

Teaching strategies for real-world application in mathematics

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Abstract: This study explored mathematics teaching strategies for real world application used by teachers. Thus, the study determine different mathematics teachers' experiences in using different teaching strategies for real world application in mathematics. Results revealed that mathematics teachers commonly used project-based learning such as collaborative learning and real-world projects. Also, they shared that the use of technology including online simulations and digital tools were means for teaching mathematical concepts and principles applying real-world situations.

Keywords: teaching, strategies, real-world application, mathematics, project-based, use of technology

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INTRODUCTION

Teaching mathematics is one of the most feared subjects by learners in the basic education institution and even by the learners in the Higher Education Institutions. Emphasizing this view, learners' academic performance in mathematics are often the root cause of poor low level of analytical, critical and problem solving skills. On the other hand, teachers also encourage extreme difficulty in teaching mathematics in the basic education institutions. They commonly encountered low level of learners' motivation which result to poor engagement and inactive participation in the teaching and learning process. The amount of which learners share their ideas and active engagement in education significantly influence teachers' preference in the formulation and design of instructional strategies, approaches and methods in teaching mathematics. In this line, researchers commonly observed that many mathematics teachers in the basic education level fail to consider the integration of real-world scenarios in the teaching and learning process so as to practically engage learners as to the basic and experiences may be relatable to their daily living. As shown in the study of Ozgeldi and Osmanoglu (2017) which concludes that there is a positive impact as real-world application on student motivation and problem solving skills in learning mathematics is applied consistently. Further, based from the study of Jurdak (2016) which reveals that real world solving problems in mathematics offer effective and efficient learning opportunities as learners can practically relate their learnings and apply them meaningfully.

Consequently, teachers continued design and development of instructional approaches that are based on the progressive demand of the teaching and learning process, have posed greater

concerns as to the efficiency, effectiveness, practicality and impact of the used or implemented instructional approaches. In this line, teachers are also facing difficulty in harmonizing the topical content in teaching mathematics and their application to the real-world situations based from learners understanding and experiences. Thus, teachers find it hard to design and construct activities that are reflective of their learners' experiences. As viewed, there are long lines of strategies emphasizing real-world applications of the topics and contents including principles, formula and theorems in mathematics. However, there are less number of teachers who are strongly engaged in using strategies that apply real-world situations within the corners of mathematics instruction. This rises the interest of the researcher to describe the strategies used by mathematics teachers in teaching mathematics applying real-world situations.

Research Objectives

This study explored mathematics teaching strategies for real world application used by teachers. Thus, the study determine different mathematics teachers' experiences in using different teaching strategies for real world application in mathematics.

METHODOLOGY

Research Design

This study utilized qualitative method specifically phenomenological research design. Here, the study explored the different mathematics teaching strategies used by teachers for real-world application in the teaching and learning process under mathematics instruction. The experiences and exposure of the participants in teaching mathematics put credence to deduce their experiences through major themes and subthemes so as to logically explore their teaching strategies used.

Participants and Locale of the Study

There were thirty-five (35) randomly selected Junior High School mathematics teachers among the selected schools in the Philippines. Selection criteria was established by the researcher such as: (1) those who teach mathematics for more than 10 years already, (2) those who have experienced teaching mathematics that utilize real-world situations or problems and (3) willingness to participate in the study.

Research Instrument

The study utilized researcher-made guide questions which were arranged inductively. These guide questions were written and composed using English language. Hence, no particular translation was done. Apparently, the developed guide questions consisted of 10 major questions with three (3) sub-questions each. As to the validation of guide questions, the researcher tapped the expertise of three (3) Graduate School Professors in Teaching Mathematics. Significantly, the guide questions were validated and obtained a verbal rating of "Excellent Crafted." This means that the guide questions are align with the goals and objectives of this current work moreso, these questions were not leading questions. The researcher proceed then, with the Focus Group Discussion.

Data Gathering Procedure and Data Analysis

The researchers sent a formal letter of request to the respondents' immediate head and informed consents to the subject respondents. In this line, the researchers established active and consistent

line of communication through their social media account. The researcher requested for the time availability and schedule of the participants. Each participant was interviewed via Zoom Teleconferencing. They were given 10-15 minutes to complete the interview. Before the actual Focus Group Discussion, the researcher discussed first the nature and intent of the study and collected the accomplished informed consent. Hence, the participants were informed their responses would be recorded. After completion of Focus Group Discussion, the researcher encoded the responses in verbatim format. The researcher developed a Table for Qualitative Responses (TQR) and used code-decoding scheme. Thus, thematic analysis was used in order to explore mathematics teachers' teaching strategies for real-world application in teaching mathematics.

DISCUSSION OF FINDINGS

The participants' responses reveal two major themes central to their teaching practices: Project-Based Learning and Use of Technology. Under Project-Based Learning, the subthemes identified are collaborative learning and real-world projects, while under Use of Technology, the subthemes are mathematics software and online simulations.

Mathematics teachers effectively implement project-based learning by engaging students in collaborative group activities where they develop and complete real-world projects. These projects require students to apply mathematical concepts to solve practical problems, reflecting authentic scenarios. Teachers encourage learners not only to follow instructions but also to design their own projects that align with instructional goals and correctly demonstrate mathematical principles. This approach emphasizes meaningful, hands-on learning, as highlighted by participants who stated that projects become more impactful when they incorporate real-world problems and allow students to apply their acquired knowledge creatively.

Alongside this, the use of technology plays a significant role in enhancing mathematics instruction. Teachers integrate digital tools such as online calculators, spreadsheets, and specialized software to perform complex calculations and simulate real-world conditions. They also incorporate online simulations and models, which extend learning beyond traditional methods by immersing students in interactive, technology-enhanced scenarios. Participants acknowledged the value of these tools, noting the diversity of technological resources available, such as simulations and digital games, to support student learning.

Overall, the findings underscore that mathematics teachers skillfully design teaching strategies that combine project-based and technology-driven approaches to make mathematical instruction more relevant and engaging. These practices align with the findings of Nugraheni et al. (2021), which confirm that realistic mathematics education becomes more effective when technology is systematically used to replicate real-world experiences, thereby deepening student understanding and application of mathematical concepts.

CONCLUSION

Real-world applications of acquired mathematical concepts and principles were effected by means of teaching strategies used by mathematics teachers. In this regard, mathematics teachers commonly used project-based learning such as collaborative learning and real-world projects. Also, they shared that the use of technology including online simulations and digital tools were means for teaching mathematical concepts and principles applying real-world situations.

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