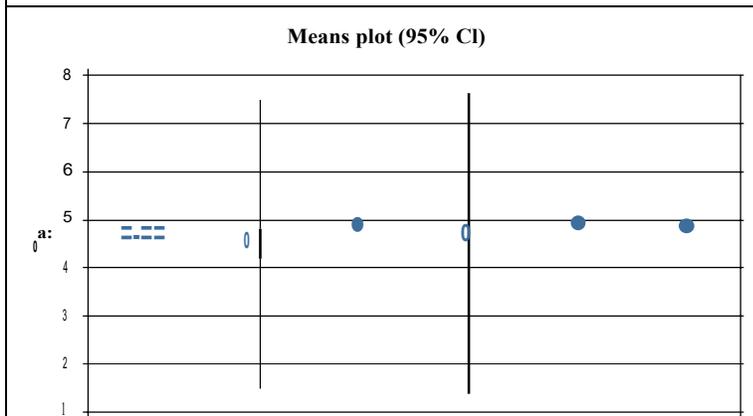
ANOVA

Source of Variation	df	SS	MS	F	p-value	Fcrit	Omega Sqr
Between Groups	5	0.0741	0.0148	0.2946	0.8938	6.2561	-0.5449
Within Groups	4	0.2013	0.0503				
Total	9	0.2754					

Model summary

R-Squared	0.2691
Adjusted R-Squared	0 0000
Residual standard error	0.2243
Coefficient of Variation	0.0498

Homogeneity of Variances

Hartley Fmax	937.5000 p-value	0.0145
Cochran C	0.6213 p-value	0.3563
Bartlett's Chi-square (df = 5)	7.6687 p-value	0.1024
Levene's F (Based on mean)	5,484.1964 p-value	1.3290E-7
Brown-Forsythe (Based on median)	621.6250 p-value	1.0285E-5

Comparisons among groups (Factor 1 - CS)

Scheffe

Group vs. Group (Contrast)	Difference	95% Confidence	Interval	Test Statistic	p-value
1 vs 2	-0.0817	-1.2271	1.0637	0.3988	0.9990
1 vs 3	-0.1467	-1.5955	1.3022	0.5662	0.9950
1 vs 4	0.0133	-1.1321	1.1587	0.0651	1.0000
1 vs 5	-0.1667	-1.6155	1.2822	0.6434	0.9912
1 vs 6	01433	-1.3055	1.5922	0.5533	0.9955
'}\I.:	_n ne;,;n	-1 Rn17	1 Li.717	n ?0,RR	n oooo