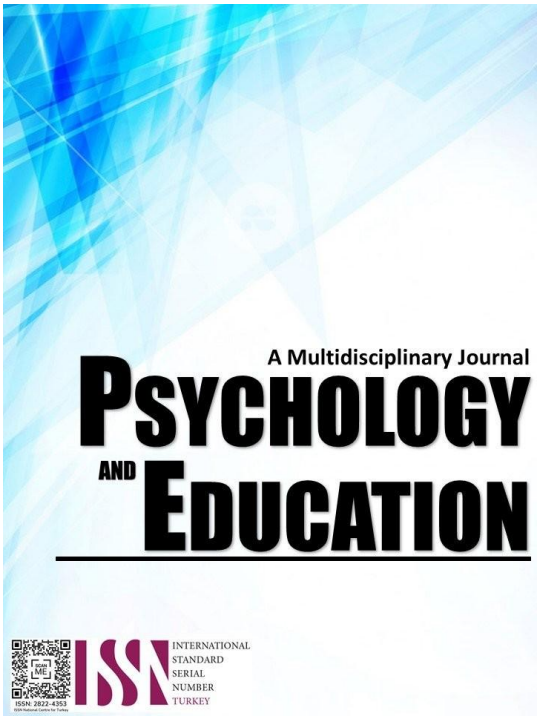
CONTEXTUALIZED EARTH SCIENCE WORKSHEET AND ITS EFFECT ON THE ACADEMIC ACHIEVEMENT OF GRADE 7 STUDENTS



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Research Article

Contextualized Earth Science Worksheet and Its Effect on the Academic Achievement of Grade 7 Students

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Abstract

This study investigated the effectiveness of Contextualized Earth Science Worksheets on the academic performance of Grade 7 students at Datu Matilondo Galmak National High School during School Year 2024–2025. Using an experimental pretest–posttest research design, eighty (80) Grade 7 students were equally divided into an experimental group and a control group. The experimental group was exposed to the contextualized worksheets developed in alignment with the MATATAG Curriculum, while the control group utilized the standard self-learning modules. A researcher-made test was administered as both a pretest and a posttest to measure students' academic performance. Results showed that the experimental group ($M = 12.85$, $SD = 3.39$) and the control group ($M = 12.82$, $SD = 3.21$) did not differ significantly in their pretest scores ($t = 0.03$, $p = 0.97$), indicating comparable baseline knowledge. However, posttest results revealed a statistically significant difference between groups, with the experimental group achieving a higher mean score ($M = 29.60$, $SD = 3.33$) compared to the control group ($M = 23.48$, $SD = 5.00$), ($t = 6.44$, $p < 0.0001$). Furthermore, the experimental group obtained a significantly higher mean gain score ($M = 16.75$) than the control group ($M = 10.65$) ($t = 5.84$, $p < 0.0001$). Additionally, the contextualized worksheets were rated highly acceptable on content ($M = 4.8$), relevance ($M = 4.7$), and instructional quality ($M = 4.8$). These findings indicate that contextualized worksheets significantly enhance students' learning outcomes and serve as an effective supplementary instructional material in Earth Science.

Keywords: *contextualized worksheets, earth science education, academic performance, grade 7 students, experimental research, instructional materials, science teaching, MATATAG Curriculum*

Introduction

The quality and effectiveness of students' learning are closely linked to the instructional materials used in the teaching–learning process. Numerous studies have consistently shown that instructional materials significantly influence students' learning outcomes, underscoring their critical function in promoting meaningful and compelling learning experiences in educational settings.

The Grade 7 curriculum represents a crucial stage in students' academic development, as it introduces foundational concepts in Earth Science that serve as building blocks for more advanced scientific learning. At this level, students are expected to develop fundamental scientific literacy, conceptual understanding, and inquiry skills. Consequently, the manner in which content is presented becomes particularly important in fostering comprehension and sustained interest in the subject.

Several scholars, including Bordia (2022), Hizon (2018), and Lane (2022), highlight that well-crafted instructional materials contribute significantly to creating engaging and comprehensive learning environments. Such materials help bridge the gap between abstract theoretical concepts and real-world applications, enabling learners to better relate to, understand, and internalize scientific ideas. When instructional materials are aligned with learners' needs and contexts, they enhance motivation and facilitate deeper learning.

Despite their importance, many schools face persistent challenges that hinder effective instruction. These challenges include an insufficient supply of textbooks, often with a ratio of one book for every eight students, limited availability of supplementary teaching materials, and frequent class interruptions due to school activities. Additional constraints, such as fewer school days, inadequate internet connectivity, and the absence of functional laboratory facilities, further complicate the coverage of all required competencies in Earth Science. In response to these challenges, this study seeks to develop contextualized worksheets that address key Grade 7 Earth Science topics. These worksheets are designed to supplement existing instructional resources, provide structured learning activities, and present content in a manner that is relevant to students' experiences. By contextualizing lessons, the study aims to enhance students' understanding of specific Earth Science concepts and improve their overall academic performance.

Finally, the effectiveness of the developed worksheets was evaluated by examining their impact on students' pretest and posttest scores. This evaluation provides empirical evidence on the potential of contextualized worksheets as a supplementary instructional tool, offering valuable insights for teachers, school administrators, and curriculum developers seeking to improve science instruction under resource-limited conditions.

Research Questions

This study assessed the impact of Contextualized Earth Science Worksheets on the academic performance of Grade 7 students at Datu Matilondo Galmak National High School. The research explored the following questions:

1. To what extent is the acceptability of the Contextualized Earth Science Worksheet in terms of its:

1.1. content;
1.2. relevance; and
1.3. instructional aspect?

2. Is there a significant difference in the pre-test scores between the control group and the experimental group?
3. Is there a significant difference in the post-test scores between the control group and the experimental group?
4. Is there a significant difference in the mean gain scores of the control and experimental groups?

Methodology

Research Design

This study employed an experimental research design to determine the effect of Contextualized Earth Science Worksheets on the academic performance of Grade 7 students. The experimental design was deemed appropriate as it allows for the systematic comparison of learning outcomes between students exposed to the developed instructional material and those who received conventional instruction. By using control and experimental groups, the design enabled the researcher to establish a cause-and-effect relationship between the use of contextualized worksheets and students' performance in Earth Science. Pretest and posttest measures were utilized to assess learning gains attributable to the intervention.

Participants

The participants of the study were Grade 7 students from Datu Matilondo Galmak National High School during School Year 2024–2025. A total of 80 students were selected to take part in the study and were divided into control and experimental groups. The control group received regular classroom instruction, while the experimental group received the Contextualized Earth Science Worksheets. The selection and grouping of participants were carried out to ensure comparability between groups in terms of academic level, thereby minimizing bias and strengthening the validity of the findings.

Instrument

The primary instructional instrument used in the study was the Contextualized Earth Science Worksheets, which were developed in alignment with the MATATAG Curriculum. These worksheets were designed to present Earth Science concepts in contexts familiar to the learners, thereby promoting relevance, engagement, and deeper understanding. To measure students' academic performance, a researcher-made test questionnaire was utilized. Two equivalent test sets were administered: one as a pretest before the worksheets were implemented and another as a posttest after the intervention. The same instrument was administered to both the control and experimental groups to ensure consistency in measurement.

Data Analysis

The collected data were analyzed using appropriate descriptive and inferential statistical tools. Frequency, percentage, and mean were employed to describe students' performance in Earth Science and to determine the acceptability level of the Contextualized Earth Science Worksheets. To assess the intervention's effectiveness, a t-test was used to determine whether there was a significant difference between the pretest and posttest scores of the control and experimental groups. The use of these statistical measures enabled a clear, objective interpretation of the results and supported valid conclusions about the impact of the contextualized worksheets.

Ethical Considerations

Ethical considerations were carefully observed throughout the study to protect participants' rights and welfare. Permission to conduct the research was obtained from the school administration, and informed consent was secured from the students and their parents or guardians, considering that the participants were minors. Participation in the study was voluntary, and students were informed that they could withdraw at any time without academic penalty. Confidentiality and anonymity were maintained by ensuring that no identifying information was disclosed in the reporting of results. Additionally, the instructional intervention posed no harm to the participants, as both groups continued to receive appropriate instruction aligned with the curriculum. These ethical measures ensured that the study adhered to accepted research standards and principles.

Results and Discussion

Level of the Acceptability of the Contextualized Earth Science Worksheet

The results reveal high acceptability of the contextualized Earth Science worksheet across three key indicators: Content, Relevance, and Instructional components. Each indicator was assessed using a Likert scale, with mean scores indicating the degree of acceptability.

Table 1. *Level of Acceptability of the Contextualized Earth Science Worksheet*

Indicator	*Mean*	*Interpretation*
Content	4.8	Highly Acceptable
Relevance	4.7	Highly Acceptable
Instructional	4.8	Highly Acceptable

The content indicator received a mean score of 4.8, suggesting that the worksheet is considered highly acceptable in terms of accuracy, completeness, and the appropriateness of the information provided. This high rating indicates that the worksheet delivers scientifically sound, comprehensive content that aligns with the curriculum standards.

Similarly, the worksheet's relevance also garnered a high mean score of 4.7, indicating that the material is highly acceptable in connecting with students' real-life experiences, interests, and local context. This suggests that the contextualization efforts were well-received and enhanced students' engagement and understanding of Earth Science concepts.

Finally, the instructional indicator also achieved a mean of 4.8, underscoring the worksheet's high acceptability for clarity of instructions, logical flow of activities, and potential to foster meaningful learning experiences.

Overall, the consistently high ratings across all indicators suggest that the contextualized Earth Science worksheet is an acceptable educational tool. It meets students' academic and instructional needs while fostering relevance and engagement, making it a valuable resource for Earth Science education.

Pre-test of the Experimental and Control Groups

The pretest results of both the experimental and control groups were analyzed to determine whether the groups were comparable in their initial knowledge of the subject matter. The experimental group (n = 40) had a mean score of 12.85 (SD = 3.39), while the control group (n = 40) had a mean score of 12.82 (SD = 3.21).

Table 2. *Pretest Scores of the Students of the Experimental and Control Groups*

Group	*n*	*SD*	*mean*	*df*	*t-comp*	*p-value*
Experimental Group	40	3.39	12.85	78	0.03	0.97
Control Group	40	3.21	12.82			

α=0.05 level of significance

To test the significance of the difference between the two means, an independent samples t-test was conducted. The computed t-value was 0.03, with a corresponding p-value of 0.97. Given that the p-value is significantly greater than the alpha level of 0.05, the difference between the two groups is not statistically significant.

This indicates that there was no significant difference in the pretest scores between the experimental and control groups. Therefore, both groups started with equivalent baseline knowledge of the Earth Science concepts being studied.

Post-test of the Experimental and Control Groups

The mean of the experimental group (29.60) is higher than the mean of the control group (23.48). The results showed that t-comp = 6.44, with a p-value of <0.0001, which is less than the alpha level of 0.05. There is enough evidence to claim that the difference between the means of the experimental group and the control group is greater than expected by chance. The results show a significant difference in post-test scores between the control and experimental groups.

Table 3. *Posttest Score of the Students in the Experimental and Control Groups*

Group	*n*	*SD*	*mean*	*df*	*t-comp*	*p-value*
Experimental Group	40	3.33	29.60	78	6.44	<0.0001
Control Group	40	5	23.48			

α=0.05 level of significance

The analysis of pre-test and post-test scores provides evidence that the intervention had a positive, statistically significant effect on the experimental group; thus, hypothesis 2 is rejected. This is evident at the start of the trial, where the two groups were essentially equal, thereby supporting whatever conclusions you would get regarding the impact of your intervention on the post-test scores or gain scores.

Mean Gain Score of the Students in the Pretest and Posttest of the Experimental and Control Groups

Based on the results, the experimental group's mean gain score (16.75) is higher than the control group's (10.65). The results showed that t-comp = 5.84, with a p-value < 0.0001, which is less than the alpha level of 0.05. This provides strong evidence that the intervention or treatment given to the experimental group produced a greater gain than that of the control group. Additionally, there is sufficient evidence to conclude that the difference in mean gain scores between the experimental and control groups is greater than expected by chance. The results show a significant difference in mean gain scores between the control and experimental groups.

Table 4. *Analysis of the Mean Gain Score of the Students in the Pretest and Posttest of the Experimental and Control Groups*

Group	*n*	*SD*	*mean*	*df*	*t-comp*	*p-value*
Experimental Group	40	4.62	16.75	78	5.84	<0.0001
Control Group	40	4.73	10.65			

α=0.05 level of significance

Conclusions

The study's findings indicate that the contextualized Earth Science worksheets are an effective instructional tool that addresses students' academic and learning needs. By presenting concepts in contexts familiar to learners, the worksheets enhanced relevance, engagement, and understanding, thereby supporting meaningful learning in Earth Science. These characteristics make the contextualized worksheets a valuable supplementary resource for improving science instruction at the Grade 7 level.

Results further revealed that both instructional approaches—the contextualized worksheets used by the experimental group and the self-learning modules used by the control group—contributed to improvements in students' academic performance. However, a comparison of the learning gains showed that students who used the contextualized worksheets achieved significantly greater improvement than those who relied solely on self-learning modules. This suggests that contextualization plays a crucial role in strengthening comprehension and reinforcing learning outcomes in Earth Science.

Overall, there is strong evidence that the instructional intervention provided to the experimental group led to greater learning gains than the control group. Thus, it can be concluded that the use of contextualized Earth Science worksheets had a positive and significant impact on students' academic performance. The results underscore the potential of contextualized instructional materials as practical tools for enhancing learning, particularly in resource-limited educational settings.

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