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Sketchnoting: A Pedagogical Tool in the Delivery of Printed Modular Distance Learning

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ABSTRACT

This study investigated the effectiveness of using sketchnoting as a pedagogical tool in the delivery of Printed Modular Distance Learning to Grade 12 students. The study employed a mixed-method research design, with 68 students selected through matched pairing of characteristics and divided into a treatment group and a comparison group. The treatment group received sketchnoting activities, while the comparison group did not. The study measured the effectiveness of the intervention through posttests of the treatment and comparison groups and a post-exposure self-report survey to understand the learning benefits and experiences of the students who were exposed to sketchnoting activities. The results of the study showed that the use of sketchnoting had a statistically and practically significant impact on the study of General Chemistry lessons. The utilization of sketchnoting significantly improved the students' test scores. The students also reported positive experiences and appreciated the learning benefits of using sketchnoting, although there were a few demotivating experiences. The findings of this study support the use of sketchnoting as an effective pedagogical tool in Printed Modular Distance Learning.

INTRODUCTION

The COVID-19 pandemic caused significant disruptions to the educational sector worldwide, and the Department of Education (DepEd) in the Philippines implemented various distance learning modalities to address this problem. Modular Distance Learning (MDL) became the most popular and widely used modality. Modular Distance Learning was a mode of distance learning that employed self-learning modules (SLMs) based on the most essential learning competencies (MELCs) provided by DepEd (Pe Dangle, 2020). Ideally, the modules included sections on motivation and assessment that served as a complete guide for both the teacher's and student's desired competencies. The teachers monitored the learner's progress through home visits (following social distancing protocols) and feedback mechanisms and guided those who needed special attention (Estrada, 2021). However, the pandemic setup of DepEd for its teachers and students presented various challenges. The use of self-learning modules (SLMs) was the primary delivery mode for this type of learning. However, SLMs alone were not sufficient for student learning. Without a knowledgeable person around who could explain confusing or complicated concepts written in the module, the student may not have understood it (Castroverde & Acala, 2021). Moreover, examples were limited, and the modules themselves differed from school to school, leading to a lack of standardization in learning. This lack of standardization could have resulted in a varying level of learning outcomes for students. Sketchnoting is a technique that involves using drawings, text, shapes, and colors to make connections and ideas from books, movies, and lectures evident (Erb, 2012). It can help learners to understand the big picture, key concepts, and

connections between ideas, and to generate content-related questions (Dimeo, 2016). Sketchnoting is a useful tool for strengthening interactions with the material and encouraging learning (Kara & Yildirim, 2020). It allows students to take control of their learning by engaging with the material in a way that is meaningful to them (Paepcke-Hjeltness, 2021). Sketchnoting can also assist with summarizing major concepts and extracting crucial details. Focusing on creating a sketchnote can help students stay engaged with the material and hold their attention for longer periods, making it especially useful for those who struggle with traditional note-taking methods or who have difficulty retaining information from lectures (Gansemer-Topf, 2020). The use of sketchnoting as a pedagogical tool in PMDL can enhance student learning outcomes. Sketchnoting can help students understand and remember concepts better by making connections between ideas and presenting them in a visual format. It provides an opportunity for students to engage with the material actively and take ownership of their learning. By creating a sketchnote, students can personalize their learning experience and make it more meaningful to them (Valeeva, 2022). Teachers find it challenging to evaluate student learning without evidence of learning. Using sketchnoting in PMDL can provide a means of evidence of learning, as students can submit their sketchnote as output. The sketchnote can also serve as a tool for self-assessment, as students can evaluate their understanding of the material based on their sketchnote. Moreover, sketchnoting can help address the limitations of SLMs. With the lack of standardization in learning due to varying modules used, sketchnoting can provide a standardized means of understanding concepts. Students can create sketchnote based on the same concept, allowing for

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a comparison of understanding and identification of common areas of difficulty (Erb, 2012.)

The COVID-19 pandemic has caused significant disruptions in the educational sector, particularly in the Philippines, where Modular Distance Learning is the most popular form of distance learning. While SLMs are the primary delivery mode for PMDL, its limitations present various challenges to student learning outcomes. Sketchnoting is an effective pedagogical tool that can enhance student learning outcomes in PMDL. It allows students to take control of their learning, make connections between ideas, and personalize their learning experience. Using sketchnote as an output can also provide evidence of learning, while the standardization of sketchnote can address the lack of standardization in learning due to varying modules used. By incorporating sketchnoting as a pedagogical tool, PMDL can become more effective in providing quality education to Filipino learners. It is for these reasons that the researcher aimed to determine the effectivity of using sketchnoting as a pedagogical tool in the delivery of Printed Modular Distance Learning (PMDL).

This research aimed to assess the effectiveness of sketchnoting as a pedagogical tool for Grade 12 STEM students in General Chemistry. The study addressed two specific research questions: (1) Can the use of sketchnoting as a teaching tool enhance student performance? (2) What are the learning benefits and experiences that students gain from creating sketchnotes in General Chemistry?

METHODOLOGY

This study utilized a mixed-method research design with a concurrent triangulation design approach to investigate the effectiveness of using sketchnoting as a pedagogical tool in Printed Modular Distance Learning. The research design included both quantitative and qualitative research strands. For the quantitative strand, a pretest-posttest design was used, where 30-item multiple-choice questions related to General Chemistry were used to assess the students' prior knowledge and learning outcomes. The test-retest reliability test was conducted to ensure the reliability of the test. The treatment and comparison groups were matched based on their academic performance, gender composition, number of students, teacher handling the subject, academic course topic, and academic schedule. For the qualitative strand, a self-report survey questionnaire was used to understand the students' perceptions of the learning benefits and experiences of using sketchnoting as a pedagogical tool. The survey included two open-ended questions to explore the students' perspectives on the continued success of using sketchnoting in Printed Modular Distance Learning. Sixty-eight Grade 12 students participated in the study, with 34 students in each group. The experimental group was asked to create sketchnotes after each module, while the comparison group only completed the activities stated in the Self-learning modules. The students were given a short online orientation on how to create sketchnotes

to familiarize themselves with the pedagogical tool. At the end of each module, the experimental group created sketchnotes, while the comparison group completed the activities. The students were provided with marking rubrics to understand the content and grading system of their assigned tasks. The pretest-posttest results were analyzed using mean percentage and standard deviation, while a paired sample t-test was employed to determine the effectiveness of sketchnoting in increasing student outcomes. Frequency count was used to tally the students' perceptions of the learning benefits and experiences of using sketchnoting. Overall, the study utilized a rigorous research design to investigate the effectiveness and learning benefits of using sketchnoting in Printed Modular Distance Learning. The findings can provide insights for educators and students who are interested in using sketchnoting as a pedagogical tool in their learning environments.

RESULTS AND DISCUSSION

The first research question posed was whether the use of sketchnoting as a pedagogical tool can lead to an improvement in test scores. The mean percentage scores of the treatment group and the comparison group were 11.38 and 11.29, respectively. These scores indicate the average performance of the two groups on the pretest. The standard deviation (SD) for the treatment group was 5.11, which means that the scores were more spread out or variable compared to the comparison group, which had a smaller SD of 2.27. However, it is worth noting that the mean scores for both groups were quite low, and neither group performed significantly better than the other. This suggests that neither group was able to demonstrate a clear advantage over the other in terms of their pretest performance.

The mean percentage posttest score for the treatment group was 21.03, with a standard deviation of 6.39. The mean score for the comparison group was 16.12, with a standard deviation of 3.08. These results suggest that the treatment group, who used sketchnoting as a pedagogical tool, had a higher average score on the posttest compared to the comparison group, who did not use sketchnoting. The larger standard deviation for the treatment group indicates that the scores were more variable or spread out compared to the comparison group. However, the difference between the mean scores of the two groups is quite significant, which suggests that using sketchnoting as a pedagogical tool had a positive impact on the treatment group's test performance.

Using a two-tailed t-test with 66 degrees of freedom and an alpha level of 0.05, the critical t-value is ± 2.00 . Since the calculated t-value (-0.20) is not greater than the critical t-value (-2.00), there is no significant difference between the mean pre-test scores of the control and treatment groups. However, since the calculated t-value (-4.01) is greater than the critical t-value (-2.00), there is a significant difference between the mean post-test scores of the control and treatment groups.

Table 1: The Test Performances of Students

| | Pretest | | Posttest | |
|------------|---------|------|----------|------|
| | Mean | SD | Mean | SD |
| Comparison | 11.29 | 2.47 | 16.12 | 3.08 |
| Treatment | 11.38 | 5.11 | 21.03 | 6.39 |

The results suggest that using sketchnoting as a pedagogical tool had a positive impact on students' test performance. The treatment group, who used sketchnoting, had a significantly higher average score on the posttest compared to the comparison group, who did not use sketchnoting. This indicates that using sketchnoting as a pedagogical tool can lead to an improvement in test scores.

The second research question aimed to investigate the learning benefits and experiences that students gained from making sketchnotes. To explore this question, the researchers asked two open-ended questions to the participants. The first question was focused on the learning benefits of sketchnoting, while the second question aimed to elicit the experiences that the students gained from the activity and how these experiences contributed to their learning process. The responses from the participants were analyzed using content analysis to identify common themes related to the learning benefits and experiences of making sketchnotes. The findings revealed six themes related to the positive learning benefits of sketchnoting, including active engagement, personalization, memory retention, creative expression, metacognition, and positive affect. On the other hand, three themes emerged as negative experiences of using sketchnoting, including time-consuming, challenging, and inflexible.

Learning Benefits and Positive Experiences

Theme 1. Active Engagement

Sketchnoting encourages students (n=15) to actively engage with the material, promoting deeper learning and understanding of concepts. Some of the participants said: "Sketchnoting makes me feel more connected to the lessons even though it's just me and the module. I get to engage with the material by drawing and organizing my notes, which makes it easier for me to understand and remember the concepts."

"I used to find the modules boring, but sketchnoting made me more curious about the topics because I get to explore and express them in my own way. It's like I'm having a conversation with the material, and it keeps me interested in learning more."

Studies have indicated that sketchnoting can enhance active engagement with learning material, a critical component of effective learning. Actively engaging with the material can lead to better retention and deeper understanding of the concepts. Sketchnoting can help students create visual representations of the material, making it more accessible to them. Sketchnoting is also a personalized approach that allows students to engage with

the material in their own way, making it more meaningful and relevant to them, which can increase their motivation and interest in the topic, resulting in a more positive and effective learning experience (Baff, 2020; Valeeva, 2022).

Theme 2. Personalization

Sketchnoting allows students (n=13) to personalize their learning experience by creating visual representations of the material that are meaningful to them. Some of the responses of the students are:

"I love sketchnoting because I can make it my own. I can choose the colors and styles that I like and make it unique to me. It's like creating a visual representation of my thoughts and understanding of the material."

"Sketchnoting helps me remember the material because I can draw pictures and symbols that are meaningful to me. It's like creating my own visual dictionary that I can refer to when I need to study or review the concepts."

Sketchnoting allows students to personalize their learning experience, making it more meaningful and relevant to them. By creating visual representations of the material that reflect their own understanding and perspective, students can take ownership of their learning and make it more engaging (Bratash *et al.*, 2020). The ability to choose colors, styles, and symbols allows students to express themselves creatively, which can increase their motivation and interest in the material. Additionally, the visual nature of sketchnoting can help students to remember the material better by creating strong associations between the concepts and the images they have created. This can be especially beneficial for students who are visual learners.

Theme 3. Memory Retention

Sketchnoting aids in memory retention by making connections between ideas and presenting them in a visual format, making it easier for students (n=10) to remember the material. Two of the participants aforementioned:

"Sketchnoting helps me remember the material because it's visual. When I draw pictures and symbols, it's like I'm creating a mental image of the concepts, which makes it easier for me to recall them later."

"Sketchnoting is a great memory tool because it's like creating a map of the lesson. I can see how the ideas are connected and organized, which helps me remember the sequence of the concepts and how they relate to each other."

Using sketchnoting as a teaching tool can assist in memory retention by facilitating the creation of visual associations between ideas and presenting them in an orderly manner. By using pictures and symbols,

students can generate mental images of the concepts they are learning, making it easier for them to recall the information later. Additionally, sketchnoting allows students to see how the ideas are interconnected and arranged, creating a visual representation of the lesson that can help them remember the order of the concepts and their relationships (Paepcke-Hjeltness & Mina, 2021). This approach can be particularly advantageous for students who experience difficulties with traditional note-taking methods or have trouble retaining information.

Theme 4. Creative Expression

Sketchnoting provides students (n=9) with a creative outlet for expressing their understanding of the material and presenting it in a unique and personalized way. Some of them mentioned:

“Sketchnoting is a way for me to express my creativity while learning. I can draw pictures and designs that are unique to me, and it makes the learning experience more fun and enjoyable.”

“Sketchnoting allows me to think outside of the box and be more creative with how I represent the concepts. It’s not just about copying down notes; it’s about creating something that reflects my understanding of the material in a unique way.”

Sketchnoting offers students a creative means to personalize their comprehension of the material. Through the use of unique drawings and designs, students can make the learning experience more enjoyable. The creative aspect of sketchnoting also promotes original thinking and innovation in learning. Instead of just recording notes, students are constructing something that demonstrates their comprehension of the material in a distinctive and imaginative way (Tidy *et al.*, 2022). This can be especially advantageous for students who appreciate creative activities or encounter difficulties with conventional note-taking methods.

Theme 5. Metacognition

Sketchnoting promotes metacognition by encouraging students (n=7) to reflect on their learning and evaluate their understanding of the material. As narrated by two of the students:

“Sketchnoting helps me reflect on my learning because I have to evaluate my understanding of the material while I’m creating the sketchnote. It’s like a way for me to check my own understanding and make sure I’m on the right track.”

“Sketchnoting encourages me to think about how I learn best because I can experiment with different styles and techniques to see what works for me. It’s like a way for me to take ownership of my learning and figure out what strategies are most effective for me.”

Research has shown that sketchnoting promotes metacognition by prompting students to reflect on their learning and assess their comprehension of the material. While creating the sketchnotes, students can evaluate their understanding and confirm their progress (Gansemer-

Topf, 2020). This process helps them identify areas where they need to concentrate and enhance their understanding. Furthermore, sketchnoting allows students to reflect on how they learn best by experimenting with various styles and techniques that are suitable for them. This approach enables students to take responsibility for their learning and develop more effective learning strategies that match their individual learning styles (Bratash *et al.*, 2020).

Theme 6. Positive Affect

Sketchnoting can have a positive affect on the emotional state of students (n=7), promoting a sense of satisfaction and accomplishment as they create their sketchnote. Two of the participants mentioned:

“Sketchnoting makes me feel good about learning because I can see my progress and understanding of the material as I create the sketchnote. It’s like a way for me to track my learning and feel a sense of accomplishment.”

“Sketchnoting is fun and enjoyable, which makes me look forward to class. It’s like a way for me to express myself and be creative while still learning and understanding the material.”

Sketchnoting can positively impact students’ emotional state by creating a sense of fulfillment and achievement as they construct their sketchnote. Through seeing their learning progress and understanding of the material represented in their sketchnotes, students can experience a sense of pride and accomplishment in their work (Paepcke-Hjeltness, 2021). Moreover, the enjoyable and pleasurable aspect of sketchnoting can make students look forward to class and feel more involved in the learning process. This can be particularly crucial for student motivation and emotional well-being, especially in subjects that may be challenging or less engaging for students.

Negative Experiences

Theme 1. Time-Consuming

Students (n=7) may feel that sketchnoting takes too much time or is too labor-intensive, which can be frustrating if they struggle to keep up with the pace of the class. Some of them narrated:

“Sketchnoting takes a lot of time, and sometimes it feels like I’m falling behind on my modules because I’m spending so much time on my sketchnote. But I know that it helps me understand the material better, so it’s worth it in the end.”

“I like sketchnoting, but it can be time-consuming, especially if I want to make it look nice and organized. Sometimes I feel like I’m sacrificing the time I could be using to do other things, but I try to balance it out by using sketchnote templates and practicing my drawing skills.”

Some students may view sketchnoting as time-consuming or requiring too much effort, especially if they find it challenging to keep up with the pace of the class. While sketchnoting can be a useful learning tool, it does demand more time and effort to create a sketchnote compared

to traditional note-taking methods (Dimeo, 2016). Some students may feel like they are falling behind on their coursework because they are spending more time on their sketchnote. Nonetheless, it is essential to note that the time and effort invested in sketchnoting can be beneficial in the long run by enhancing their comprehension and retention of the material. Furthermore, students can balance their time by utilizing sketchnote templates or honing their drawing skills to streamline the process.

Theme 2. Challenging

Some students (n=5) may find sketchnoting challenging if they are not confident in their artistic abilities or struggle to represent complex concepts in a visual format. Sample comments included are:

“Sketchnoting is challenging for me because I’m not very good at drawing, and sometimes I struggle to represent complex ideas in a visual format. But I keep practicing, and I’ve found that it’s getting easier over time.”

“Sketchnoting can be challenging because you have to think about the material in a different way. Sometimes it’s hard to come up with creative ways to represent the ideas, but it’s also rewarding when you finally figure it out.”

Students may find sketchnoting challenging if they are not confident in their artistic abilities or struggle to represent complex concepts in a visual format. Sketchnoting requires a certain level of creativity and artistic skill, which can be intimidating for some students (Valeeva, 2022).. Additionally, representing complex ideas in a visual format can be challenging, as it requires students to think about the material in a different way. However, with practice and patience, students can improve their sketchnoting skills and find ways to represent the material in a way that works for them. The process of overcoming these challenges can be rewarding and can lead to increased confidence and self-efficacy.

Theme 3. Inflexible

While sketchnoting allows for personalization, some students (n=4) may feel limited by the format or structure of their sketchnote and find it difficult to adapt to different types of information. Some responses are as follows:

“Sometimes sketchnoting can feel inflexible because I’m limited by the format of my sketchnote. If the module presents the material in a way that doesn’t fit with my sketchnote template, it can be challenging to adapt and make it work.”

“Sketchnoting can be inflexible because I’m using a computer, and I don’t have access to all the drawing tools and materials that I would if I were sketchnoting on paper. Sometimes I feel like I’m limited by what I can do with the digital tools available to me.”

Some students may perceive sketchnoting as inflexible due to the format or structure of their sketchnote, making it challenging to adapt to various types of information. Although sketchnoting permits personalization, some students may feel restricted by the format of their

sketchnote, particularly if the material does not align well with the chosen format or template (Baff, 2020). Moreover, students who use digital tools for sketchnoting may feel limited by the available drawing tools and materials. Nonetheless, it is crucial to recognize that sketchnoting is not the only note-taking method available, and students should be encouraged to explore different options to discover the one that works best for them. Students can also experiment with different sketchnote templates or digital tools to find the ones that align with their needs and preferences (Paepcke-Hjeltness & Mina, 2021).

CONCLUSION

The use of sketchnoting as a pedagogical tool in teaching General Chemistry in Printed Modular Distance Learning has been shown to be effective in improving student performance. The treatment group, who used sketchnoting, demonstrated a significantly higher average score on the posttest compared to the comparison group, who did not use sketchnoting. This suggests that sketchnoting positively impacts students’ performance. The study identified several positive learning benefits of using sketchnoting, including active engagement, personalization, memory retention, creative expression, metacognition, and positive affect. Sketchnoting encourages students to actively engage in the learning process by visually representing concepts and ideas, thereby promoting better understanding and retention of information. Additionally, sketchnoting allows for personalization and creative expression, which can enhance students’ sense of ownership and motivation in their learning. The practice of sketchnoting also promotes metacognition, as students reflect on their thought processes and actively monitor their own learning. However, the study also identified some negative experiences associated with using sketchnoting. For instance, some students found sketchnoting to be time-consuming and challenging, especially if they lacked artistic skills. Additionally, the inflexibility of sketchnoting may not be suitable for all learning styles, and some students may prefer other methods of note-taking. Overall, the study suggests that sketchnoting can be a valuable pedagogical tool in teaching General Chemistry in Printed Modular Distance Learning. However, it is important to take into account the potential challenges and limitations associated with this approach and to provide students with appropriate support and guidance to optimize their learning experience.

RECOMMENDATION

The school administration should consider allowing and encouraging the use of sketchnoting activities in delivering learning content. The study suggests that sketchnoting can be an effective pedagogical tool that can improve student learning outcomes. In addition, Science teachers can employ the use of sketchnoting as a pedagogical tool for all Science courses during remote learning. This can

help enhance student engagement and motivation, and improve learning outcomes. Teachers should also provide students with clear instructions and guidelines on how to use sketchnoting effectively, and provide opportunities for students to practice and develop their sketchnoting skills. Moreover, future researchers may consider conducting further studies to explore the instructional effectiveness of sketchnoting. This can include increasing the sample size and considering different grade levels to establish high reliability and validity of the study. Additionally, researchers can explore other variables such as students' motivation, engagement, self-esteem, and behavior, as well as the challenges encountered and the learning gained from using sketchnoting. The impact of variables such as sex, socio-economic status, and learning styles can also be explored to gain a more comprehensive understanding of the effectiveness of sketchnoting in different contexts.

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