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Research Paper

Effectiveness of Interactive Classroom Tool: A Quasi-Experiment in Assessing Students' Engagement and Performance in Mathematics 10 using ClassPoint

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Abstract

Concerns about students' math skills have long existed on a global scale, the Philippines performed "significantly low" compared to all other participating countries in different achievement assessments. In addition, many students are showing signs of growing disengagement, particularly in mathematics. This is a significant matter since students' success and performance in mathematics may be at risk because of their lack of engagement. This study aimed to determine the effectiveness of the ClassPoint, an Interactive Classroom Tool, in enhancing students' engagement and performance in mathematics in face-to-face classes. The researcher utilized a quantitative quasi-experimental design, with 60 students as participants, covering the second quarter of Most Essential Learning Skills of Mathematics 10. Independent and Paired Samples t-test was employed to determine significant differences between formative test, post-test, and student engagement mean responses. The results showed that the students in the Experimental group who used the Interactive Classroom Tool performed better than the Comparison group who did not. The Experimental group showed a significant improvement in their performance, reaching a mastery level of 78% MPS, and a highly significant difference between the Comparison group in the independent t-test result. In addition, a paired t-test revealed that the interactive classroom tool considerably increased student engagement, as indicated by the significant difference in engagement scores before and after the Interactive Classroom Tool was implemented. The study suggests that instructors may use Interactive Classroom Tool or ClassPoint as instructional materials to increase student participation and performance.

Keywords: Interactive Classroom tool, Student Engagement, Mathematics, Student's Performance, Quasi-Experiment, ClassPoint

INTRODUCTION

Mathematical proficiency among students has long been a concern on the international stage. According to the 2018 Program for International Student Assessment (PISA), the Philippines scored 353 in mathematics, compared to the average of 489 in the Organization for Economic Co-operation and Development (OECD) countries (OECD, 2020). This is the second-lowest score among OECD countries. In addition, the 2019 Trends in International Mathematics and Science Survey (TIMSS) revealed that, with a score of 297, the Philippines performed "significantly" worse than all other countries participating in mathematics and science assessments. Maamin et al. (2017) identify demographics, gender, attitude, knowledge, and student engagement as factors influencing mathematical achievement. According to a study (Lee, 2014), student engagement is a complex structure frequently correlated with academic success predictions.

When students actively and ardently engage in their studies, teachers experience complete fulfillment. Teachers feel successful when they observe students participating in the teaching-learning process. Students' engagement is vital to academic achievement (Panhwar & Bell, 2022). The government-mandated K-12 curriculum in public schools centered on the students rather than the teachers. Students are encouraged to learn what is necessary. Lawmakers believe that students' participation can produce desirable outcomes because they can look into and discover, which

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fosters excellence. Teachers are facilitators of the learning process; the primary objective is to increase student participation and identify their strengths.

However, physical interaction between students and teachers was hindered by the COVID-19 pandemic. Schools were closed, and each classroom's teachings were postponed. The education sector proposed adopting distance education to continue students' education. The academic performance of students is negatively affected by the abrupt transition to online classes and modular distance learning, according to a growing body of research (Bird et al., 2021), and based on their studies, experimental and quasi-experimental studies demonstrated that students in online classes had lower test scores. In addition, modalities of student engagement involving face-to-face components, such as collaborative learning and teacher-student interaction, have declined significantly (Weissman, 2022). Their lack of engagement may compromise students' mathematics achievement and performance. Unfortunately, there are still limited discussions on mathematics student performance and engagement in the pandemic recovery. Engagement in learning mathematics has become the norm for future generations, restoring schools. Teachers utilize web-based student response systems like interactive classroom tools to engage pupils.

Teaching strategies must be optimized due to the accelerated integration of education and information technology in the digital age. Interactive Classroom Tool (also called classroom-response systems) is one technological tool teachers can use to improve classroom communication and interaction (Terreri & Simons, 2005; Eastman, 2007). Most interactive tools only allow multiple-choice responses. Students may enter quantitative or written responses. However, mathematical formulas and diagrams are beyond these systems. With sketching capabilities and different functions, the ClassPoint allows real-time interaction between teachers and students. The study of Abdelrady & Akram (2022) provides empirical proof for this assertion; incorporating ClassPoint tool activities into the English as a foreign language (EFL) learning environment considerably boosts students' e-learning satisfaction compared to students who did not use ClassPoint. However, few studies discuss the effectiveness of the tool on students' performance and engagement in Mathematics. Indeed, Classpoint's user-friendly interface and innovative features have propelled its popularity in the Philippines. It has revolutionized the way that instructors conduct classes by providing a platform for interactive learning. Classpoint facilitates the creation and distribution of student presentations, examinations, and other educational materials by teachers. The platform also facilitates real-time collaboration, which makes it simpler for students to work on group projects together. In addition, the gamification features of Classpoint have made learning more interesting and enjoyable for students. Analytics and reporting tools it has also aided instructors in keeping track of their student's progress. Its affordability makes it accessible to institutions with limited budgets, contributing to its popularity. Overall, Classpoint has revolutionized the education system in the Philippines by introducing a contemporary and efficient method of teaching and learning. This study sought to ascertain the effectiveness of ClassPoint, an Interactive Classroom Tool, in enhancing students' engagement and performance in mathematics in traditional classrooms in the post-pandemic.

LITERATURE REVIEW

Student Performance and Engagement in Mathematics Post-Pandemic

The COVID-19 pandemic has rocked the education system. Modular learning during the COVID-19 pandemic has impacted educational systems, especially mathematics. Different scenarios affect student motivation, interests/attitudes, anxiety, and achievement. COVID-19 would adversely affect student performance in the 2020 Grade 12 National Mathematics, Science, Design, and Engineering Examinations. The study's findings revealed that national tests and the passing rate of secondary school students would predict to fall given the abrupt disruption of the academic calendar caused by the early, untimely closure of all schools if the COVID-19 outbreak in a short period is controlled (Sintema, 2020). Undeniably, the COVID-19 pandemic has profoundly impacted education, particularly for students from low-income families.

The pandemic limits teachers and parents in providing students with the necessary learning opportunities. COVID-19 regulations in schools around the world severely limit student peer support. According to Moliner and Alegre (2022), COVID-19 restrictions decreased students' mathematics achievement. In this regard, several researchers in this field contend that direct support without restrictions during the pre-COVID-19 period generates higher accomplishment than online or in-person with restrictions. In connection with this study, Mohan et al. (2021) found that discriminatory learning losses during distance learning are likely to affect students' educational pathways and later life due to an overall decrease in student engagement during school closures. From this perspective, student engagement in mathematics lessons concerns many researchers. Many students show growing disengagement, particularly in mathematics, during the pandemic. It is a significant matter since students' success and performance in mathematics may be at risk because of their lack of engagement (Cevikbas, 2022). According to school authorities, many students have become more docile after many months of distance learning, have a weakened sense of social connection, and are alienated from their academics. The EdWeek Research Center (2021) surveyed students and teachers and found that student engagement and determination were substantially lower than before the pandemic (Karlson, 2021).

Furthermore, Lei et al. (2018) discovered a moderately significant positive relationship between student engagement and school performance. Studies of behavioral, emotional, and cognitive involvement categories revealed that nearly all were positively connected with students' academic achievement. In their study, Maamin et al. (2021) confirmed a link between student engagement and mathematics achievement; specifically, behavioral engagement, affective engagement, and mathematical achievement are significantly positively correlated, with affective engagement as the primary predictor. Students' engagement in mathematics is crucial to improving mathematics learning and teaching effectiveness.

As the world emerges slowly from the pandemic, many wonder how it will affect students' Mathematics performance and engagement. As a result, it will be essential for educators to identify students' performance and provide them with individualized assistance to prevent them from falling further behind. After the pandemic, there is still ample space for studying students' mathematics performance and classroom engagement. Effective collaboration and optimal utilization of all available resources can guarantee that each student has equal opportunities to achieve success and reach their maximum potential, regardless of any hindrances.

“Interactive Classroom Tools – ClassPoint”

Fortunately, innovative educators from all around our nation have produced a wide range of teaching resources. Many schools have implemented new technologies and resources that facilitate interactive and engaging math education. Nevertheless, it is essential to recognize that some pupils may have fallen behind during the pandemic due to a lack of access to technology or other resources.

Joshi et al. (2017) indicate that ICT helps mathematics teachers improve teaching and learning practices, such as lesson planning, pedagogical abilities, and knowledge updating. Undeniably, ICT has highly beneficial to students to stimulate learning and engagement in their mathematical capabilities. ICT increases student performance, according to Liburd and Jen (2021). In their study, Students using technology displayed a higher degree of conceptual knowledge than those taught using the traditional method.

According to Patten (2022), Interactive classroom tools are a type of educational technology (EdTech) that enables students to observe and interact with the lesson content. Over the past years, different Interactive Classroom Tools such as Kahoot!, Quizzes, Mentimeter, and Nearpod have been developed as supplemental instructional material, enabling innovative instruction. To improve students' interest, engagement, and learning, it is possible to employ students' cell phones, tablets, or laptops in addition to teachers' laptops connected to a projector and wireless network access (Chaiyo & Nokham, 2017). Chaiyo and Nokham (2017) explored how using Kahoot, Quizizz, and Google Forms in the classroom affected students' perceptions of focus, engagement, enjoyment, learning, motivation, and satisfaction. The results reveal that the students learned new things by taking Google Forms, Kahoot, and Quizizz quizzes. On the other hand, concentration, participation, enjoyment, motivation, and satisfaction levels vary greatly. Most student response systems only allow multiple-choice responses. Sometimes students can write or enter numbers. These systems cannot handle mathematical formulas and graphs. In that case, McLoone et al. (2017) observed that students are generally optimistic about using UniDoodle, a classroom tool with sketching capability. UniDoodle keeps pupils active in class, and over 90% of students find it entertaining. As expected, 93% of students said anonymity made them more likely to answer questions. Students also believed the learning outcomes benefited them and their professors. The majority said the app helped the speaker identify the problem and that the feedback after answering the question improved their understanding. Since Unidoodle differs from PowerPoint, it is hard for teachers to transition between the two. Unidoodle may only work on some devices and operating systems, limiting student access. With the same sketching features, ClassPoint allows teachers and students to communicate in real-time. ClassPoint allows teachers to quickly add interactive quizzes to their Microsoft PowerPoint presentations and ask questions without switching programs. According to Bong and Chatterjee (2022), over 80% of students thought ClassPoint was an excellent platform for encouraging classroom engagement. Because ClassPoint fosters student participation in online and in-person sessions, teachers and students like it. ClassPoint tool activities in the English as a foreign language (EFL) learning environment increase students' e-learning satisfaction, according to Abdelrady & Akram (2022). Integrating the ClassPoint tool in all sorts of language learning at all educational levels improves students' learning experiences by sparking their interest. However, since ClassPoint was only developed in 2015, there is a need for more evidence of its effectiveness in engaging students, specifically in Mathematics. In this instance, the researcher would like to investigate how useful it is as a tool for performance and engagement in mathematics throughout this post-pandemic period.

RESEARCH METHOD

Research Design

The research design was a quantitative research design using quasi-experimental research. According to Yazon et al. (2019), experimental design describes what will be when variables are carefully controlled or manipulated. This study used a pretest-posttest non-equivalent group design with the Experimental and the Comparison groups. The Experimental group received a pretest, treatment, and posttest, whereas the Comparison group received a pretest and posttest. With this strategy, both groups were compared by choosing and assigning for convenience.

The researcher used Experimental and Comparative groups. The Experimental group consisted of the class treated with ClassPoint, an Interactive Classroom Tool, and the Comparison group used regular PowerPoint and traditional discussion.

Conceptual Framework

The research paradigm in Figure 1 presents the Independent Variable (IV) and Dependent Variable (DV). The Instructional Material, which is the adopted interactive Classroom Tool for the Experimental Group, and the Traditional method with Comparison group are included as the Independent Variable. The Dependent Variables of the study, on the other hand, are students' mathematics performance (pretest, formative test, and posttest) and their level of engagement.

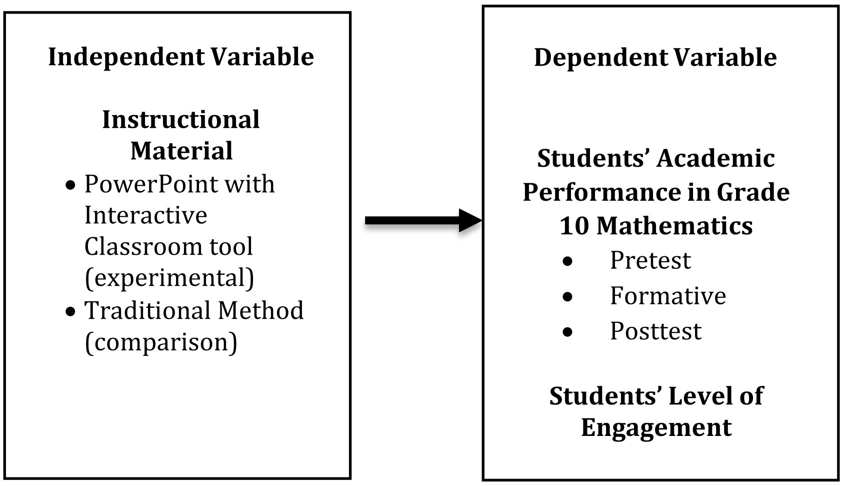

Figure 1. Research Paradigm of the Study

Understanding how instructional materials are related to academic performance and engagement is crucial to Mathematics Learning.

Figure 1 shows the independent variables, including the Instructional Material, Powerpoint with Interactive Classroom tool, and Traditional Method, and how they can be related to dependent variables of academic performance and Engagement in Mathematics.

Participants of the Study

The study's participants were divided into two groups: Comparison and Experimental. They were Grade 10 students from Kapayapaan Integrated School in the Division of Calamba City, Laguna, Philippines. The researcher used a purposive sampling strategy by identifying two sections from fifteen sections in the Grade 10 pupils based on the Mean Percentage Score (MPS). Those two sections are selected due to the same range of MPS in the first quarter exam, and each section has 43 pupils. The researcher utilized the Match Pairing Sampling technique to determine the participants in the study by using the pretest scores. These sections are included in the official classes handled by the researcher.

Table 1. Participants of the Study

Group	N	Sample Size	Blind Participants
Comparison Group	43	30	13
Experimental Group	43	30	13
Total	86	60	26

As shown in Table 1, participants in the study included a sample size drawn from the two sections of Grade 10 at Kapayapaan Integrated School. The inclusive criteria of the respondent in the study have the same score in the pretest both in the comparison & experimental group using the Match Pairing technique. Sixty eligible/ qualified respondents are involved in this study (Comparison & Experimental Group). The Comparison group employed the traditional method and standard PowerPoint. The Experimental group utilized interactive classroom technology during the entire quarter. Those who were not qualified were blind respondents.

Research Instrument

The researcher administered a pretest, formative tests, and a posttest to assess ClassPoint's effectiveness as an interactive classroom tool. Both groups pretested before the experiment and took formative assessments after each lesson or week. The quarter ended with a posttest after using the Interactive Classroom Tool. This study's pretest/posttest was based on Grade 10 Mathematics' second quarter MELCS. ILLESES et al. (2020)'s Learning Activity Sheet Mathematics10 is used for formative assessments by the Curriculum and Learning Management Division (CLMD).

The 40-item pretest and posttest were validated by the mathematics head teacher, master teachers, and language teachers. The researcher used Oducado's (2020) survey questionnaire validator rating scale to validate the test's definition, content, and formative test. This survey's statements are based on Good and Scates' (1972) survey questionnaire assessment guidelines, Polit and Beck's (2004; 2006) definition and content validity criteria, and Chavez and Canino's (2005) Cultural Equivalency Model for Translating and Adapting Instruments. It considers Johnson's (2013) face validation definition. The study's measures achieved a mean acceptance of 4.92, indicating that their objectives, content, and language are well-accepted. After validating and modifying test questions, the researcher conducted pilot testing to guarantee reliability. Twenty Grade 11 students from Kapayapaan Integrated School's four strands participated in the pilot testing. The instrument's Cronbach's alpha is 0.761, which meets George and Mallery's (2003) general rule of thumb (Gleim & Gliem, 2003). Cronbach's alpha measures internal consistency, or how closely related items are, and measures scale reliability.

The Comparison group used PowerPoint and traditional class activities, while the Experimental group used a PowerPoint with ClassPoint integrated activities like multiple choice, word cloud, short questions, and slide drawing.

The Experimental group took a Likert scale survey to assess student engagement before and after using interactive classroom technology. The Classroom Engagement Inventory Questionnaire, adapted from Wang et al. (2014), measured student participation in class and had a McDonald omega of 0.90 for affective engagement, 0.82 for behavioral engagement, 0.82 for behavioral engagement-compliance, 0.82 for behavioral engagement-effective class participation, 0.88 for cognitive engagement, and 0.82 for disengagement, indicating good internal consistency (Zhang & Yuan, 2016).

Data Collection

The research occurred in the second quarter of the 2022-2023 academic year. The researcher first emailed Inknoe, the software company that created ClassPoint, for permission to use it as the Interactive Classroom Tool. ClassPoint Philippine Customer Success Manager granted the research by email. The researcher used parental and institutional informed consent ethically. The researcher requested permission from DepEd Calamba City's Division Office. The researcher then requested permission from the school's principal to perform the study. Since the study involved students' participation, the researcher sought approval from their parents and legal guardian through a letter. Finally, the researcher gave the study's participants the data collection tasks.

Comparison and Experimental groups had pretests, formative assessments, and posttests. Each group took a math pretest before using ClassPoint. The pretest questionnaire was provided before the second quarter began in a regular school calendar. The pretest score compared both groups' beginning capabilities before treatment. It is also used as match pairing for determining the specific participants of the study.

Following the pretest, ClassPoint was introduced to the Experimental group. In other words, the first three months of the academic year were conducted traditionally, while the second three months of the academic year were supported by the Interactive Classroom Tool.

The Experimental group was given a questionnaire to assess the level of engagement with the classroom before implementing the interactive tool ClassPoint. The researchers made every effort to ensure that no part of this study was abusive or hurtful to the participants, including the students. Responses from students were entirely anonymous. The instructor could see they turned in the survey but could not distinguish between the participants' responses. This way, it was accomplished by ensuring the survey did not record the precise responses of any students.

During the experimental study, each week, a formative test was conducted in both groups using paper and pencil tests. Lastly, a posttest and survey questionnaire on student engagement was administered at the end of the second quarter.

Statistical Treatment of Data

After tallying, tabulating, and editing the data, the Interactive Classroom Tool's effect on student engagement and mathematics performance was assessed. The study employed the following statistical treatment.

Pretest, formative, and posttest scores were described by mean and standard deviation. The weighted mean and standard deviation showed student engagement. The researcher used the independent samples t-test to compare the post-test mean scores of the Comparison and Experimental groups. The researcher used a paired sample t-test to evaluate the Engagement of the Experimental group before and after introducing the Interactive Classroom Tool. Cohen's d was used to validate the t-test results. Cohen's d is a good effect size for comparing the mean test scores of the Experimental and Comparison groups.

FINDINGS AND DISCUSSION

The results, analysis, and evaluation of the data collected from 60 participants at the Junior High School of Kapayapaan Integrated School in Canlubang, Calamba City, are presented in this section.

Table 2. Level of engagement in mathematics among students from the experimental group before the experimentation period

Indicative Statement	Mean	Standard Deviation	Descriptive Interpretation
Affective Engagement	5.28	0.76	High
Behavioral Engagement	5.30	0.88	High
Behavioral Engagement–Effortful Class Participation	5.08	0.59	High
Cognitive Engagement	4.98	0.62	High
Disengagement	4.12	0.84	Moderate
Composite	**5.00**	**0.47**	**High**

Legend: 6.50 – 7.00 = Extremely High; 5.50 – 6.49 = Very High; 4.50 – 5.49 = High; 3.50 – 4.49 = Moderate; 2.50 – 3.49 = Low; 1.50 – 2.49 = Very Low; 1.00 – 1.49 = Extremely Low

Table 2 shows a high mean of 5.28 and a standard deviation of 0.760 for affective involvement. Affective engagement includes students' interest, enjoyment, and love for learning (Ben-Eliyahu et al., 2018; Fredericks & Skinner, 2004).

"Behavioral Engagement" includes time spent on a task, overt attention, classroom engagement, questioning, and task selection (Fredricks et al., 2011; Ben-Eliyahu, 2018). The group had a high mean score of 5.30 and a standard deviation of 0.88 before using the interactive classroom application. The experimental group's behavioral involvement in effortful class participation was high at 5.08 and 0.59.

Purposeful processing, strategies, attention, and metacognition are cognitive engagement. Before using the interactive tool, the group had a high mean of 4.98 and a standard deviation of 0.62. Last, disengagement includes withdrawing from educational activities and being unhappy at school (Steenberghs et al., 2021). Before the tool, the group had a Moderate mean of 4.12 and a standard deviation of 0.84. The Experimental group exhibited High classroom engagement and Moderate disengagement before utilizing ClassPoint. According to the Programme International Student Assessment (PISA), most young people are frightened and nervous about math lessons. Mathematics anxiety interacts with qualities like self-efficacy and motivation, which can both raise and decrease math anxiety. Math anxiety has long-term implications on performance in math settings and inefficient learning, course selection, and even career decisions (Luttenberger et al., 2018).

Table 3. Level of engagement in mathematics among students from the experimental group after the experimentation period

Indicative Statement	Mean	Standard Deviation	Descriptive Interpretation
Affective Engagement	6.53	0.07	Extremely High
Behavioral Engagement	6.51	0.67	Extremely High
Behavioral Engagement–Effortful Class Participation	6.23	0.09	Very High
Cognitive Engagement	6.31	0.07	Very High
Disengagement	2.64	0.21	Low
Composite	5.91	0.28	**Very High**

Legend: 6.50 – 7.00 = Extremely High; 5.50 – 6.49 = Very High; 4.50 – 5.49 = High; 3.50 – 4.49 = Moderate; 2.50 – 3.49 = Low; 1.50 – 2.49 = Very Low; 1.00 – 1.49 = Extremely Low

Table 3 shows students' participation after using the Interactive Classroom Tool. Affective Engagement improved with an Extremely High-level mean of 6.53 and a standard deviation of 0.07. ClassPoint's interactive classroom technology increased students' affective involvement. After the study period, Behavioral Engagement climbed to 6.51 with a standard deviation of 0.67. The Experimental group had a Very High mean of 6.23 and a standard deviation of 0.09 in effortful class participation. Cognitive Engagement rose to a Very High mean of 6.31 and a standard deviation of 0.07. Finally, the group's disengagement levels declined to 2.64 and 0.21.

The Interactive Classroom Tool enhanced students' classroom engagement and reduced disengagement. According to Sun and Hsieh (2018), gamified Classroom Response System (CRS) used for in-class activities that are fun, interactive, competitive, and novel increases students' intrinsic motivation, general engagement, and emotional intelligence. These characteristics improve focused attention and active engagement, affirming this study. Chan et al. (2018) found active collaborative learning influences the association between engagement and student learning outcomes. Interactivity's positive impact on student learning was enhanced by the interactive response tool's high degree of enjoyment.

Table 4. Mathematics Performance Formative test mean scores for the two groups

	Group	Mean	SD	Mean Difference	t-value	Cohen's d (Effect size)
Overall	Experimental	106.50 (High)	9.46	28.53	7.937**	2.05 (Huge)
	Comparison	77.97 (Average)	17.27			

*df = 58; **Significant at .01 level; Cohen's d: Very small (0.01), Small (0.20), Medium (0.50), Large (0.80), Very large (1.20), Huge (2.0)*

Overall, based on the table above, the group exposed to the Interactive Classroom Tool, specifically ClassPoint, has a *High* mean of 106.50 and a standard deviation of 9.46 with an MPS of 85.2%, while the other group has an *Average* mean score of 77.97 with a standard deviation of 17.27 and an MPS of 62.38%. The table also implies that the Experimental group exposed to the Interactive Classroom Tool performed better in all the topics. As presented Table 4, revealed a highly significant difference between several formative test mean scores between the Experimental group and the Comparison group. The table implies that the null hypothesis is rejected and that there is a significant difference between the performance of the participants on formative test mean scores of the Experimental group (Mean=106.50, SD=9.46) and Comparison group (Mean=77.97, SD=17.27), conditions [t-value(58)=7.937, p<0.01]. Furthermore, the two (2) groups have a mean difference of 28.53 supporting this result since the values were apart from each other and by the huge effect size of 2.05. The results of this study are supported by the study of Taylor et al. (2017) that most participants in their study, that interactive tool helps understand the subject matter.

In addition, the study of Outhwaite et al. (2019) in their 12-week experiment also supports the results that revealed in their study that both application implementation methods led to significantly more significant math learning gains than traditional math methods. The findings of Kültür and Kutlu (2021) support the use of the formative test in this study. The results showed that formative assessment practices significantly affected students' perspectives on mathematics and mathematical performance.

Table 5. Mathematics Performance Posttest mean scores for the two groups

Test	Group	Mean	SD	Mean Difference	t -value	Cohen's d (Effect size)
Post test	Experimental	31.30	4.95	8.40	7.367**	1.90 (Very Large)
	Comparison	22.90	3.81			

*df = 58, **Significant at .01 level; Cohen's d: Very small (0.01), Small (0.20), Medium (0.50), Large (0.80), Very large (1.20), Huge (2.0)*

Mean scores, standard deviations, and mean percentage scores (MPS) from the given posttest were used to compare the two groups' performance. As shown in Table 5, the group of students exposed to the Interactive Classroom Tool had a High mean of 31.30 with a standard deviation of 4.95 with an MPS of 78.25%. In contrast, the group that used the traditional approach had an Average mean of 22.90, a standard deviation of 3.81, and an MPS of 57.25%.

The results expressed that the Experimental group reached mastery level on the posttest. In contrast, the Comparison group had an average level which implies that, compared to those who used the traditional method, students who used the interactive classroom tool performed better. Although there is an improvement in the Comparison group's scores in their posttest, it is relatively far from the Experimental group's mean score results. Therefore, it is acceptable to state that the ClassPoint as an Interactive Classroom Tool is beneficial in enhancing students' performance.

As shown in Table 5, it implies that the null hypothesis is rejected and that there is a significant difference between the performance of the participants on posttest mean scores of the Experimental group (Mean=31.30, SD=4.95) and Comparison group (Mean=22.90, SD=3.81), conditions [t-value(58)=7.367, p<0.01]. Furthermore, the two (2) groups have a mean difference of 8.40 and were supported by the Very Large effect size of 1.90.

Correspondingly, the result of the study is supported by the study of Liburd and Jen (2021). It can be claimed that students whose lessons were given using technology displayed a higher degree of conceptual knowledge than those taught using the traditional way. According to the study, the interactive tool assisted teachers in evaluating and obtaining a more accurate image of how well students understood the lecture subjects (feedback). Similarly, the results are likely supported by the study by Zhu and Urbane (2018) in their quasi-experimental pre-post-test intervention, which found that students who used this interactive classroom tool achieved more mathematical knowledge than those who did not.

Table 6. Test of Significant difference in Mathematics performance of the two groups

Group	Test	Mean	SD	Mean Difference	t-value	Cohen's d (Effect size)
Comparison	Posttest	22.90	2.74	10.27	11.580**	3.09 (Huge)
	Pretest	12.63	3.81			
Experimental	Posttest	31.30	2.74	18.67	17.353**	4.67 (Huge)
	Pretest	12.63	4.95			

*df = 29; **Significant at .01 level; Cohen's d: Very small (0.01), Small (0.20), Medium (0.50), Large (0.80), Very large (1.20), Huge (2.0)*

The result, as shown in Table 6, the comparison group that used traditional teaching strategies and regular PowerPoint implies that the null hypothesis is rejected and that there is a significant difference between the comparison group pretest mean scores (Mean=12.63, SD=2.74) and posttest mean score(Mean=22.90, SD=3.81), conditions [t-value(29)=11.580, p<0.01]. Furthermore, the Comparison group has a mean difference of 10.27 and a Huge effect size of 3.09.

Tularam (2018) asserts that traditional teaching strategies are generally teacher-directed and urge students to sit still and listen. Indeed, traditional expectations frequently continue with the lecture-based paradigm with some beneficial results, as evidenced by countless previous accomplishments, which cannot be disputed. However, the traditional method does not teach students valuable skills, and some believe that it causes students to forget what they learned after tests.

Furthermore, results imply that the null hypothesis is rejected and indicates that there is a significant difference between the Experimental group pretest mean scores (Mean=12.63, SD=2.74) and posttest mean score (Mean=31.30, SD=4.95), conditions [t-value (29)=17.353, p<0.01]. Furthermore, the experimental group has a mean difference of 18.67 and a Huge effect size of 4.67.

Using the e-learning method enhances motivation, independence, involvement, mathematical concepts, outcomes, and grades, according to a study by Guerrero et al. (2020). The e-learning approach enhances the performance of adult learners doing high school mathematics. Although both groups improved on their posttest, ClassPoint students performed above 75% mastery level compared to traditional method students. ClassPoint increased student performance. The interactive classroom tool has penetrated students' learning more than the traditional way.

The Experimental group outperformed the Comparison group in the post-test and mean difference. The posttest scores show that interactive classroom technology improved students' performance.

Table 7. Test of significant difference between the level of engagement among the students in the experimental group before and after the implementation of the interactive classroom tool

Time Interval	Mean	SD	Mean Difference	t-value	Cohen's d
After	5.91	0.28	0.91	9.375**	2.35 (Huge)
Before	5.00	0.47			

*df = 29;*Significant at .01 level; Cohen's d: Very small (0.01), Small (0.20), Medium (0.50), Large (0.80), Very large (1.20), Huge (2.0)*

The table implies that the null hypothesis is rejected and that there is a significant difference between the students' engagement before (Mean=5 SD=0.47) and after (Mean=5.91, SD=0.28), conditions [t-value(29)=9.375 p<0.01], using the interactive classroom tool. The group engagement had a mean difference of 0.91, supported by a huge effect size of 2.35. It signifies that utilizing an Interactive Classroom Tool ClassPoint helps increase students' classroom engagement.

In connection with the result, it is supported by the study of Meguid and Collins (2017) and Ismaili and Alhosban (2018) that the anonymity provided by a different interactive classroom tool, like ClassPoint, has been recognized as advantageous by numerous studies. The anonymity provided by interactive tools increases students' willingness to participate in the classroom and helps alleviate anxiety. In addition, the Van Daele et al. (2017) study revealed that students experienced increased participation, interaction, and enjoyment and were satisfied with the necessity for possible mobile technology utilization in regular educational practice.

DISCUSSION

The broad adoption of multiple interactive tools in teaching-learning has drawn the interest of researchers due to the importance of student performance and engagement in mathematics. The present study gives essential data on ClassPoint's effects on students' mathematics performance and engagement. The findings indicated that the performance of ClassPoint students was considerably higher than that of non-ClassPoint users and showed that experimental group engagement increased significantly after the experiment. These favorable results support previous interactive tools research like Chaiyo and Nokham (2017) and McLoone et al. (2017), showing that interactive tool engages and motivates students. In addition, Wang and Tahir (2020) also recommended using interactive game-based technological applications like Kahoot to improve students' learning satisfaction and help teachers identify and address learning challenges. Current study supports that ClassPoint with its different features improves student learning, according to studies by Abdelrady & Akram (2022) and Bong and Chatterjee (2022). This indicates that past studies on the utilization of technology in learning are still vital in increasing students' participation and performance and have had the same results even after the pandemic occurs.

The study's findings suggest the importance of programs in improving teachers' access to various technological applications to increase students' engagement, particularly in Mathematics, where anxiety is essential for them not to participate. The government may establish Interactive Classroom tool training and resource centers to train all teachers on new technological infrastructure and help them enhance their technological and pedagogical skills and teaching methods.

CONCLUSIONS

The Covid19 pandemic opened opportunities to reshape the educational system by using different technologies and preparing students for the new normal. The study sought to examine the effectiveness of the ClassPoint on the Mathematics performance and Engagement of Grade 10 students. Results show that experimental students performed better in Mathematics after about eight weeks of ClassPoint intervention than control students, revealing a significant difference. The post-test values are considered high and reached mastery level, which implies that the Interactive Classroom Tool is effective with effect sizes of 1.90 on Posttest results and 2.05 on formative tests, both interpreted as a huge effect in size. These results concluded that utilizing ClassPoint caused a considerable increase in the student's performance in Mathematics which implies the effectiveness of CLassPoint in performance.

Regarding the students' engagement, results indicate a significant difference in the level of students' engagement before and after the treatment with a huge effect size of 2.35, indicating that the treatment or utilizing Interactive Classroom Tool ClassPoint caused a massive improvement in students' engagement level. The result implies that ClassPoint is effective in enhancing student engagement.

The study results imply that using Interactive Classroom Tools, specifically ClassPoint, in the face-to-face setting has increased students' performance and classroom engagement in Mathematics. It signifies that interactive tool has improved students' mathematical skills compared to the traditional approach. With this, the Interactive Classroom tool is proven effective and can improve learners' performances and students' engagement in Mathematics.

The positive result of the study may help teachers who struggle to engage students in class, especially in mathematics. It may give opportunities to teachers to explore approaches and strategies in teaching mathematics to make the lesson more appealing to students and may eventually improve students' performance.

LIMITATIONS & FURTHER RESEARCH

This research aimed to determine the effectiveness of an Interactive Classroom Tool as instructional material in enhancing students' engagement and performance in Mathematics in face-to-face classes. However, this study was limited only to the effectiveness of ClassPoint. The study was conducted during the second quarter of 2022-2023. The second quarter topics covered in the study involve polynomial functions, graphing of polynomial functions, and concepts and theories about circles. The study participants were limited to the Kapayapaan Integrated School students in Calamba City.

Various variables may affect the accuracy and reliability of the data, to begin with, the sample size is small, and as a result, conclusions may not apply to all educational contexts. The researcher believes the outcomes may generalize to Grade 10 Kapayapaan Integrated School Students. Since this utilization of the Interactive Classroom Tool ClassPoint may still not represent all possible situations, the researcher has carefully considered how it was used to stimulate classroom dynamics, students' engagement, motivation, and, ultimately, their learning.

Furthermore, the result of the study creates a comparison with different learning elements, such as engagements while applying the interactive tool. An exploratory study of students' and teachers' perception in using ClassPoint teaching Mathematics. A comparison of students' experiences and challenges with the ClassPoint and other interactive tools arises.

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