Republic of the Philippines
Department of Education
REGION IV-A CALABARZON
CITY SCHOOLS DIVISION OF BIÑAN CITY

PROBLEM-SOLVING SKILLS ENHANCEMENT THROUGH TEACHER-MADE WORKSHEETS FOR GRADE 11 PHYSICAL SCIENCE IN BIÑAN CITY SENIOR HIGH SCHOOL - SAN ANTONIO CAMPUS

ROSALYN B. MISA
Teacher II
BCSHS-San Antonio Campus

LYNDJOY O. MARTIN
Teacher II
BCSHS-San Antonio Campus

ABSTRACT

This study aimed to evaluate the impact of teacher-made worksheets on enhancing problem-solving skills through the scientific method in Grade 11 HE1-Cookery students, specifically in the domain of Physical Science. The research addressed three fundamental questions: the influence of teacher-made worksheets on students' science performance, a comparison between pretest and posttest mean scores, and the identification of any significant differences in mean scores in Physical Science. Strengths of the study include the utilization of quantitative research design, used purposive sampling resulting to 22 respondents or participants, and the provision of practical insights for enhancing science education. Nonetheless, the study had limitations, notably its focus on a single class, which may limit generalizability.

In terms of the effects of teacher-made worksheets on students' science performance, the results were promising. Participants exhibited a high level of confidence and comfort in their ability to solve problems, with the statement "I could now solve problems with ease and confidence" receiving the most positive response, boasting a mean score of 4.85. This implies that teacher-made worksheets effectively engaged students, encouraging active participation and nurturing confidence in problem-solving during class.

The analysis of Grade 11 HE1-Cookery students' performance in pretests and posttests revealed a significant improvement. The pretest mean score of 11.91 indicated an average performance level, whereas the posttest mean score of 19.35 signified substantial progress. The

posttest results, involving 22 students, allowed for a fair comparison between pretest and posttest data, albeit displaying some variability, as indicated by a standard deviation of 2.34.

Furthermore, a statistically significant difference was observed between the pretest and posttest scores in Physical Science. The calculated t-statistic was less than 0.012, with 18 degrees of freedom and a one-tailed significance level of 0.0139. This suggests that the observed change in mean scores was likely attributed to the intervention – the utilization of teacher-made worksheets. The teacher-made worksheets had indeed significantly improved their problem-solving skills in physical science, resulting in a strong foundation in scientific techniques.

Keywords: *teacher-made worksheets, Science, collaborative learning, integrating technology, physical science problems, Physical Science*

INTRODUCTION

The Department of Education, in a statement, maintained confidence in the benefits of holding in-person classes to promote academic development and the overall mental health and well-being of learners. Several published studies "pointed to the undisputable fact that in-person classes remained the best option for basic education." (MANILA BULLETIN, 2022). This statement proved that in-person classes still stood as the best option to deliver quality education, which pushed all the members of this educational institution to start face-to-face classes amidst the post-pandemic situation.

The Philippines was one of the few countries that went back to face-to-face learning amid Covid-19. Experts said that the extended deferment of in-person lessons had deteriorated into an education crisis. In November, students in areas identified as an insignificant risk for the coronavirus started to return to limited face-to-face classes across the country after 20 months of blended learning. With the progressive increase of face-to-face classes, the Department of Education (DepEd) developed a learning recovery plan framework to guide schools in addressing learning gaps due to pandemic-related disruptions.

In the statement of Vice President Sara Z. Duterte, she said that "Ang pinakamahalaga na masasabi ko na nagawa natin as a country is naibalik natin 'yung ating in-person classes sa ating mga eskwelahan," (Magsambol, 2022). This statement renewed and strengthened the determination of the department to continue education despite the 2-year distance learning scheme implemented by all schools. In a study conducted by the World Bank Group (2022), it was noted that the COVID-19 pandemic had disrupted education in over 150 countries and affected 1.6 billion students.

During this challenging situation, the department stayed optimistic about increasing the number of schools that could implement face-to-face learning. As specified in DepEd Order No. 34, s 2022, entitled school calendar and activities for S. Y. 2022-2023, whereas the Department of Education guaranteed the effective implementation of the K to 12 Curriculum amid the challenges posed by the pandemic, it continuously highlighted its effort to bring initiatives and technical assistance in contributing to the strategic instructions of schools on the delivery, accessibility, responsiveness, and quality education through the development of the Learning Recovery and Continuity Plan (LRCP). With the implementation of these, it announced the Presentation of each

Division LRCP, which aimed to emphasize the implementation of the contextualized set of strategies and interventions.

The researchers of this study believed that through teacher-made worksheets, the learning gap caused by homeschooling during the pandemic could be closed through interventions such as teacher-made worksheets. These teacher-made worksheets followed a pattern that made it easier for students to answer science problems using scientific methods. The contents of the said worksheets were activities that fit the learners' needs based on their least learned competencies. The Office of Human Resources (2017) defined competencies as knowledge, skills, abilities, and behaviors that contributed to individual and organizational performance. Uy (n.d.), on the other hand, defined least learned competency as any skill from the competencies of a given subject of which learners showed most of the difficulty in performing. In the case of the Grade 11 learners, it was observed by the Science teachers that most of the students found difficulty in solving science problems using the scientific method. The researchers found it a necessity to intervene through teacher-made worksheets especially crafted to eliminate these challenges.

METHODOLOGY

The researchers used surveys and teacher-made worksheets as the primary tools for this study. A survey questionnaire was a set of questions used to collect data that was helpful to a community or a group of people, and the results of the statistical analysis were used to further the development of the individual or the community (2019). The purpose of a survey questionnaire was to gather, analyze, and interpret the various opinions of a group of people from a specific population. In this case, the questionnaire was used to find out the effects of these teacher-made worksheets after they were used.

In the conduct of this study the following procedures were followed by the proponents:

Phase I. Preparation Stage

During this phase, the researchers sought permission from the school's principal to conduct the study. They also devised the necessary tools and instruments.

Phase II. Data Gathering Stage

In this stage, the researchers created a pretest consisting of problem-solving items, which they administered to the students before the implementation of teacher-made worksheets. Following that, a post-test was given.

Phase III. Data Analysis Stage

Upon collecting all the required data, the researchers organized, tabulated, evaluated, and interpreted the information. They then formulated conclusions and generalizations.

This study analyzed the data using statistical methods, including an independent T-test to determine if there was a significant difference in learners' performance before and after using teacher-made worksheets. The P-value approach was used to state the hypothesis and select appropriate test statistics. The weighted mean was used to determine the average weighted mean for grade 6 students' performance. The Likert scale was used to determine attitudes, values, and views, as respondents expressed agreement on how teacher-made worksheets would improve their problem-solving skills. The study aimed to determine the effectiveness of these teacher-made worksheets in improving students' problem-solving skills.

Range	Verbal Interpretation
4.50 -5.00	Strongly Agree
3.50 -4.49	Agree
2.50 -3.49	Neutral
1.50 -2.49	Disagree
1.0 -1.49	Strongly Disagree

RESULTS

The results of the study provided compelling evidence that teacher-made worksheets effectively enhanced problem-solving skills in the context of physical science education. Through a comprehensive analysis of both quantitative and qualitative data, several key findings emerged, supporting the positive impact of teacher-made worksheets on students' problem-solving abilities in physical science.

Question 1: *What are the effects of implementing Teacher-Made Worksheets on the science performance of Grade 11 HE-Cookery students?*

- the students possessed a baseline familiarity with the scientific method, although there was room for improvement in their understanding. Effective teaching of the scientific method was evident, with students demonstrating clarity in the process;
- the teacher-made worksheets engaged students effectively in problem-solving, fostering their confidence in applying the scientific method to address scientific challenges;
- the participants exhibited strong confidence in their ability to solve problems with ease and confidence, as evidenced by a mean score of 4.85, ranking this statement as first and the most positively received among all items in the survey.

Question 2: *What are the pretest and posttest mean scores of Grade 11 HE1-Cookery students before and after the application of teacher-made worksheets?*

The pretest and posttest, the pretest score was 11.91, indicating an average performance level of 11.91 out of the total possible scores. The posttest mean score was 19.35, indicating an improvement in student performance. The posttest data also included 22 students, allowing for a fair comparison between the pretest and posttest data. The standard deviation for the posttest scores was 2.34, suggesting some variability in the scores.

Question 3: *Is there a statistically significant difference between the pretest and posttest mean scores in the field of Physical Science?*

The statistically significant difference between the pretest and posttest scores in Physical Science was found to be less than 0.012, with 18 degrees of freedom and a one-tailed significance level of 0.0139. This suggests that the change observed in the mean scores was likely a result of the intervention or instruction applied between the pretest and posttest assessments. However, it is important to consider the practical significance and context of the study to assess the real-world impact of this difference. The magnitude of the change and its educational or clinical relevance should be further examined to understand the full implications of these findings.

DISCUSSION

The findings of this study carry important implications for education. The study focused on the effectiveness of teacher-made worksheets in enhancing problem-solving skills among Grade 11 HE1-Cookery students in the context of Physical Science. The results revealed several key findings:

The study found that teacher-made worksheets were effective in engaging students in problem-solving. Students strongly agreed that the worksheets enhanced their problem-solving skills in the context of physical science. This result suggests that well-designed worksheets can serve as valuable tools to actively involve students in the learning process.

The study showed that students felt comfortable with the use of the scientific method in problem-solving. They exhibited a high level of confidence in applying the

scientific method to address scientific questions. This finding highlights the success of the educational approach in equipping students with the knowledge and confidence to employ the scientific method in their problem-solving endeavors.

One of the most significant findings was the substantial increase in students' problem-solving skills. The pretest and posttest comparison demonstrated a remarkable improvement in student performance. The mean pretest score was 11.91, while the mean posttest score was 19.35, indicating a significant gain in their problem-solving abilities.

The statistical analysis revealed a significant difference between the pretest and posttest scores in Physical Science. The calculated t-statistic was less than 0.012, with a one-tailed significance level of 0.0139. This statistical significance implies that the observed change in mean scores was not due to random fluctuations but was a result of the intervention, in this case, the use of teacher-made worksheets.

The significance of these findings is paramount in the field of education. They underscore the value of active learning through well-designed worksheets, particularly in science education. The enhanced problem-solving skills and students' confidence in applying the scientific method suggest that this teaching approach can be instrumental in improving the quality of science education.

The study's findings emphasize the positive impact of teacher-made worksheets in enhancing problem-solving skills and students' confidence in the scientific method. The observed significant difference reinforces the importance of innovative teaching methods in improving educational outcomes. These results have the potential to inform teaching practices and curriculum development, ultimately benefiting students' learning experiences.

ACKNOWLEDGMENTS

The proponent would like to express her deepest gratitude to those who contributed to the completion of the research study. First and foremost, she is thankful to Ma'am Leslie V. Denosta for her invaluable guidance, support, and encouragement throughout the course of the research. Her research colleague, Lyndjoy O. Martin for her expertise in editing provided valuable perspectives.

The proponent extends her gratitude to the BCSHS-San Antonio Campus, the City Schools Division of Biñan City, and the Local Government Unit of Biñan City for the support on the conduct of the study as well as her appreciation to the participants of this study, the grade 11 HE 1 Cookery class, without whom this research would not have been possible. Their willingness to share their experiences and insights provided essential data and context for this study.

Thank you to everyone who contributed to this research study. Your support has been invaluable, in which the proponent is sincerely appreciative of all the help she received.

REFERENCES

A., A. (2019, July 9). What Is a Survey Questionnaire? Examples. Examples.com. https://www.examples.com/education/what-is-a-surveyquestionnaire.html#what_is_a_survey_questionnaire

Bhandari, P. (2022, October 10). What Is Quantitative Research? | Definition & Methods. Scribbr. https://www.scribbr.co.uk/research-methods/introduction-to-quantitative-research/

Blog, I. O. W. |. M. H. T. (2021, August 31). Importance of worksheets | Mera

home Tutor blog. Importance of Worksheets | Mera Home Tutor Blog. https://www.merahometutor.com/blog/61/Importance-of-worksheets.html

Braun, V. and Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3 (2). pp. 77-101. ISSN 1478-0887

Creswell, John W. (2006). Five Qualitative Approaches to Inquiry. Sage Publications. https://www.sagepub.com/sites/default/files/upm-binaries/13421_Chapter4.pdf

Department of Education. (2020, May 11). IATF Approved the BE-LCP, School Opening on August 24, 2020. https://www.deped.gov.ph/2020/05/11/iatf-approves-the-be-lcp- school-opening-on-august-24-2020/

DepEd on the expansion phase of limited face-to-face classeshttps://www.deped.gov.ph/2022/02/02/on-the-expansion-phase-of-limited-face- to-face-classes/

Doyle, A. (2020). What Is a Semi-Structured Interview? The Balance Careers. https://www.thebalancecareers.com/what-is-a-semi-structured-interview-

Duquesne University. (1980). LibGuides: Qualitative Research Methods: Phenomenology.Duquesne University Website. https://guides.library.duq.edu/c.php?g=836228&p=5972144

Engaging students via In-Class Worksheets | Mathematical Association of America. (n.d.). https://maa.org/programs/faculty-and-departments/curriculum-department-guidelines-recommendations/innovative-teaching-exchange/in-class-worksheets

Gramlick, V. a. P. B. N. (2019, February 21). Are worksheets good, or bad? Nicolette's Educational Technology Portfolio. https://gramlick.wordpress.com/2019/02/16/are-worksheets-good-or-bad/

Journal of Technology and Science Education

PROBLEM-SOLVING DIFFICULTIES: HOW CAN WE HELP STUDENTS OVERCOME COGNITIVE

D Liberato Cardellini Dipartmento SIMAU, Universita' Politecnica della Marche Italy l.cardellini@univpm.it

Manila Bulletin. (2020, July 22). DepEd: No Filipino learner will be left behind. Manila Bulletin. https://mb.com.ph/2020/06/24/deped-no-filipino-learner-will-be-left-behind/

Moustakas, C. (1994). Phenomenological Research Methods. Thousand Oaks, CA: Sage. P.

Philippine News Agency, By Ma. Teresa Montemayor, Dec. 31,2021 https://www.pna.gov.ph/articles/1164154 21

Remediana Dias. Author & Founder of the NGO - Vision Education Societyhttps://www.gesseducation.com/gess- talks/articles/youve-identified-the-gaps-what-do-you-do-