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RESEARCH ARTICLE

STRENGTHENING THE MATHEMATICAL SKILLS OF GRADE 7 STUDENTS USING CONTEXTUALIZED PROBLEM-SOLVING ACTIVITIES: A LEARNING MATERIAL

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ABSTRACT

This study aimed to strengthen the mathematical skills of Grade 7 students through contextualized problem-solving activities used as learning materials. The study was conducted among 50 Grade 7 students of Lian Institute in Lian, Batangas, Philippines. A descriptive research method was employed, using a researcher-made questionnaire to gather data on students' perceptions of the contextualized problem-solving activities in terms of development, experimental learning, and mathematics experience. Frequency and percentage were used to describe the respondents' profile, while weighted mean and standard deviation were used to analyze perceptions. A t-test was identified in the thesis as the statistical treatment for determining differences according to profile. Results showed that most respondents were 12 years old (60%) and female (66%). The composite mean for development was 3.38 (SD = 0.643), interpreted as Agree; experimental learning was 3.55 (SD = 0.564), interpreted as Strongly Agree; and mathematics experience was 3.40 (SD = 0.591), interpreted as Agree. The study reported no significant differences in perceptions according to age and sex. Based on the

findings, learning activities were crafted to support students' mathematical development, application, and engagement through real-life problem-solving contexts.

Keywords: contextualized learning, problem solving, mathematics skills, Grade 7, learning materials

INTRODUCTION

Mathematics is a core subject in basic education and plays an important role in developing learners' logical thinking, problem-solving ability, and decision-making skills. The thesis notes that many Grade 7 students experience difficulty when mathematical ideas are presented through word problems and other contextual tasks. Students may perform basic computations but struggle to interpret situations and identify appropriate mathematical operations.

Contextualized problem-solving activities provide a way to connect mathematical concepts with learners' familiar experiences. The study describes contexts such as shopping, budgeting, cooking, transportation, household activities, and community situations as examples that can make mathematics more meaningful. This approach is consistent with the study's use of Problem-Based Learning, Meaningful Learning, and Social Development perspectives.

The study was conducted to respond to the need for learning materials that help Grade 7 learners understand and apply mathematics in meaningful situations. It focused on students of Lian Institute and examined their perceptions of contextualized problem-solving activities in terms of development, experimental learning, and mathematics experience. The findings were also used as the basis for crafting learning activities.

LITERATURE REVIEW

The literature reviewed in the thesis presents development as a continuing improvement in learners' knowledge, skills, and abilities through learning, practice, interaction, and meaningful experiences. Piaget's cognitive perspective, Vygotsky's emphasis on guided social interaction, Bruner's emphasis on discovery and structured experiences, and Ausubel's meaningful learning perspective support the use of familiar and relevant learning experiences in mathematics. Boaler's work is also cited to emphasize the value of contextual and problem-based mathematics activities.

The experimental dimension of the study is linked to the use of instructional interventions to examine learning outcomes. The thesis cites Creswell, Boaler, Hiebert and Grouws, Schoenfeld, Bernardo, Santos, and Dizon in discussing problem-solving, meaningful tasks, contextualized instruction, and activity-based learning in mathematics.

Mathematics experience refers to learners' encounters and interactions with mathematical concepts through activities, exercises, and real-life problem-solving situations. Skemp, Hiebert and Carpenter, Bernardo, Santos, and Dizon are cited to support the view that active engagement, multiple representations, contextual activities, and varied problem-solving experiences can strengthen understanding and confidence.

The study also considered age and sex as respondent-profile variables. The thesis discusses age as a demographic characteristic associated with developmental differences and learning needs, while sex is considered in relation to differences that may occur in participation and learning experiences. These variables were examined to determine whether perceptions of the contextualized problem-solving activities differed among respondent groups.

The theoretical framework combines Problem-Based Learning Theory (Barrows), Meaningful Learning Theory (Ausubel), and Social Development Theory (Vygotsky). Contextualized problem-solving activities serve as the independent variable, mathematical

skills serve as the dependent variable, and respondent profile is considered in examining differences in perceptions.

RESEARCH QUESTIONS

The study sought to answer the following questions:

1. What is the profile of the respondents in terms of age and sex?

2. What is the perception of the respondents regarding the strengthening of their mathematical skills through contextualized problem-solving activities in terms of development, experimental learning, and mathematics experience?

3. Is there a significant difference in the respondents' perceptions when their profile is considered?

4. What learning materials may be crafted based on the results of the study?

METHODOLOGY

The study employed the Descriptive Method of Research. It was conducted at Lian Institute, a private educational institution in Lian, Batangas, Philippines. The respondents were 50 Grade 7 students from selected sections.

A researcher-made questionnaire served as the main data-gathering instrument. The questionnaire included profile items and five-item sets covering development, experimental learning, and mathematics experience, using a four-point scale from Strongly Agree to Strongly Disagree. The instrument was reviewed by the adviser and validated by three experts, including the school principal, Dean of Colleges, and a graduate school professor.

For data gathering, the researcher secured approval from the school authority and administered the questionnaire to the target respondents. The completed questionnaires were

retrieved, tallied, tabulated, analyzed, and interpreted. Frequency counts and percentages were used for profile data; weighted mean and standard deviation were used for perceptions; and a t-test was identified in the thesis for determining differences according to profile.

Ethical review and informed consent were observed. The study was subjected to institutional ethics review, and the researcher reports that participation was voluntary and confidential.

FINDINGS

The principal findings of the study are summarized below.

Profile	Frequency	Percentage
Age 11	10	20%
Age 12	30	60%
Age 13	10	20%
Total	50	100%
Male	17	34%
Female	33	66%

Most respondents were 12 years old (30 or 60%), while 10 respondents (20%) were 11 and another 10 (20%) were 13. In terms of sex, 33 respondents (66%) were female and 17 (34%) were male. □filecite□turn17file0□L275-L327□

Dimension	Composite Mean	SD	Interpretation
Development	3.38	0.643	Agree

Experimental learning	3.55	0.564	Strongly Agree
Mathematics experience	3.40	0.591	Agree

For development, the composite mean was 3.38 (SD = 0.643), interpreted as Agree. Students reported better understanding of mathematical concepts, greater confidence, connection of mathematics to real-life situations, use of learned strategies, and enjoyment of the activities. □filecite□turn17file0□L332-L381□

For experimental learning, the composite mean was 3.55 (SD = 0.564), interpreted as Strongly Agree. The results indicate positive perceptions of hands-on and real-life-based problem-solving experiences. □filecite□turn17file0□L382-L435□

For mathematics experience, the composite mean was 3.40 (SD = 0.591), interpreted as Agree. Respondents reported positive experiences in understanding concepts, applying mathematics to real-life situations, improving skills and confidence, and engaging in classroom activities. □filecite□turn17file0□L436-L491□

The study reported no significant difference in respondents' perceptions when age and sex were considered, and the null hypothesis was reported as failed to be rejected. The thesis table lists values of 6.16, 2.93, and 3.11 for age and 8.25, 8.17, and 6.94 for sex, all marked NS. These reported values should be checked against the original statistical output before journal submission because conventional p-values are normally expressed between 0 and 1. □filecite□turn17file0□L492-L549□

Based on the results, the researcher crafted learning activities intended to help improve students' academic skills. □filecite□turn18file1□L1203-L1218□ Significant at $p < 0.05$

CONCLUSIONS

1. The majority of respondents were 12 years old and most were female.

2. The respondents showed positive perceptions of contextualized problem-solving activities in strengthening mathematical skills.

3. The study reported no significant difference in perceptions when the respondents' profile was considered.

4. Learning activities were crafted from the study's findings to enhance students' academic skills.

RECOMMENDATIONS

1. Teachers and future researchers may consider learners' age and sex when designing instructional activities to make learning experiences inclusive, engaging, and appropriate for diverse learners.

2. Mathematics teachers may continue integrating contextualized and real-life-based problem-solving activities to improve students' understanding, confidence, and engagement.

3. Future studies may examine other factors such as teaching strategies, learning environment, and student motivation.

4. The learning activities developed from the study may be further improved and validated for use in other learning contexts and grade levels.

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