DESMOS APPLICATION INTEGRATION ON TEACHING PRACTICES: A STUDY OF J1 HIGH SCHOOL MATHEMATICS TEACHERS

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ABSTRACT

In the digital age, technology significantly enhances mathematics instruction by providing a range of interactive tools that foster greater comprehension, teamwork, and practical application. Through intentional integration, technology enhances learning experiences and makes abstract mathematical concepts more approachable and meaningful by enabling students to participate in dynamic activities, visualize complex concepts through simulations, and collaborate more successfully. The study aimed to determine the relationship between the integration of the Desmos program and the methodologies employed by J1 math teachers. The 54 J1 Math teachers responded to a survey created by the researcher, using a combination of descriptive-correlational and descriptive-comparative research methods. According to the findings, most J1 Mathematics teachers were male, between the ages of 25 and 34, had master's degrees, and had taught for at least five years in the United States; overall, there is a moderate level of integration between Desmos and teaching methods; When teachers were grouped by age, notable variations were found in the degree of technology integration of the Desmos application concerning teaching methods and curriculum content, whereas when teachers were grouped by sex, notable variations were found in the degree of technology integration of the Desmos application about assessment and reporting; When teachers were grouped by age, significant differences in their level of teaching practices were found in terms of instructional efficiency, student engagement, and perceived effectiveness. Furthermore, a robust positive link existed between the teaching techniques of J1 Mathematics educators and the Extent of technology integration, specifically for the Desmos application.

Keywords: *Desmos Application, Instructional Styles, Teaching Practices, Technology Integration, Student Engagement*

INTRODUCTION

Mathematics involves comprehending the world through the examination of quantity, structure, pattern, and change to formulate logical answers that enhance the significance and aesthetics of life (Quinn, 2022). It encompasses tasks including reasoning, argumentation, problem-solving, and mathematical communication. The mathematics taught throughout elementary school is crucial as it imparts essential skills for basic computations used in daily life; conversely, the mathematics learned in middle and high school is less immediately utilized. Mathematics instructs students in critical thinking. It was markedly distinct from other academic subjects, and comprehending it can be profoundly gratifying (Grey, 2022).

In the digital era, technology plays a salient role in facilitating the teaching and learning process. When teachers use technology strategically, they provide students with more significant opportunities to learn mathematics. Incorporating technology in classrooms enables learners to engage with prepared activities, including alternative means of understanding mathematical concepts and processes, to increase powerful collaborative learning experiences, and to provide more accurate simulations of mathematics in real-life situations.

Desmos was the term associated with mathematics instruction utilizing graphing techniques. This STEM-learning platform employs a web and app-based interface that enables students to engage with mathematics, producing visual outcomes through graphs (Edwards, 2023). Among the numerous new technology tools now available to teachers, Desmos has emerged as a powerful platform that enhances mathematical visualization, fosters interactive learning, and supports deeper conceptual understanding. Mostly implemented in secondary schools across the United States, Desmos offers both teachers and students a way to approach mathematical concepts in ways that traditional methods often fail to achieve.

Studies indicate that incorporating educational technology in mathematics instruction enhances student performance, boosts motivation, and fosters the acquisition of 21st-century skills. The effective implementation of tools like Desmos is contingent upon how educators incorporate them into their teaching methodologies. Among these educators, J1 teachers, who are foreign exchange teachers teaching in the United States, bring unique pedagogical perspectives shaped by both their home country training and their adaptation to U.S. classrooms. Their experiences with Desmos offer a valuable lens through which to examine the role of technology in teaching mathematics across diverse contexts (Gulli, 2021).

While various studies have explored the impact of Desmos on student performance and engagement, few have examined the specific experiences of J1 math teachers who use Desmos as part of their instructional strategies. Their perspectives were vital not only in understanding the effectiveness of Desmos in multicultural classrooms but also in evaluating how such tools might be implemented in different educational contexts, particularly upon their return to their home countries.

By exploring the instructional strategies, perceived benefits, and challenges associated with using Desmos, this study aimed to contribute to both educational technology and mathematics education literature. It also provides practical recommendations for enhancing math instruction through technology, not only in the U.S. but also in international contexts, such as the Philippines, should these teachers choose to implement the knowledge they have gained abroad. By doing so, this study highlights the importance of effective technology integration and aims to promote continuous innovation in mathematics education across diverse cultural and educational contexts.

In the first year as a J1 math teacher, navigating technology tools in the U.S. classroom has been both a challenge and a learning curve for the researcher. Tools such as the TI-84 calculator and Desmos were entirely new to me when the researcher arrived. Unlike the traditional methods with which the researcher was accustomed in the Philippines, these digital platforms required not only technical familiarity but also a shift in instructional mindset. At first, integrating these tools into the researcher's teaching felt overwhelming. However, as the researcher gradually explored their functions and saw how they could help students visualize complex concepts, the researcher began to appreciate their value. This journey has deepened my understanding of the role technology plays in fostering engagement and comprehension in math education and has motivated the researcher to study how other J1 teachers adapt to and utilize these tools in their own classrooms.

In recent years, international exchange programs, such as the J-1 Teachers Exchange Program, have welcomed educators from various countries, particularly those from the Philippines, into American classrooms. These J1 Teachers handle the double challenge of readjusting to a new educational system while sustaining effective teaching practices. Most of them were disclosed to instruments and platforms, like Desmos, that may not have been regularly used in their home countries. Their experiences contribute an exclusive viewpoint on the integration of educational technology and extend insights into how such instruments can be adapted and implemented involving multicultural and instructional environments.

This study is grounded in the constructivist theory of social interaction for cognitive development, highlighting the importance of technology and collaboration in enhancing learning outcomes. As J1 high school mathematics teachers integrate Desmos into their teaching, they construct new instructional strategies that align with evolving educational trends and technological advancements. The study quantitatively examined how Desmos impacts their teaching practices, focusing on measurable factors such as instructional efficiency, student engagement, and perceived effectiveness.

This research aims to investigate how J1 Mathematics teachers in the United States utilize Desmos as an instructional tool in high school mathematics classrooms during the 2024-2025 school year. It aims to document their teaching experiences, identify effective strategies, and highlight the impact of Desmos on their teaching practice. Furthermore, this research explores whether these teachers would consider integrating Desmos into their future teaching practices upon returning to their home countries, particularly in the Philippines. Thus, the research aims to bridge a gap in educational studies, encourage cross-cultural knowledge exchange, and provide practical insights for enhancing the use of educational technology in heterogeneous classroom settings.

OBJECTIVES OF THE STUDY

This study quantitatively assessed the relationship between J1 teachers integrating the Desmos application into their instruction and evaluating their perceived effectiveness in improving student learning outcomes. This study aimed to:

1. Determine the demographic profile of the J1 Mathematics Teachers in terms of:
   - 1.1. Age;
   - 1.2. Sex;
   - 1.3. Highest educational attainment;
   - 1.4 Number of years in teaching in the USA
2. Evaluate the extent of Desmos application integration as assessed by J1 Mathematics teachers in terms of:
   - 2.1. Instructional styles;
   - 2.2. School curriculum content; and
   - 2.3. Assessment and reporting
3. Analyze the level of teaching practices of J1 Mathematics teachers in terms of:
   - 3.1. Instructional efficiency;
   - 3.2. Student engagement;
   - 3.3. Perceived effectiveness

METHODOLOGY

Research Design. This study employed a descriptive-comparative and descriptive-correlational research design to examine the relationship between the integration of the Desmos application and the teaching practices of J1 Mathematics teachers. The descriptive-correlational research design, as outlined by Bierut (2025), is a research approach that investigates and characterizes the associations and relationships between variables without asserting causal relationships.

Population and Sampling. This study employed a purposive sampling technique to select a representative sample of J1 high school mathematics teachers, ensuring a comprehensive understanding of their experiences with integrating Desmos into mathematics instruction. Since this study focuses exclusively on J1 teachers, the sampling method was designed to capture the perspectives of educators currently teaching high school mathematics in the United States under the J1 visa program.

The population consists of J1 mathematics teachers across various schools in Texas, USA. A stratified sampling method will be used to ensure representation from different school settings, including urban, suburban, and rural areas. Schools will be categorized based on location and technological accessibility, after which a random selection of J1 teachers will be invited to participate.

The study determined the sample size based on the principle of data saturation, continuing data collection and analysis until no new patterns or insights were identified. It is estimated that a sample of 50–100 J1 mathematics teachers will be sufficient to achieve statistical reliability and validity in the findings.

Ethical considerations were rigorously adhered to during the sampling and data collection process. Informed consent will be secured from all participants, ensuring confidentiality and anonymity in the reporting of findings. Participation in the study is voluntary, and individuals may withdraw at any point. This study aims to offer generalizable insights into the effectiveness, challenges, and pedagogical influence of Desmos in high school mathematics classrooms by selecting a diverse yet targeted sample of J1 teachers. The collected data will facilitate a quantitative analysis that guides best practices and identifies potential enhancements in technology-enhanced mathematics instruction.

Respondents of the Study. The respondents of this study were 54 J1 high school mathematics teachers in various schools in the USA. These respondents were purposefully selected for their active use of Desmos, making them ideal participants for analyzing the role of educational technology in enhancing math instruction. Their background as international teachers navigating a new educational system while adapting to digital tools makes their perspectives particularly valuable.

Research Instrument. The researcher utilized a researcher-made questionnaire for this study. First, this study employed questionnaire surveys as its primary data collection tool. By designing and distributing questionnaires, this study was able to collect a large number of data samples to understand the impact of Desmos on the J1 Mathematics teacher in the USA.

Validation of the Research Instrument

The research instrument was composed of the following validation process:

Validation derived from the experts. This refers to the validation of these tools by three experts. They were all from the University of Perpetual Help System-DALTA, who hold doctorate degrees, and reviewed and provided suggestions for improvement. They issued certificates as proof of verification.

Reliability test. Twenty non-responders or those who were not part of the actual study will help with the reliability test. The reliability test, using Cronbach's alpha, was employed in this study since the survey questionnaire was researcher-made. The coefficient of Cronbach's alpha was 97.11%, interpreted as “Excellent”, which made the survey questionnaire a reliable instrument.

Data Gathering Procedure. The researcher-created questionnaire was submitted to research consultants and academic experts, also known as content validators, for review and evaluation. All suggestions were considered for improvement before being administered to the target respondents.

Statistical Treatment of Data. This study used statistical processing. Statistical processing, including weighted averages, standard deviations, and Likert scales and the weighted average.

Ethical Consideration. The University of Perpetual Help System-Institutional Ethics Review Board reviews all research protocols involving human participants and continues its monitoring review until the end of the study. UPHS-IERB Standard Operating Procedure (SOP) and Guidelines ensure the protection of the rights, safety, and well-being of human subjects involved in health-related research and to provide public assurance of that protection. It believes in and adheres to the basic ethical principles – respect for the person and his/her autonomy, beneficence, non-maleficence, and justice (University of Perpetual Help System-Institutional Ethics Review Board [UPHS-IERB], n.d.)

RESULTS AND DISCUSSION

1. Profile of the Respondents

1.1 in terms of Age

Based on the findings, out of the 54 respondents, 26 or 48% were ages 25 to 34 years old; 14 or 26% were ages 35 to 44 years old; and 14 or 26% were ages 45 to 54 years old. It can be observed that the majority of the J1 Math teachers were 25 to 34 years old. This implies that the majority of the J1 Math teachers are relatively young, predominantly within the 25 to 34-year age range, which may suggest a trend of newer or early-career educators in this group.

1.2 in terms of Sex

The findings revealed that out of 54 respondents, 10 or 18% had a bachelor's degree, 30 or 56% had a master's degree, and 14 or 26% had a doctorate. It can be observed that the majority of the J1 teachers had a master's degree. This implies that the majority of the J1 teachers possess a master's degree, indicating a significant level of postgraduate qualification among the educators, which may reflect their advanced expertise and commitment to professional development in their field.

1.3 in terms of Years in Teaching in the USA

The findings showed that out of 54 respondents, 4 or 7% were teaching for less than a year; 14 or 26% were teaching for 1 to 2 years; 12 or 22% were teaching for 3 to 4 years; and 24 or 45% were teaching for 5 years and above. It can be observed that the majority of the J1 Math teachers were teaching for at least 5 years. This implies that most of the J1 Math teachers have substantial teaching experience, with at least five years in the profession, which may contribute to their expertise, confidence, and effectiveness in their teaching roles.

2. Desmos application integration as assessed by J1 Mathematics teachers in terms of instructional styles, school curriculum content, and assessment and reporting

2.1 in terms of Instructional Styles

Table 1
Extent of Desmos Application Integration as Assessed by J1 Mathematics Teachers in terms of Instructional Styles

Indicators	Weighted Mean	Standard Deviation	Verbal Interpretation
1. Using Desmos for visual demonstrations of mathematical concepts during lessons	3.30	0.72	Integrated to a Moderate Extent
2. Incorporating Desmos in interactive problem-solving activities with students	3.22	0.88	Integrated to a Moderate Extent
3. Using Desmos to facilitate student exploration and discovery learning	3.22	0.96	Integrated to a Moderate Extent
4. Employing Desmos for collaborative group work or discussions	3.00	0.99	Integrated to a Moderate Extent
5. Using Desmos as a tool for immediate feedback during instruction	3.22	1.00	Integrated to a Moderate Extent
Overall Weighted Mean	**3.19**	**0.92**	**Integrated to a Moderate Extent**

As shown in Table 1, all indicators were considered to be "Integrated to a Moderate Extent". The indicator "Using Desmos for visual demonstrations of mathematical concepts during lessons" obtained the highest mean of 3.30 (SD = 0.72). Followed by the indicators "Incorporating Desmos in interactive problem-solving activities with students", "Using Desmos to facilitate student exploration and discovery learning", and "Using Desmos as a tool for immediate feedback during instruction", with a mean of 3.22 (SD = 0.88, 0.96, & 1.00) for these indicators. The indicator "Employing Desmos for collaborative group work or discussions” obtained the lowest mean of 3.00 (SD = 0.99).

The overall extent of Desmos application integration, as assessed by J1 Mathematics teachers in terms of instructional styles, was found to be "Integrated to a Moderate Extent" with an overall mean of 3.19 (SD = 0.92). The teachers effectively integrate the Desmos application to allow students to visualize mathematical concepts in a visually pleasing manner. This implies that while J1 Mathematics teachers moderately incorporate Desmos into their instructional styles, they effectively utilize its capabilities to enhance students' understanding of mathematical concepts through visualizations, which can make learning more engaging and meaningful.

The findings mentioned above align with the research conducted by Mediana and Dio (2025), which documented Desmos's adaptability and efficiency in improving conceptual comprehension, student involvement, and academic achievement despite obstacles such as a lack of formal training. Desmos's flexibility and interactivity support conceptual understanding, problem-solving skills, and foster positive attitudes toward math, highlighting its value as an effective educational tool. The studies also emphasize that the successful integration of Desmos depends heavily on teacher creativity and strategic implementation, which are crucial for maximizing its impact on student learning outcomes and ensuring that its potential benefits are fully realized within diverse classroom contexts.

2.2 in terms of School Curriculum Content

As shown in Table 2, the Math teachers responded "Integrated to a Moderate Extent" to all the indicators. The highest-ranked indicator, which was "Using Desmos to illustrate key concepts required by the curriculum standards," obtained a mean of 3.33 (SD = 0.87). The second-ranked indicator, which was "Incorporating Desmos tasks that reinforce the topics covered in the curriculum," obtained a mean of 3.26 (SD = 0.89). The third-ranked indicator, which was "Aligning Desmos activities with the specific learning objectives of the curriculum," obtained a mean of 3.22 (SD = 0.92).

Table 2
Extent of Desmos Application Integration as Assessed by J1 Mathematics Teachers in terms of School Curriculum Content

Indicators	Weighted Mean	Standard Deviation	Verbal Interpretation
1. Aligning Desmos activities with the specific learning objectives of the curriculum	3.22	0.92	Integrated to a Moderate Extent
2. Using Desmos to illustrate key concepts required by the curriculum standards	3.33	0.87	Integrated to a Moderate Extent
3. Incorporating Desmos tasks that reinforce the topics covered in the curriculum	3.26	0.89	Integrated to a Moderate Extent
4. Adapting Desmos materials to fit the pacing and sequence of the curriculum	3.15	1.02	Integrated to a Moderate Extent
5. Integrating Desmos to support curriculum-based projects or assignments	3.15	0.86	Integrated to a Moderate Extent
Overall Weighted Mean	**3.22**	**0.91**	**Integrated to a Moderate Extent**

The remaining indicators, "Adapting Desmos materials to fit the pacing and sequence of the curriculum” and “Integrating Desmos to support curriculum-based projects or assignments," obtained a mean of 3.15 (SD = 1.02) and 0.86, respectively.

The overall extent of Desmos application integration, as assessed by J1 Mathematics teachers in terms of school curriculum content, was found to be "Integrated to a Moderate Extent" with an overall mean of 3.22 (SD = 0.91). The integration of the Desmos application helps the Math teachers illustrate the concepts required in the curriculum. This implies that while Desmos is significantly utilized to support the teaching of curriculum concepts, there is still room for increased integration to further enhance its effectiveness; the moderate level suggests potential for more comprehensive adoption to improve student understanding and engagement in mathematics lessons.

The results, as mentioned above, were corroborated by Chorney's (2022) study, which emphasizes the necessity for educators to autonomously integrate Desmos into their instruction. The study highlights Desmos as a sophisticated graphing tool that surpasses traditional calculators by facilitating networked, interactive tasks. This knowledge arises from practical experience, demonstrating educators' ability to design and modify technological tools to align with specific learning objectives outlined in the curriculum.

2.3 In terms of Assessment and Reporting of Assessment and Reporting

Table 3
Extent of Desmos Application Integration as Assessed by J1 Mathematics Teachers in terms of Assessment and Reporting

Indicators	Weighted Mean	Standard Deviation	Verbal Interpretation
1. Using Desmos to create formative assessments or quizzes	2.56	1.11	Integrated to a Moderate Extent
2. Utilizing Desmos to collect and analyze student responses during assessments	2.56	0.88	Integrated to a Moderate Extent
3. Employing Desmos tools to track individual student progress over time	2.56	1.04	Integrated to a Moderate Extent
4. Using Desmos to generate reports or visual summaries of student learning outcomes	2.52	1.08	Integrated to a Moderate Extent
5. Integrating Desmos data to inform instructional adjustments and planning	2.67	1.13	Integrated to a Moderate Extent
Overall Weighted Mean	**2.57**	**1.05**	**Integrated to a Moderate Extent**

Table 3 shows that the teachers responded “Integrated to a Moderate Extent” to all the indicators. The indicator “Integrating Desmos data to inform instructional adjustments and planning" obtained the highest mean of 2.67 (SD = 1.13). The next three indicators, "Utilizing Desmos to collect and analyze student responses during assessments”, “Employing Desmos tools to track individual student progress over time”, and “Using Desmos to generate reports or visual summaries of student learning outcomes" all obtained a mean of 2.56 (SD = 1.11, 0.88, & 1.04). The lowest-ranking indicator, "Using Desmos to generate reports or visual summaries of student learning outcomes," obtained a mean of 3.52 (SD = 1.08).

The overall extent of Desmos application integration, as assessed by J1 Mathematics teachers in terms of assessment and reporting, was found to be "Integrated to a Moderate Extent" with an overall mean of 2.57 (SD = 1.05). The teachers believed that integrating Desmos data to inform instructional adjustments and planning. This implies that although J1 Mathematics teachers recognize the value of Desmos data for informing instructional adjustments and planning, its integration into assessment and reporting processes remains moderate, indicating a need for greater utilization to optimize teaching strategies and student outcomes.

The results, as mentioned above, correspond with the studies conducted by Machado et al. (2023) and Karindra and Ekawati (2022), which underscore both the advantages and drawbacks of Desmos in educational contexts. These studies acknowledge its potential to promote interactive learning while also highlighting technical challenges, including the need for familiarity with programming languages, difficulties in classroom implementation, assessment methods, and instructional adjustments. The findings highlight the necessity of aligning Desmos with explicit instructional objectives, ensuring its application serves not only aesthetic appeal but also a pedagogical purpose. The ongoing necessity for testing and validating digital materials, such as interactive worksheets and task modules, is highlighted to refine and optimize technology-enhanced instruction. Effective integration demands careful planning, skill development, and continuous evaluation.

3. Level of teaching practices of J1 Mathematics teachers in terms of instructional efficiency, student engagement, and perceived effectiveness

3.1 In terms of Instructional Efficiency

As shown in Table 4, the teachers responded "Moderately Practiced" to all the indicators. The highest rank indicator, "Desmos helps me deliver lessons more clearly and efficiently," obtained a mean of 3.41 (SD = 0.79); followed by the indicator "Desmos allows me to quickly assess student understanding during lessons," having a mean of 3.37 (SD = 0.83).

Table 4
Level of Teaching Practices of J1 Mathematics Teachers in terms of Instructional Efficiency

Indicators	Weighted Mean	Standard Deviation	Verbal Interpretation
1. I effectively manage class time when integrating Desmos into lessons.	3.15	0.86	Moderately Practiced
2. Desmos helps me deliver lessons more clearly and efficiently.	3.41	0.79	Moderately Practiced
3. I can cover more curriculum content using Desmos than without it.	3.00	0.87	Moderately Practiced
4. Using Desmos reduces the time needed to explain complex concepts.	3.33	0.78	Moderately Practiced
5. Desmos allows me to quickly assess student understanding during lessons.	3.37	0.83	Moderately Practiced
Overall Weighted Mean	**3.25**	**0.83**	**Moderately Practiced**

The third in rank indicator, "Using Desmos reduces the time needed to explain complex concepts," obtained a mean of 3.33 (SD = 0.78); followed by the indicator "I effectively manage class time when integrating Desmos into lessons" with a mean of 3.15 (SD = 0.86). The lowest rank indicator, "I can cover more curriculum content using Desmos than without it," obtained a mean of 3.00 (SD = 0.87).

The overall level of teaching practices of J1 Mathematics teachers in terms of instructional efficiency was found to be "Moderately Practiced" with an overall mean of 3.25 (SD = 0.83). Using Desmos applications, teachers can clearly demonstrate lessons with visual and interactive tools, making concepts easier to understand and engaging students more effectively, which leads to more efficient teaching and learning experiences.

The results above were supported by Glaze et al. (2021), in their study that teachers relying solely on intelligent tutoring systems should incorporate additional technologies like graphing calculators, Desmos, and dynamic geometry software, as these tools promote student exploration, enhance understanding through visual and computational activities, and create a more interactive and engaging learning environment.

3.2 in terms of student engagement student

Table 5
Level of Teaching Practices of J1 Mathematics Teachers in terms of Student Engagement

Indicators	Weighted Mean	Standard Deviation	Verbal Interpretation
1. Desmos increases student participation in mathematics lessons.	3.44	0.74	Moderately Practiced
2. Students show greater interest when lessons involve Desmos activities.	2.67	1.13	Moderately Practiced
3. Desmos encourages collaborative learning among students.	3.15	0.86	Moderately Practiced
4. Using Desmos motivates students to explore mathematical concepts independently.	3.41	0.79	Moderately Practiced
5. Desmos supports diverse learning styles and keeps students engaged.	3.00	0.87	Moderately Practiced
Overall Weighted Mean	**3.13**	**0.93**	**Moderately Practiced**

As shown in Table 5, all indicators were considered "Moderately Practiced." The highest rank indicator, "Desmos increases student participation in mathematics lessons," obtained a mean of 3.44 (SD = 0.74); followed by the indicator "Using Desmos motivates students to explore mathematical concepts independently," with a mean of 3.41 (SD = 0.79).

The third in rank indicator, "Desmos encourages collaborative learning among students," obtained a mean of 3.15 (SD = 0.86); followed by the indicator "Desmos supports diverse learning styles and keeps students engaged" with a mean of 3.00 (SD = 0.87). The least in rank indicator, "Students show greater interest when lessons involve Desmos activities," has a mean of 2.67 (SD = 1.13).

The overall level of teaching practices of J1 Mathematics teachers in terms of student engagement was found to be "Moderately Practiced" with an overall mean of 3.13 (SD = 0.93). The Desmos application effectively increases student participation in mathematics lessons by providing an interactive platform that encourages active engagement, exploration, and visual understanding of mathematical concepts. Moreover, by using Desmos, students can actively explore concepts through graphing and interactive tools, which helps them better understand abstract ideas, leading to higher engagement and improved problem-solving skills.

The study by Peni & Dewi (2023) highlights that integrating Desmos into functions classes significantly enhances student engagement, deepens understanding of mathematical concepts, and promotes problem-solving skills, leading to increased enthusiasm and a more enjoyable learning experience. These findings suggest that Desmos serves as a powerful tool to create dynamic, engaging, and curriculum-aligned mathematics lessons, ultimately contributing to more effective instruction and a brighter future for both students and educators.

3.2 in terms of Perceived Effectiveness

Table 6
Level of Teaching Practices of J1 Mathematics Teachers in terms of Perceived Effectiveness

Indicators	Weighted Mean	Standard Deviation	Verbal Interpretation
1. I believe Desmos improves students' mathematical understanding.	3.44	0.74	Moderately Practiced
2. Desmos helps me identify students' strengths and weaknesses more effectively.	3.11	0.84	Moderately Practiced
3. Using Desmos enhances the overall quality of my teaching.	3.41	0.74	Moderately Practiced
4. Students' academic performance has improved since I started using Desmos.	3.37	0.78	Moderately Practiced
5. I am confident that Desmos positively impacts student learning outcomes.	3.48	0.64	Moderately Practiced
Overall Weighted Mean	**3.36**	**0.76**	**Moderately Practiced**

The results from Table 6 revealed that all the indicators were regarded as "Moderately Practiced". The highest rank indicator "I am confident that Desmos positively impacts student learning outcomes" with a mean of 3.48 9SD = 0.64); followed by the indicator "I believe Desmos improves students' mathematical understanding" with a mean of 3.44 (SD = 0.74).

The third in rank indicator, "Using Desmos enhances the overall quality of my teaching," obtained a mean of 3.41 (SD = 0.74); followed by the indicator "Students' academic performance has improved since I started using Desmos," with a mean of 3.376 (SD = 0.78). The lowest-ranked indicator, "Desmos helps me identify students' strengths and weaknesses more effectively," obtained a mean of 3.11 (SD = 0.84).

The overall level of teaching practices of J1 Mathematics teachers in terms of student engagement was found to be "Moderately Practiced" with an overall mean of 3.13 (SD = 0.93). Teachers are confident in Desmos because it provides an interactive and engaging platform that positively impacts student learning by improving comprehension and participation. It enhances mathematical understanding through visualization, enabling a deeper comprehension of complex concepts. By enabling active participation and collaboration, Desmos fosters deeper understanding, which in turn boosts student outcomes, as supported by research on educational technology.

The findings correspond with Hamdi Serin's (2023) study, indicating that the integration of technology in mathematics education, exemplified by the Desmos graphing calculator, possesses significant potential to transform the educational process and improve student performance. Instructors can create customized learning environments that cater to diverse student needs by utilizing interactive tools, instructional software, and online learning platforms. It is imperative to tackle challenges such as the digital divide and to furnish educators with appropriate support and training.

CONCLUSION

Conclusions were highly based on findings of the study, as follows.

1. The J1 Math teachers were relatively young male early-career educators, with a significant level of postgraduate qualification, and with at least five years in the profession in the USA.
2. The J1 Mathematics teachers recognize the value of Desmos data for informing instructional adjustments and planning, which were aligned with the curriculum. Its integration into assessment and reporting processes remains moderate, indicating a need for greater utilization to optimize teaching strategies and student outcomes.
3. Desmos applications helped the teachers to clearly demonstrate lessons with visual and interactive tools, making concepts easier to understand and engaging students more effectively, which leads to more efficient teaching and learning experiences.
4. The Desmos application supports diverse instructional strategies regardless of age, enabling teachers to adapt their approach to effectively meet their students' learning needs and preferences.
5. The J1 Math teachers employ varied strategies or approaches to engage students effectively in the classroom, thereby fostering a dynamic learning environment where students are motivated, participate actively, and develop a deeper understanding of mathematical concepts
6. When technology is more effectively incorporated, teachers tend to adopt more innovative and effective instructional methods; thereby, enhancing student motivation, fostering profound collaboration among peers, and leading to better student performance.
7. The program plan was crafted based on the lowest mean scores relative to technology integration and teaching practices, which allowed better student collaboration and academic performance.

RECOMMENDATION

Based on the conclusions of the study, the following recommendations were forwarded:

1. Students should immerse themselves in the Desmos application to gain a better understanding of mathematical concepts and to improve their overall Math performance, as active engagement with the tool can enhance learning experiences and foster deeper comprehension.
2. Teachers should utilize the Desmos application more frequently to enhance instructional effectiveness, promote interactive learning, and create a more engaging classroom environment that supports student understanding and academic success.
3. School administrators and school heads should promote the integration of technology by providing training and resources for teachers to effectively utilize applications like Desmos, establishing a supportive environment for innovative teaching strategies, and encouraging collaborative efforts to improve student learning outcomes across the school community.
4. The proposed intervention program for Desmos application integration should be implemented to determine its effectiveness across all levels.
5. Similar studies should be conducted to evaluate the effectiveness of Desmos application integration in diverse educational settings, identify best practices, and determine its impact on student learning outcomes, thereby providing evidence-based recommendations for wider adoption and continuous improvement of the program.

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Mark Kenneth Ones is an educator with extensive experience in mathematics instruction and curriculum leadership. He holds a Master of Arts in Education major in Mathematics in University of Perpetual Help Delta System, Las Piñas City Philippines and a Bachelor of Secondary Education major in Mathematics from Rizal Technological University, Madaluyong City Philippines. His teaching career spans over a decade, beginning in the Philippines as a Junior High School Mathematics Teacher at Miraculous Medal School from 2013 to 2015, followed by eight years of service at Manresa School in Parañaque City. In 2023, he transitioned to Beaumont United High School in Texas, USA, where he currently serves as a Mathematics Teacher and Department Head. Throughout his career, he has developed expertise in curriculum planning, instructional design, assessments, data coordination, and the integration of educational technology, including the Desmos Graphing Calculator. Known for his strong analytical skills, effective communication, and ability to thrive in dynamic environments, he leads organizational initiatives, coaches fellow educators, and manages instructional resources to improve teaching and learning. His professional objective centers on leveraging his advanced mathematical and pedagogical knowledge to enhance student outcomes and contribute meaningfully to progressive educational communities.

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