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# Performance, Conceptual Understanding, and Self-Efficacy of Students via Contextualized Self-learning Modules in Junior High School, Philippines

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**Abstract:- This study examined students' performance, conceptual understanding, and self-efficacy via contextualized self-learning modules in the Junior High School of Cambangon Integrated School, Lilingayon, Valencia City. Specifically, it aimed to: 1) assess the level of student's performance via contextualized self-learning module (CSLM) and non-contextualized self-learning module (non-CSLM), 2) identify the level of students' conceptual understanding in science via CSLM and non-CSLM in the pre-test and post-test, 3) determine the level of students' self-efficacy via CSLM and non-CSLM in terms of: a) conceptual understanding, b) higher-order thinking skill, c) practical work, d) everyday application, and e) science communication, 4) compare if there is a significant difference in students' performance via CSLM and to non-CSLM, 5) ascertain if there is a significant difference in the students' conceptual understanding in science via CSLM and to non-CSLM in the pre-test and post-test, and 6) find out if there is a significant difference in the students' self-efficacy via CSLM and to non-CSLM in terms of: a) conceptual understanding, b) higher-order thinking skill, c) practical work, d) everyday application, and e) science communication. The study used a quasi-experimental research design utilizing two (2) intact sections of Grade-9 students. The results of the study revealed that the level of students' performance, conceptual understanding, and self-efficacy under CSLM had a higher increase in mean scores compared to the mean scores of students under non-CSLM. Furthermore, the study also found a significant difference in the performance, conceptual understanding, and self-efficacy of students who utilized CSLM and non-CSLM. This study suggests contextualizing and localizing self-learning modules since these respond effectively to learners' changing needs and conditions in this new normal, which can further contribute to their holistic development.**

***Keywords:-*** *Contextualized Self-Learning Module; Students' Performance; Self-Efficacy; Conceptual Understanding.*

## I. INTRODUCTION

Science education is crucial in shaping individuals into informed citizens capable of contributing to modern societies (Walag, 2019). Recent results from the Programme for International Student Assessment (PISA) 2018 have raised concerns about science education in the Philippines. The country scored second-lowest in math and science, with an average score of 357 points in scientific literacy, placing it in the low-performing category (PISA 2018 National Report of the Philippines, 2019).

In the Division of Valencia City, Cambangon Integrated School is considered the lowest-performing Integrated School in science subjects within District Eight. This is evident in its science Mean Percentage Score (MPS) of 65.04 for the academic year 2019-2020. The COVID-19 pandemic has brought unprecedented educational challenges, prompting the implementation of various learning delivery modalities nationwide. DepEd Order No. 012, s.2020, highlights the importance of distance learning and self-learning modules, especially in low-risk and remote areas. Dangle and Sumaoang (2020) identified critical challenges in this new normal, including limited school funding for module production and delivery, students' difficulties with self-studying, and parents' lack of guidance for their children's academic pursuits. Additionally, Walag (2019) emphasizes the significant influence of students' self-efficacy on their academic performance.

In this context, Cambangon Integrated School, situated in a remote area, serves predominantly low-income Junior High School students who lack access to the internet and essential tools like computers, smartphones, and televisions. As a result, online learning is not feasible. The school has adopted Modular Distance Learning as the primary mode of education for the academic year, posing challenges for teachers and students. Parents have noted that their children face difficulties with self-study due to low self-efficacy and unfamiliarity with certain module content.

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This study introduced contextualized self-learning modules to address these educational concerns as an intervention. These modules aimed to enhance student performance, conceptual understanding, and self-efficacy of Grade-9 students. The modules follow an ADIDAS approach, which includes different stages: Activity, Discussion, Input, Deepen, Application, and Synthesis. Thus, this research investigated students' performance, conceptual understanding, and self-efficacy via contextualized self-learning modules in Junior High School at Cambangon Integrated School, Lilingayon, Valencia City.

## II. METHODOLOGY

The study employed a quasi-experimental research design to assess student performance, conceptual understanding, and self-efficacy in science. The respondents of the study consisted of two (2) heterogeneous Grade 9 sections, officially enrolled during the 2020-2021 school year at Cambangon Integrated School, Valencia City, Bukidnon. One section was assigned to utilize contextualized self-learning modules (the experimental group), while the other section used non-contextualized self-learning modules (the control group). This study involved two intact classes, with thirty-two (32) participants in the experimental group and twenty-nine (29) participants in the control group. Data collection employed four (4) instruments: contextualized self-learning modules, subject to content validity assessment; student performance through portfolio assessment; a standardized test on conceptual understanding in science from DepEd; and a survey questionnaire adapted from the student science learning self-efficacy (SLSE) of Lin and Tsai (2012).

Before commencing the study, the researcher submitted a formal request in writing to the Schools Division Superintendent (SDS) of Valencia City and the School Head of Cambangon Integrated School, Lilingayon, Valencia City. Upon receiving permission, the researcher conducted an orientation for both the control and experimental groups, with parental involvement in informing the students about using contextualized and non-contextualized self-learning modules. Parental orientation was divided into two sessions: the experimental group's parents were oriented in the morning, while the control group's parents were oriented in the afternoon. During the orientation sessions, the researcher explained the study's purpose and distributed consent letters, requesting permission for their child's participation. The schedules for administering the pre-test, distributing, and collecting the modules were also discussed.

To assess student conceptual understanding of science using the CSLM and non-CSLM, a standardized test covering third-quarter Grade 9 science topics was administered as a pre-test and a post-test to the experimental and control groups. The pre-test was administered before exposure to the respective learning approaches to determine the students' prior knowledge of the subjects. Subsequently, the experimental group used the CSLM, while the control group utilized the non-CSLM. At the end of the quarter, a post-test was administered to both groups to evaluate their comprehension of scientific concepts. Moreover, the survey questionnaire concerning student self-efficacy was administered after implementing both CSLM and non-CSLM. After completing the post-test in both groups, student portfolios were collected and assessed using a portfolio grading rubric.

This study employed descriptive statistics, including means, frequency values, percentages, and standard deviation, to characterize student self-efficacy in science. Analysis of Covariance (ANCOVA) was utilized to determine any significant relationships between student performance, conceptual understanding, and self-efficacy among junior high school students. A t-test for paired samples was conducted to analyze data derived from the pre-test and post-test results. Furthermore, a one-sample t-test was employed to evaluate the outcomes of learners based on their portfolio scores and self-efficacy scores in both groups.

## III. RESULTS

➢ *Students Performance*

As shown in Table 1, students who utilized CSLM had the following performance: four (4) or 12.5% had a fairly satisfactory performance, seven (7) or 21.9% got satisfactory, six (6), or 18.8%, very satisfactory performance and fifteen (15) or 46.8% of them had reached an outstanding performance. While the students under the non-CSLM group had the following performances: eleven (11) or 37.7% of the students did not meet the expectations; four (4) or 13.8% had a fairly satisfactory performance, three (3) or 10.3% had a satisfactory performance, six (6) or 20.7% had a very satisfactory performance and only five (5) or 17.2% had an outstanding performance. The result implies that most of the students under CSLM could showcase their creativity sense of responsibility and demonstrate their understanding of the lessons.

Table 1. Students Performance under CSLM and non-CSLM via Portfolio

| Range | GROUP | | | | Qualitative Interpretation |
|---|---|---|---|---|---|
| | CSLM n=32 | | non-CSLM n=29 | | |
| | f | % | F | % | |
| 90% and above | 15 | 46.8% | 5 | 17.2% | Outstanding (O) |
| 85%- 89% | 6 | 18.8% | 6 | 20.7% | Very Satisfactory (VS) |
| 80%- 84% | 7 | 21.9% | 3 | 10.3% | Satisfactory (S) |
| 75%- 79% | 4 | 12.5% | 4 | 13.8% | Fairly Satisfactory (FS) |
| 74% and below | 0 | 0% | 11 | 37.7% | Did Not Meet Expectations (DNME) |
| WEIGHTED MEAN | 87.66 (very satisfactory) | | 75.69 (fairly satisfactory) | | |

Legend:

| Grade Scale | Percentage score | Interpretation |
|---|---|---|
| 90-100 | 90% and above | Outstanding (O) |
| 85-89 | 85%- 89% | Very Satisfactory (VS) |
| 80-84 | 80%- 84% | Satisfactory (S) |
| 75-79 | 75%- 79% | Fairly Satisfactory (FS) |
| 0-74 | 74% and below | Did Not Meet Expectations (DNME) |

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The data indicates that 37.7% of students using non-CSLM did not meet the Department of Education's standards. Some learners in this group failed to meet portfolio assessment criteria, including content, following instructions, design and organization, creativity, effort, reflection, and punctuality. This suggests that students using non-CSLM showed less engagement and interest in learning and understanding science concepts. This may be attributed to the unfamiliarity of the content in the non-contextualized self-learning modules. Additionally, some students reside in remote areas without access to electricity, gadgets like smartphones and TVs, and poor internet connectivity, putting them at a disadvantage. In addition, the students who utilized CSLM obtained a mean score of 87.66, indicating a very satisfactory result. In contrast, the students who utilized non-CSLM had a mean score of 75.69, indicating a fairly satisfactory result. The results show that CSLM users obtained a higher mean score in academic performance via portfolio assessment than the non-CSLM users. It implies further that the learners under CSLM exerted more effort, demonstrated an understanding of scientific knowledge, fulfilled the required conditions, and successfully presented their best outputs, as reflected in the data shown in Table 1.

➢ *Students' Conceptual Understanding*

Table 2 depicts the level of students' conceptual understanding in the pre-test and post-test, indicating frequency, qualitative interpretation, and percentage scores of the students under the contextualized self-learning module (CSLM) and non-contextualized self-learning module (non-CSLM).

Table 2. Students Level of Conceptual Understanding

| Range | CSLM n=32 | | | | Non-CSLM n=29 | | | | Qualitative Interpretation |
|---|---|---|---|---|---|---|---|---|---|
| | Pre-test | | Post-test | | Pre-test | | Post-test | | |
| | f | % | f | % | F | % | f | % | |
| 90% and above | 0 | 0 | 1 | 3.1 | 0 | 0 | 0 | 0 | Outstanding (O) |
| 85%- 89% | 0 | 0 | 1 | 3.1 | 0 | 0 | 0 | 0 | Very Satisfactory (VS) |
| 80 %- 84% | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3.4 | Satisfactory (S) |
| 75%- 79% | 0 | 0 | 1 | 3.1 | 0 | 0 | 1 | 3.4 | Fairly Satisfactory (FS) |
| 74% and below | 32 | 100% | 29 | 90.7% | 29 | 100% | 27 | 92.6 % | Did Not Meet Expectations (DNME) |
| OVER-ALL MEAN | 17.47 (fairly satisfactory) | | 30.28 (very satisfactory) | | 19.24 (fairly satisfactory) | | 27.66 (satisfactory) | | |
| MPS | 36.39 (average mastery learning) | | 63.09 (average mastery learning) | | 40.09 (average mastery learning) | | 57.61 (average mastery learning) | | |

Legend:

| Grade Scale | Percentage score | Interpretation |
|---|---|---|
| 39-48 | 90% and above | Outstanding (O) |
| 30-38 | 85%- 89% | Very Satisfactory (VS) |
| 21-29 | 80%- 84% | Satisfactory (S) |

The level of conceptual understanding was measured through the scores as results of the standardized Grade-9 science test adopted from the DepEd K-12 curriculum. As shown in the table above, 32 or 100% of the students under CSLM and 29 or 100% under non-CSLM obtained a very low rating in conceptual understanding. At this level, students struggled with their understanding, prerequisite, and fundamental knowledge. The skills had not been acquired or developed adequately to aid understanding. Moreover, the group of students under CSLM had an overall pre-test mean score of 17.47, while non-CSLM had an overall pre-test mean score of 19.24. Both groups had fairly satisfactory results, inferring that learners still need enhancement. On the other hand, the overall pre-test mean score of students under CSLM was 17.47, with an MPS value of 36.39%, revealing the descriptive equivalent of average mastery learning.

On the other hand, the overall post-test mean score of students under non-CSLM was 19.24, with an MPS value of 40.09%, which also explained to have a descriptive equivalent of average mastery learning. The Mean Percentage Score (MPS) interpretation was based on the DepEd standard in categorizing performing schools as cited in DepEd Memorandum, No. 160, s. 2012 (see appendix, N). The MPS result of the pre-test was lower than the last school year's MPS result, which was 65.04. The findings of the study are parallel to the low National Achievement Test (NAT) and PISA results in 2018. The pre-test result implies that both groups had a weak background in some scientific concepts about Earth Science. These findings are supported by the study of Al Mutawah et al. (2019), which confirms that students' conceptual understanding level was high, mostly for students with solid backgrounds in mathematics and science. In addition, the result of the study is similar to the previous results of the local studies on the level of students in pre-test exams in a contextualized learning environment (Baiño, 2016; Cainoy, 2020; and Ederango, 2019)

➢ *Students Self-Efficacy towards Science Learning*

- *Conceptual Understanding*

Table 3 presents the level of student's self-efficacy towards learning science in terms of conceptual understanding under the contextualized self-learning module (CSLM) and non-contextualized self-learning module (non-CSLM).

Table 3. Students Self-Efficacy Towards Learning Science in Terms of Conceptual Understanding.

| Conceptual Understanding | GROUP | | | |
|---|---|---|---|---|
| | CSLM n=32 | | Non-CSLM n=29 | |
| Indicators | Mean | QI | Mean | QI |
| 1. I can choose an appropriate formula to solve a science problem. | 4.06 | High | 3.21 | Moderate |
| 2. I can explain scientific laws and theories to others. | 3.88 | High | 3.07 | Moderate |
| 3. know the definitions of basic scientific concepts (for example, gravity, photosynthesis, etc.) very well. | 3.81 | High | 3.10 | Moderate |
| 4. I can link the contents among different science subjects (for example biology, chemistry and physics) and establish the relationships between them. | 3.75 | High | 2.79 | Moderate |
| WEIGHTED MEAN | 3.87 | High | 3.04 | Moderate |

Legend:

| Scale | Qualitative Interpretation |
|---|---|
| 4.51-5.0 | Very High |
| 3.51-4.50 | High |
| 2.51-3.50 | Moderate |
| 1.51-2.50 | Low |
| 1.0-1.50 | Very Low |

The table above shows that among the four statements, "I can choose an appropriate formula to solve a science problem" (4.06) was the highest, while "I can link the

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contents among different science subjects and establish the relationships between them" (3.75) was the lowest in the group of students who utilized CSLM. The study suggests that incorporating localized resources and contextualizing module content could positively increase students' self-efficacy in choosing an appropriate formula or method for solving a science problem. However, the difficulty in linking and correlating the contents among the different areas of science was determined.

On the other hand, students in the non-CSLM group showed that among the four statements, "I can choose an appropriate formula to solve a science problem" (3.21) was the highest, and "I can link the contents among different science subjects and establish the relationships between them" (2.79) came the lowest. Moreover, students who utilized the CSLM had an overall mean score of 3.87, indicating a high self-efficacy result. In contrast, the students who utilized non-CSLM had an overall mean score of 3.04, indicating moderate self-efficacy.

- *Higher-Order Thinking Skill*

Table 4 presents the result of students' science learning self-efficacy towards higher-order thinking skills under the contextualized self-learning module (CSLM) and non-contextualized self-learning module (non-CSLM).

Table 4. Students Self-Efficacy Towards Learning Science in Terms of Higher-Order Thinking Skill

| Higher-Order Thinking Skill | GROUP | | | |
|---|---|---|---|---|
| | CSLM n=32 | | Non-CSLM n=29 | |
| Indicators | Mean | QI | Mean | QI |
| 1. When I come across a science problem, I will actively think over it first and devise a strategy to solve it. | 4.41 | High | 3.45 | Moderate |
| 2. I am able to propose many viable solutions to solve a science problem. | 4.25 | High | 3.52 | High |
| 3. I am able to make systematic observations and inquiries based on a specific science concept or scientific phenomenon. | 4.00 | High | 3.31 | Moderate |
| 4. I am able to critically evaluate the solutions of scientific problems. | 4.00 | High | 3.14 | Moderate |
| 5. I am able to design scientific experiments to verify my hypotheses. | 3.97 | High | 3.03 | Moderate |
| 6. When I am exploring a scientific phenomenon, I am able to observe its changing process and think of possible reasons behind it. | 3.69 | High | 3.31 | Moderate |
| WEIGHTED MEAN | 4.05 | High | 3.29 | Moderate |

Legend:

| Scale | Qualitative Interpretation |
|---|---|
| 4.51-5.0 | Very High |
| 3.51-4.50 | High |
| 2.51-3.50 | Moderate |
| 1.51-2.50 | Low |
| 1.0-1.50 | Very Low |

The data shows that students who utilized CSLM had the highest mean in the statement, “when I come across a science problem, I will actively think over it first and devise a strategy to solve it” (4.41) and lowest in “when I am exploring a scientific phenomenon, I am able to observe its changing process and think of possible reasons behind” (3.69). On the other hand, students who utilized the non-CSLM showed that among the six (6) statements, “When I come across a science problem, I will actively think it over first and devise a strategy to solve it” (3.45) was the highest indicating high self-efficacy, and “I am able to design scientific experiments to verify my hypotheses” (3.03) was the lowest indicating moderate self-efficacy. Moreover, the data also illustrates that students under CSLM had an overall mean score of 4.05, indicating a high self-efficacy result. In contrast, the students who utilized non-CSLM had an overall mean score of 3.29, indicating moderate self-efficacy.

- *Practical Work*

Table 5 presents the results of students' science learning self-efficacy towards practical work under the contextualized self-learning module (CSLM) and non-contextualized self-learning module (non-CSLM).

Table 5. Students Self-Efficacy Towards Learning Science in Terms of Practical Work

| Practical Work | GROUP | | | |
|---|---|---|---|---|
| | CSLM n=32 | | Non-CSLM n=29 | |
| Indicators | Mean | QI | Mean | QI |
| 1. I know how to carry out experimental procedures in the science laboratory. | 4.44 | High | 2.66 | High |
| 2. I know how to collect data during the science laboratory. | 4.22 | High | 2.86 | High |
| 3. I know how to set up equipment for laboratory experiments. | 4.38 | High | 3.07 | High |
| 4. I know how to use equipment (for example measuring cylinders, measuring scales, etc.) in the science laboratory. | 4.12 | High | 2.90 | High |
| WEIGHTED MEAN | 4.28 | High | 2.87 | Moderate |

Legend:

| Scale | Qualitative Interpretation |
|---|---|
| 4.51-5.0 | Very High |
| 3.51-4.50 | High |
| 2.51-3.50 | Moderate |
| 1.51-2.50 | Low |

The data showed that students who utilized CSLM had the highest mean in the statement, “ I know how to carry out experimental procedures," had the highest mean (4.44), while "I know how to use equipment in the science laboratory" had the lowest (4.12). On the other hand, students who utilized the non-CSLM showed that among the four (4) statements, the statement "I know how to set up equipment for laboratory experiments" (3.07) had the highest, and "I know how to carry out experimental procedures in the science laboratory" (2.66) had the lowest mean. On the other hand, students under CSLM had an overall mean score of 4.28, indicating a high self-efficacy result, while those under non-CSLM had an overall mean score of 2.87, indicating a moderate self-efficacy result. Similarly, mean scores of students under non-CSLM imply that they knew how to set up equipment, although they lacked self-efficacy in conducting experiments that their uncertainty might cause.

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- *Everyday Application*

Table 6 illustrates the result of science learning self-efficacy in terms of everyday application under the contextualized self-learning module (CSLM) and non-contextualized self-learning module (non-CSLM).

Table 6. Students Self-Efficacy Towards Learning Science in Terms of Everyday Application

| Everyday Application | GROUP | | | |
|---|---|---|---|---|
| | CSLM n=32 | | Non-CSLM n=29 | |
| Indicators | Mean | QI | Mean | QI |
| **A.** I am able to apply what I have learned in school science to daily life | 4.41 | High | 3.38 | Moderate |
| **B.** I am able to propose solutions to everyday problems using science. | 4.34 | High | 3.41 | Moderate |
| **C.** I am able to use scientific methods to solve problems in everyday life. | 4.09 | High | 3.14 | Moderate |
| **D.** I am aware that a variety of phenomena in daily life involve science-related concepts | 4.09 | High | 3.52 | High |
| **E.** I can understand the news/documentaries I watch on television related to science. | 4.03 | High | 3.66 | High |
| **F.** I can recognize the careers related to science | 3.91 | High | 3.48 | Moderate |
| **G.** I can understand and interpret social issues related to science (for example nuclear power usage and genetically modified foods) in a scientific manner. | 3.91 | High | 3.31 | Moderate |
| **H.** I am able to explain everyday life using scientific theories. | 3.87 | High | 3.59 | High |
| WEIGHTED MEAN | 4.08 | High | 3.43 | Moderate |

Legend:

| Scale | Qualitative Interpretation |
|---|---|
| 4.51-5.0 | Very High |
| 3.51-4.50 | High |
| 2.51-3.50 | Moderate |
| 1.51-2.50 | Low |
| 1.0-1.50 | Very Low |

The data showed that among eight (8) statements, the students who utilized the CSLM had the highest mean rating for the statement “I am able to apply what I have learned in school science to daily life” (4.41) and lowest for “I am able to explain everyday life using scientific theories” (3.87). On the other hand, for students who utilized the non-CSLM, the statement, "I can understand the news/documentaries I watch on television related to science" (3.66), had the highest mean scores, indicating high self-efficacy. At the same time, "I am able to use scientific methods to solve problems in everyday life" (3.14) had the lowest, indicating moderate self-efficacy. Moreover, the students under CSLM had an overall mean score of 4.08 indicating a high self-efficacy result, while the students who utilized non-CSLM had an overall mean score of 3.43, indicating a moderate self-efficacy. The overall mean score of both groups implies that the students under CSLM developed higher self-efficacy in applying science concepts and related skills to daily life events than the non-CSLM group.

- *Science Communication*

Table 7 presents the result of science learning self-efficacy in terms of science communication under the contextualized self-learning module (CSLM) and non-contextualized self-learning module (non-CSLM).

Table 7. Students Self-Efficacy Towards Learning Science in Terms of Science Communication

| Science Communication | GROUP | | | |
|---|---|---|---|---|
| | CSLM n=32 | | Non-CSLM n=29 | |
| Indicators | Mean | QI | Mean | QI |
| **A.** I am able to comment on presentations made by my classmates in science class. | 4.31 | High | 3.69 | High |
| **B.** In science classes, I can clearly express my own opinions. | 4.13 | High | 3.52 | High |
| **C.** I am able to clearly explain what I have learned to others. | 3.97 | High | 3.28 | Moderate |
| **D.** I feel comfortable discussing science content with my classmates. | 3.94 | High | 3.45 | Moderate |
| **E.** In science classes, I can express my ideas properly | 3.94 | High | 3.45 | Moderate |
| **F.** I am able to use what I have learned in science classes to discuss with others. | 3.91 | High | 3.55 | High |
| WEIGHTED MEAN | 4.03 | High | 3.27 | Moderate |

Legend:

| Scale | Qualitative Interpretation |
|---|---|
| 4.51-5.0 | Very High |
| 3.51-4.50 | High |
| 2.51-3.50 | Moderate |
| 1.51-2.50 | Low |
| 1.0-1.50 | Very Low |

As shown in the table, students who utilized the CSLM showed high self-efficacy in six (6) statements which among the statements, "I am able to comment on presentations made by my classmates in science class" (4.31), and in science class, I can clearly express my own opinions" (4.13) had the highest mean scores. In contrast, the statement “I am able to use what I have learned in science classes to discuss with others” (3.91) had the lowest mean. On the other hand, students under non-CSLM showed that among the six (6) statements, the statements "I am able to comment on presentations made by my classmates in science class" (3.69), "I am able to use what I have learned in science classes to discuss with others" (3.55), and "In science classes, I can express my own ideas properly" (3.45) had the highest mean scores indicating high self-efficacy while the statement "I feel comfortable discussing science content with my classmates" (3.45), "In science classes, I can express my ideas properly" (3.45) and "I am able to clearly explain what I have learned to others" (3.28) had the lowest indicating moderate self-efficacy. The data also illustrated that the students who utilized CSLM had an overall mean score of 4.03, indicating high self-efficacy, while those who utilized non-CSLM had an overall mean score of 3.27, indicating moderate self-efficacy. The overall mean score of students revealed that students under CSLM developed a higher level of self-efficacy towards science communication compared to the control group

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➢ *Comparison of Students' Performance via CSLM and the non-CSLM Using Portfolio Assessment*

Table 9 shows the difference in students' performance via portfolio in science learning under CSLM and non-CSLM. Students under the CSLM obtained a mean score of 87.66, higher than those under the non-CSLM, which was 75.69. Upon comparison, the t-value obtained was 4.504 with a probability value 0.000, indicating significance at the 0.05 level. These results conclude that the study rejects the null hypothesis that "there is no significant difference in the student's portfolio in science via contextualized self-learning module and non-contextualized self-learning module."

Table 9. Difference in students performance via CSLM and Non-CSLM

| Group | N | Mean | SD | t | Sig |
|---|---|---|---|---|---|
| CSLM | 32 | 87.66 | 8.612 | | |
| non-CSLM | 29 | 75.69 | 12.006 | 4.504 | 0.00 |
| TOTAL | 61 | | | | |

*p<0.05 ns= not significant

The result of the study shows that a contextualized module enhances and improves students learning output or performance. Moreover, with the contextualized content of a module, the learners could perform confidently in their science experiments and activities; thus, they improved their learning output. Furthermore, the study's findings revealed that students' science performance was enhanced along with the learners' self-efficacy and conceptual understanding using a contextualized module. Thus, it proves that quality learning is still possible and attainable despite the pandemic.

➢ *Analysis of Covariance (ANCOVA) on Student's Conceptual Understanding*

Table 10 presents the analysis of covariance on students' conceptual understanding under CSLM and non-CSLM. The pre-test was used as a covariate to equate dissimilar prognostic variables, which may affect the analysis statistically. Students under CSLM obtained a mean score of 63.09, while those under non-CSLM obtained a mean score of 57.61. The computed F-value between groups was 33.131 at a p-value of 0.000, indicating a highly significant difference.

Table 10. Analysis of covariance (ANCOVA) on students conceptual understanding exposed to CSLM and Non-CSLM

| GROUP | N | MEAN | SD |
|---|---|---|---|
| CSLM | 32 | 63.09 | 9.7 |
| Non-CSLM | 29 | 57.61 | 11.56 |
| Total | 61 | 60.49 | 10.91 |

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Group | 6344.925 | 2 | 3172.462 | 33.131 | 0.000* |
| Pre-test | 1134.587 | 1 | 1134.587 | 11.849 | 0.001* |
| Error | 5553.869 | 58 | 95.756 | | |
| Total | 230308.160 | 61 | | | |

* p<0.05 ns= not significant

This implies that the students under CSLM obtained higher conceptual understanding than those students under non-CSLM. Thus, the null hypothesis that there is no significant difference in the students' conceptual understanding of science via contextualized self-learning and non-contextualized self-learning modules is rejected.

➢ *Difference in Students Self-Efficacy in Science Learning*

Table 11 illustrates the difference in student's self-efficacy in science learning under CSLM and non-CSLM. Students under CSLM obtained an overall mean score of 4.06, higher than those under non-CSLM, which was 3.27. Upon comparison, the t-value obtained was 10.266 with a probability value of 0.000, indicating significance at the 0.05 level. Thus, the null hypothesis that there is no significant difference in the level of students' self-efficacy via contextualized self-learning modules and non-contextualized self-learning modules is rejected. Based on the results, all the self-efficacy dimensions, namely conceptual understanding, higher-order thinking skills, practical work, everyday application, and science communication, were significant within the 95% confidence interval. Indeed, students under CSLM have higher self-efficacy than those students under non-CSLM.

Table 11. Difference in students self-efficacy in science learning via CLSM and non-CSLM

| Self-efficacy Dimensions | Mean | | SD | | t | Sig. |
|---|---|---|---|---|---|---|
| | CSLM | non-CSLM | CSLM | non-CSLM | | |
| A. Practical Work | 4.29 | 2.87 | 0.50843 | 0.49830 | 10.984 | 0.000* |
| B. Everyday Application | 4.08 | 3.44 | 0.36285 | 0.35137 | 7.056 | 0.000* |
| C. Higher-Order Thinking Skill | 4.05 | 3.29 | 0.45680 | 0.41941 | 6.736 | 0.000* |
| D. Science Communication | 4.03 | 3.49 | 0.36524 | 0.47753 | 5.013 | 0.000* |
| E. Conceptual Understanding | 3.86 | 3.04 | 0.54625 | 0.59787 | 5.679 | 0.000* |
| OVERALL SELF-EFFICACY MEAN | 4.06 | 3.27 | 0.32098 | 0.27822 | 10.266 | 0.000* |

* p<0.05 ns= not significant

## IV. DISCUSSION

Results revealed that, in the CSLM group, four (4) of the students had a fairly satisfactory performance, seven (7) of the students had a satisfactory performance, six (6) of the students had a very satisfactory performance and fifteen (15) of the students had reached an outstanding performance. While students under the non-CSLM group had the following performance: eleven (11) of the students did not meet expectations, four (4) had fairly satisfactory performance, three (3) had satisfactory performance, six (6) had a very satisfactory performance, and only five (5) had an outstanding performance. Moreover, the pretest-posttest mean percentage scores obtained by students under CSLM were 36.39% (average mastery learning) and 63.09% (average mastery learning), respectively. On the other hand, the pretest-posttest mean percentage scores obtained by students under SLM were 40.09% (average mastery learning) and 57.61% (average mastery learning), respectively. The result showed an increase in students' MPS for both groups. However, students' MPS under CSLM was higher than the other group. On the other hand, the self-efficacy of students under CSLM and non-CSLM in terms of "conceptual

understanding" were (3.87) and (3.04), "higher-order thinking skill" were (4.05) and (3.29), "practical Work" were (4.29) and (2.87), "everyday application" was (4.08) and (3.46), and "science communication" were (4.03) and (3.48), respectively. Students under CSLM had an overall mean score of 4.06, indicating high self-efficacy, while non-CSLM had an overall mean score of 3.27, indicating moderate self-efficacy. The result of the study indicated that students under CSLM developed a higher level of self-efficacy than the non-CSLM group.

Students' academic performance via portfolio assessment under CSLM obtained a mean score of 87.66, higher than that of students under non-CSLM which was 75.69. Upon comparison, the t-value obtained is 4.504 with a probability value 0.000, indicating significance at the 0.05 level. The result of the study showed that a contextualized module enhanced and improved students' learning output or performance.

Analysis of Covariance on students' conceptual understanding between groups indicated a highly significant difference with a computed F-value of 33.131 at a p-value of 0.000. More importantly, students' self-efficacy under CSLM obtained an overall mean score of 4.06, higher than those under non-CSLM, which was 3.27. Upon comparison, the t-value obtained was 10.266 with a probability value 0.000, indicating significance at the 0.05 level. Self-efficacy dimensions significantly differed between groups, namely conceptual understanding, higher-order thinking skills, practical work, everyday application, and science communication.

## V. CONCLUSIONS

The study's findings revealed that the students in portfolio assessment under contextualized self-learning modules (CSLM) accomplish and perform better in portfolio assessment than the other group of students. This study infers that in learning when activities, pictures, and materials used in science lessons and experiments are localized and contextualized, it promotes better performance and output from the learners. Furthermore, the results of the study indicated that through contextualized self-learning modules, students apply their knowledge and skills as they interpret and solve problems in real-life situations and scenarios, thus, they can develop a greater understanding of the context and nature of science.

Students under CSLM developed a higher level of self-efficacy in science than those under non-CSLM. With a series of localized and contextualized activities offered by the self-learning module, the learners under CSLM are able to develop high self-efficacy. Also, there is a significant difference in students' performance via CSLM and non-CSLM. This study infers that a contextualized module can enhance and improve students' output or performance. Lastly, students' conceptual understanding shows a highly significant difference after the respective groups utilized their modules. The study attests that with contextualized and localized content in activities, pictures, and materials, the students can better understand science concepts. Finally, the students' self-efficacy significantly differed after utilizing CSLM and non-CSLM. This concludes that a significant difference exists in students' conceptual understanding, higher-order thinking skills, practical work, everyday application, and science communication.

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