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Research Article

Effectiveness of COSCIVOW (Contextualized Science Vocabulary Worksheet) in The Level of Vocabulary Skills of Grade 10 Learner

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ABSTRACT

As a subject rich in specialized vocabulary, science requires learners to develop strong reading and comprehension skills for a deeper conceptual understanding. Integrating literacy strategies, such as vocabulary instruction, can significantly benefit students (Venida, 2021). This study aimed to enhance the science vocabulary skills of Grade 10 learners using the Contextualized Science Vocabulary Worksheet (COSCIVOW). A quasi-experimental design compared an experimental group that received COSCIVOW-based instruction with a control group taught using traditional methods. Data analysis involved mean, percentage scores, and ANOVA.

Results showed that learners' vocabulary skills were rated as Satisfactory before the intervention and improved to Very Satisfactory afterward. A significant difference was observed between pre-and post-intervention vocabulary skills, indicating the effectiveness of COSCIVOW. The findings suggest that COSCIVOW effectively encourages learners to engage with and understand science vocabulary, leading to improved language skills. Therefore, the researchers recommend incorporating COSCIVOW in science instruction to enhance learners' vocabulary proficiency. They also advocate for its adoption in the Division of La Union to support broader educational improvement.

Keywords: *Science Vocabulary Skills, Worksheets, COSCIVOW (Contextualized Science Vocabulary Worksheet), Level of Science Vocabulary Skills, Quasi-experimental design, vocabulary strategy*

Introduction

Science is essential for enriching knowledge, advancing personal experiences, and providing practical solutions to everyday problems (Manalo, 2019; UNESCO, 2020). A

strong foundation in science vocabulary is crucial for academic success, as it helps students comprehend scientific concepts and theories effectively. Science education is vocabu-

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lary-rich, requiring students to read and comprehend complex terms for deeper conceptual understanding. Integrating literacy strategies, such as vocabulary instruction, can significantly enhance learning (Venida, 2021). Effective science vocabulary instruction supports students in explaining observations, formulating inquiries, and accessing information from various resources (Erin, 2023).

Despite these benefits, challenges remain. Many students struggle with scientific terms, hindering their comprehension and confidence in discussing scientific concepts (Fleck, 2021). The Education Endowment Foundation (EEF) emphasizes the need for teachers to focus on vocabulary development to improve science education outcomes.

In the Division of La Union, the PHILIRI SY 2022-2023 report revealed significant issues with students' science vocabulary skills. Of 8,977 Grade 10 learners assessed, 1,665 were classified as "Frustration" during the pretest, decreasing slightly to 661 in the post-test. Similarly, reading comprehension results showed 1,712 learners classified as "Frustration" during the pretest, reducing to 684 post-tests. At Dona Francisca Lacsamana de Ortega Memorial National High School, data from the first periodical test in science 10 (SY 2023-2024) indicated poor performance linked to weak vocabulary skills. Out of 478 learners, 200 struggled with basic comprehension questions related to scientific vocabulary. This deficiency also affected their ability to explain key concepts such as plate boundaries and tectonic activity. Teachers' item analyses further revealed that many Grade 10 learners fell below expectations due to limited vocabulary skills, often hindering their performance in summative tests and performance tasks.

To address these issues, the researchers propose the implementation of the Contextualized Science Vocabulary Worksheet (COS-CIVOW). This worksheet encourages students to understand and use scientific terms in meaningful contexts, promoting both vocabulary retention and conceptual understanding. By incorporating COSCIVOW into regular instruction, the researchers aim to improve the sci-

ence vocabulary skills of Grade 10 learners, ultimately enhancing their overall academic performance.

Research Questions

This study aims to enhance the science vocabulary skills of Grade 10 Learners of Doña Francisca Lacsamana de Ortega Memorial National High School through a Contextualized Science Vocabulary worksheet.

Specifically, the study sought answers to the following questions:

- What is the vocabulary skill levels of the control and experimental groups before and after the use of COSCIVOW?
- Is there a significant difference in the vocabulary skill levels of the control and experimental groups before and after the use of COSCIVOW?
- What is the mean percentage increase in the vocabulary skill levels of learners in both the control and experimental groups?

Methodology

Research Design

This study adopted a quasi-experimental two-group pretest-posttest design to determine the effectiveness of COSCIVOW in improving Grade 10 learners' vocabulary skills. A quasi-experimental design involves manipulating one or more independent variables and observing their effects on dependent variables (Mitchell, 2015; Harland et al.). This design was chosen to establish a causal relationship between the intervention and learners' vocabulary development.

Participants

The study involved 164 Grade 10 learners from Doña Francisca Lacsamana de Ortega Memorial National High School. Learners were selected through purposive sampling, a non-random method where participants are deliberately chosen based on specific criteria relevant to the study. Based on a teacher-made pretest, the learners were divided equally into a control group and an experimental group, each with 82 participants. This approach ensured a balanced representation and allowed for focused observation of the intervention's impact.

Table 1. Distribution of Number of Respondents

Group	Number of respondents
Control group	82
Experimental Group	82
Total	164

Intervention

COSCIVOW (Contextualized Science Vocabulary Worksheet), consisted of vocabulary worksheets designed to enhance scientific vocabulary understanding through contextualization. Each worksheet provided scientific terms with context-based tasks, encouraging students to understand word meanings within real-life situations. Specific COSCIVOW activities included matching terms with definitions, sentence construction using scientific vocabulary, and concept maps linking terms to scientific processes.

The intervention was implemented during the third quarter every Friday from 4:00 to 4:30 PM with the experimental group, while the control group received traditional instruction. Learners were provided clear instructions and completed the worksheets independently before submitting them for evaluation.

Instrumentation and Data Collection

A researcher-made multiple-choice pretest and posttest assessed learners' vocabulary skills. The test was validated by three science education experts using a validity instrument adapted from Veroy (2010), scoring a validity rating of 4.90 (Very Highly Valid). Reliability testing was conducted using Cronbach's alpha on senior high school learners from DFLOM-NHS, yielding a value of 0.73 (Adequately Reliable), indicating consistent measurement of vocabulary skills.

Data collection included a pretest to establish baseline vocabulary skills, followed by the COSCIVOW intervention. A posttest identical to the pretest was administered to both groups after the intervention. Weekly worksheets completed by the experimental group were also collected for qualitative data on learner engagement and progress.

Data Analysis

Score Range	Interpretation
41-50	Outstanding (O)
31-40	Very Satisfactory (VS)
21-30	Satisfactory (S)
11-20	Fairly Satisfactory (FS)
1-10	Did Not Meet Expectations (DNME)

To determine vocabulary skill levels (Question 1), mean and frequency counts were used. For Questions 2 and 3, ANOVA was conducted using the Analysis ToolPak to test for significant differences in vocabulary skills before and

after the intervention. The mean scores were categorized according to the above scale to interpret learners' overall vocabulary proficiency.

Results

Level of Vocabulary Skills before and after the Implementation of the Intervention

Table 2. Level of Science Vocabulary Skills before and after the Implementation of the Intervention

Group	Pre-test Mean	Pre-test Rating	Post-test Mean	Post-test Rating
Control	22.11	Satisfactory	26.04	Satisfactory
Experimental	22.71	Satisfactory	37.02	Very Satisfactory

Table 2 presents the learners' level of vocabulary skills in the control and experimental groups before and after the utilization of COSCIVOW. The control group had a satisfactory level of vocabulary skills during both the pre-

test and post-test with means of 22.11 and 26.04, respectively. The experimental group also started with a satisfactory level (mean = 22.71) but improved to a very satisfactory level (mean = 37.02) after the intervention.

Difference of level of vocabulary skills between controlled and experimental groups along pre-test and post-test

Table 3. Level of vocabulary skills between controlled and experimental groups along pre-test and post-test

Source	SS	df	MS	F	F_crit	Remarks
Treatment	82.17	100	0.35	0.53	1.66	Not Significant
Error	78.33	100	0.41			

*0.05 level of significance

Source	SS	df	MS	F	F_crit	Remarks
Treatment	54.51	100	0.35	10.93	4.58	Significant
Error	84.48	100	0.41			

*0.05 level of significance

The data reveal that in the pre-test, the F value (0.53) was lower than the critical value (1.66), indicating no significant difference between the control and experimental groups. In

contrast, the post-test results showed a significant difference (F = 10.93, p < 0.05) between the groups, indicating the effectiveness of COSCIVOW.

Mean Percentage Increase in the Level of Vocabulary Skills of the Learners both in the Control and Experimental Groups

Table 4. Mean Percentage Increase in the Level of Vocabulary Skills of the Learners both in the Control and Experimental Groups

Group	N	Pre-test Mean	Post-test Mean	Percentage Increase
Control	82	22.11	26.04	17.77%
Experimental	82	22.71	37.02	63.01%

Table 4 displays the mean percentage increase in the level of vocabulary skills for both the control and experimental groups before and after the intervention. The experimental group showed a substantially higher percentage increase (63.01%) compared to the control group (17.77%).

satisfactory. This similarity suggests that any differences observed in the post-test scores can be attributed to the intervention applied to the experimental group.

Discussion

Level of Vocabulary Skills before and after the Implementation of the Intervention

Both groups started with similar levels of vocabulary skills, indicated by the mean scores and both were rated as Both groups started with similar levels of vocabulary skills, indicated by their pre-test mean scores rated as

After the intervention, the control group showed slight improvement, maintaining a satisfactory rating, while the experimental group exhibited a substantial improvement, with the mean score rising significantly to a very satisfactory level. This suggests that the COSCIVOW intervention was successful in enhancing vocabulary skills significantly compared to traditional methods. The findings align with Andazola (2019), who found that science vocabulary worksheets enhance understanding by

connecting images, words, and graphic organizers, leading to improved test performance and deeper science literacy.

Significant Difference Between the level of science vocabulary skills of the controlled and experimental group Before and After the Intervention

The pre-test results indicated no significant difference between the control and experimental groups, confirming a balanced starting point for both groups. However, post-test analysis revealed a significant difference, with the experimental group achieving higher vocabulary skills after the COSCIVOW intervention. The results support the study by Quin Li (2023), emphasizing the importance of effective vocabulary teaching methods for improving learning outcomes. The significant post-test difference indicates that the COSCIVOW intervention effectively enhanced the experimental group's vocabulary skills compared to the control group.

This outcome is further supported by Hadiarah (2021), who found that vocabulary worksheets positively influenced students' desire to learn vocabulary, particularly when paired with engaging visuals and interactive tasks.

Mean Percentage Increase in the Level of Vocabulary Skills of the Learners both in the Control and Experimental Groups

The mean percentage increase analysis revealed a greater improvement in the experimental group compared to the control group. This indicates that the COSCIVOW intervention significantly improved vocabulary skills more effectively than traditional methods. These findings are consistent with Brooks et al. (2021) and Ramadhani et al. (2023), who emphasized the importance of vocabulary support in classrooms and the effectiveness of pictorial worksheets in improving vocabulary learning outcomes. The results confirm that COSCIVOW is a valuable tool for enhancing science vocabulary skills.

Conclusions

The findings and corroborations presented consistently support the effectiveness of

COSCIVOW in enhancing science vocabulary skills among Grade 10 learners. The results highlight significant improvements in comprehension and retention, validating COSCIVOW as a powerful instructional tool.

In conclusion, the study emphasizes the substantial impact of COSCIVOW in improving science vocabulary skills, metacognition, self-directed learning, and emotional development. Its positive influence establishes it as a versatile teaching strategy capable of fostering deeper understanding and student engagement.

Recommendations

1. **Integration in Teaching Practices:** Educators are encouraged to integrate COSCIVOW into regular instructional strategies to promote critical thinking, curiosity, and deeper learning.
2. **Division-Wide Implementation:** Research teachers should advocate for the adoption of COSCIVOW not only within their schools but also across the Division of La Union to maximize its positive impact.
3. **Professional Development:** Provide workshops and training sessions for teachers on the effective use of COSCIVOW in lesson planning and classroom instruction.
4. **Ongoing Research and Adaptation:** Further studies are recommended to explore the long-term impact of COSCIVOW on various learning competencies and adjust the tool for broader subject applications.

By embracing COSCIVOW, educators can create engaging learning environments that empower students and support lasting academic growth.

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