

## Editorial of the Summer 2024 issue 53, Vol 16 No 3

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### Editorial by William Baker



This issue contains teaching research articles from a variety of countries in the global community of mathematics teacher-researchers. This collection of articles investigates the use of internet-based technology, flexible teaching methods, ethnomathematics, realistic mathematics problems within problem-solving, hypothetical learning trajectories, geometry to assist visualization, and collaborative group work within problem-solving. The different papers in this article attempt to show improvement in student learning, motivation, conceptual understanding, and problem-solving ability through the use of these various methodologies.

### Flexible Teaching-Learning Modality in Mathematics Education of a State University in West Philippines

*Authors: Ronalyn M. Bautista, Dominga C. Valtoribio (p.5)*

The paper explores the implementation of flexible teaching and learning modalities in mathematics education in response to the COVID-19 pandemic. It focuses on assessing the modalities used by Mathematics Teacher Educators (MTEs), learners' perceptions of flexible teaching and learning, opportunities for improvement, and developing an action plan to enhance these modalities. The teaching research study emphasizes the implementation of flexible instructional approaches. The research involves a mixed-methods research design to gather data and analyze results in a state university in West Philippines. The possible audience for this paper includes mathematics educators, MTEs, educational researchers, curriculum developers, and policymakers interested in enhancing teaching and learning modalities in mathematics education, especially in response to challenges like the COVID-19 pandemic.

### Development of Discovery-Based Ethnobra (Ethnomathematics Geogebra) Geometry Learning Model to Improve Geometric Skills in Terms of Student Learning Styles and Domicile.

*Authors: Hamidah, Jaka Wijaya Kusuma, Sigit Auliana (p.25)*

The paper presents a research study on improving students' geometry skills by developing a culture-based Geometry learning design based on Geogebra to implement an Ethnomathematics model. The study, which takes place in Indonesia, proposes a new approach to teaching geometry

based on students' learning styles and domicile. This model was found practical and effective in enhancing students' geometry skills. The possible audience for this paper includes educators, researchers in the field of education, and those interested in the integration of culture and technology in teaching and learning

### **The Use of Variation Theory of Learning in Teaching Solving Right Triangles**

*Authors: Joel B. Mendoza, Minie Rose C. Lapinid (p.58)*

This research examines how Variation Theory is employed as a pedagogical tool to enhance students' problem-solving abilities in trigonometry, in the Philippines. This topic is important as disseminating the principles of Variation Theory among instructors can substantially improve students' learning outcomes. The article describes learning trigonometry under the usage of Variation Theory. It focuses on the variation patterns of *contrast*, *separation*, and *generalization* to help students discern that not all triangles are solvable, especially when there is a lack of given information. The primary audience for this study is Mathematics instructors of trigonometry or branches of math that use trigonometry.

### **How Students Understand the Area under a Curve: A Hypothetical Learning Trajectory**

*Authors: Aniswita, Ahmad Fauzan, Armianti (p.80)*

This paper focuses on how students understand the area under the curve in contextual problems and how the Hypothetical Learning Trajectory (HLT) can help students discover the concept. This paper studies how students understand the concept of the area under a curve over a closed interval in Integral Calculus, in a college-level class in Indonesia. This paper presents teaching research on how students can improve their understanding of the area under a curve, using a Hypothetical Learning Trajectory. This article is appropriate for Calculus instructors interested in using HLTs to assist student learning.

### **The Role of Ethnomathematics in South-East Asian Learning: A Perspective of Indonesian and Thailand Educators**

*Authors: Gusti Ayu Putu Arya Wulandari, I Putu Ade Andre Payadnya, Kadek Rahayu Puspadewi, Sompob Saelee (p.101)*

The paper explores ethnomathematics in Indonesia and Thailand, to understand its importance in teaching mathematics. Participants included educators and pre-service teachers, who provided positive responses through questionnaires and interviews.

The study emphasizes the need to integrate ethnomathematics into education, highlighting its close ties to cultural development. More specifically, this paper addresses the role of ethnomathematics in Southeast Asian learning, focusing on educators' perspectives in Indonesia and Thailand. This proposal seeks to understand the challenges, and opportunities educators face in implementing ethnomathematics. The research methodology is a descriptive qualitative approach, involving teaching activities, questionnaires, interviews, and documentation. Teaching activities showcase the effectiveness of ethnomathematics instruction in enhancing students'

understanding of mathematical concepts through real-world and cultural contexts. Questionnaires and interviews provide insights into educators' perspectives on ethnomathematics, revealing positive recognition in Indonesia and Thailand, with nuanced differences.

### **Effectiveness of the CORE Learning Model: A Case Study of Learning the Method of Coordinates in a Plane in Vietnam**

*Authors: Duong Huu Tong, Pham Sy Nam, Nguyen Thi Nga, Le Thai Bao Thien Trung, Tang Minh Dung, Bui Phuong Uyen, Nguyen Nguyen Chuong (p 120)*

The authors studied the CORE (connecting, organizing, reflecting, and extending) method for teaching geometry. This study is a quasi-experimental design with a treatment group of 47 tenth-grade students and 49 students in the control group. The results found that students in the treatment group performed better academically than the control group, taught using a traditional teaching method. The problems used in the experimental group were interesting real-life problems that connected to student life.

### **Visualizing Math Word Problems: Impact on First-Grade Students' Problem-Solving Performance**

*Authors: Nihan Şahinkaya, Zeynep Çiğdem Özcan , Selda Obalar (p.146)*

This study contributes to the literature on problem-solving. The authors explore the use of visualization to support student problem-solving. The methodology was both quantitative and qualitative. Participants consisted of 41 first-grade students and interviews were conducted with eight of the students. Findings reveal an improvement in problem-solving through visualization.

### **Geometric Reasoning to Reinventing Quadratic Formula: Designing the Learning Trajectory**

*Authors: Sani Sahara, Dadang Juandi, Turmudi Turmudi, Agus Hendriyanto, Lukman Hakim Muhaimin, Matawal D. Bulus (p.164)*

This paper explores geometry as a valuable tool for teaching students how to solve quadratic equations. By incorporating geometric concepts, this study aims to establish a strong foundation of knowledge to support students' comprehension of the quadratic formula. This research strives to provide insights and strategies for enhancing students' understanding of mathematical concepts.

The research methodology was a qualitative reflection on student answers and teacher comments that are well documented. The results suggest that improvement is achieved through using interactive tools developed by the authors. By employing these tools, students were empowered to explore and discover solutions to quadratic equations.

### **Unlocking the Future: Mathematics Teachers' Insight into Combination of M-learning with Problem-Based Learning Teaching Activities**

Authors: Mohamad Ikram Zakaria, Nik Abdul Hadi Noor Nasran, Abdul Halim Abdullah, Najua Syuhada Ahmad Alhassora, Rasidi Pairan, Wanda Nugroho Yanuarto. (p.196)

This paper focuses on using technology to support mathematics education within problem-solving. It reviews the benefits and shortcomings of internet-based technology in Mathematics education. The authors' research methodology was qualitative interviews on the impact of integrating mobile technology within problem-solving in mathematics education. Despite the limited number of participants (three), the authors concluded that the overall effect was positive.

### **Mathematical Problem Design to Explore Students' Critical Thinking Skills in Collaborative Problem Solving**

Authors: Arif Hidayatul Khusna, Tatag Yuli Eko Siswono, Pradnyo Wijayanti (p.217)

The authors explored using student social interactions, and non-routine problems to improve problem-solving and critical thinking in the classroom. The authors contextualized their study within Vygotsky's sociocultural theory

### **The Situation of Mathematical Problem Solving and Higher Order Thinking Skills in Traditional Teaching Method and Lesson Study Program**

Author: Hosseinali Gholami (p.241)

This paper employs qualitative and quantitative research to study students' problem-solving and higher-order thinking skills. The study employs a traditional teaching program (control group), and compares this to a "Lesson Study" program (experimental group). The Lesson Study program used collaborative learning and problem-solving techniques. The results revealed better problem-solving and higher-order thinking in the Lesson Study group.

### **Development of Student Self-Efficacy for Mathematics Learning in Indonesia**

Authors: Destiniar, Ali Syahbana, Tika Dwi Nopriyanti (p.265)

These authors developed a self-efficacy instrument for mathematics learning. Self-efficacy is an important area of study in mathematics education, given its impact on successful math learning. The authors use this instrument with middle and high school students.

**The Problem Corner** by Ivan Retamoso (p.290)