PAPERS WITH ABSTRACT ONLY

ABSTRACT FOR 21150

IMPACT OF USING TINKERPLOTS IN STATISTICAL REASONING

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In this 21st century of learning, students are not only required to know how to do the calculation procedures but more importantly they must be able to justify their solutions by reasoning. This is particularly important in the teaching and learning of statistics in schools. This study aims at investigating the impact of using TinkerPlots in statistical reasoning among Year Five pupils. The research was conducted in an international school. The research utilized the quasi experimental research design. Two intact classrooms were selected with one classroom as the control group while the other was the experimental group. The experimental group went through intervention using TinkerPlots whereas the control group went through the traditional method. The research conducted pre- test and post-test for both the groups. The findings show that a significant difference existed between pre-test and post-test for the experimental group. In conclusion, the students' statistical reasoning results improved using TinkerPlots. The study implies that using TinkerPlots enhances students' reasoning skills. Implementing teaching and learning statistics using TinkerPlots would help students explore data, concepts and test their conjectures. This would support the student-centered learning where teachers facilitate the students to develop their ideas and knowledge.

ABSTRACT FOR 21153

Modeling with Netlogo

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Netlogo is a free software in which can be used to learn agent based modeling. In addition, there is a package for importing data from Netlogo into Mathematica so students can then explore the similarities and differences between agent based models and traditional differential equation models. This presentation will give an overview of how to introduce Netlogo programming in the classroom, examples of predator

prey and SIR agent based models developed by students, and how this technology inspires further study in applied mathematics.

ABSTRACT FOR 21154

THE COMBINED EFFECT OF OUTCOME-BASED EDUCATION (OBE) AND BLENDED LEARNING ON THE STUDENTS PERFORMANCE IN GENERAL MATHEMATICS

AUTHOR: Restituto Rodelas

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The need to improve student learning in response to the increasing demands of globalization prompted studies on and pilot testing of alternatives to the traditional approach to delivering education. This study evaluated the effectiveness of the combined use of blended learning and outcomes-based education in Grade 11 General Mathematics classes at Andres Bonifacio Integrated School in the first semester of AY 2016 – 2017. Each consisting of two classes, the control group was handled using blended learning while the experimental group was handled using blended learning and outcomes-based education.

Blended learning consisted of 4 face-to-face classes and one online module per week. With outcomes-based education, various instructional strategies, class requirements, and assessments were used to ensure that the students were able to do the learning outcomes. The same test was given as pretest and posttest and the posttest-pretest score difference was used to measure the student learning. All results were statistically significant at a significance level of 0.05. The groups were equal in prior knowledge on the topics. There was positive learning in each group, but both classes in the experimental group had greater score difference than those in the control group. Based on this, the combined blended learning and outcomes-based education had positive impact on student learning.

ABSTRACT 21166

Exploring Mathematics with Technology

AUTHORS: Maree Skillen

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Technology has been referred to as having an integral role in the reform of mathematics education, and is rapidly changing how we teach and how we learn. Educationalists are required to support changes in mathematical content and instructional methods, as well as incorporating and supporting changes in technology. A new approach to instructional design is needed to combine and integrate these changes so that technology can be utilised to allow students to explore and discover mathematical concepts through appropriate computer applications.

Recent trends emphasise the importance of learning with technology, rather than learning about technology. Computers should be viewed as a cognitive tool to enhance student learning of content material, rather than a tool which allows an individual to acquire isolated skills in basic applications or specific programming languages.

This presentation will consider how the use of technology provides a paradigmatic shift in the instructional focus of specific computer applications, to more sophisticated uses of general purpose software. Educational uses of technology will be examined as exemplars for a discussion of alternative modes of teaching to engage students.

ABSTRACT 21168

Enriching the Teaching and Learning of Linear and Non-linear Systems of Equations through Developing a Module using HP Prime Graphing Calculator

AUTHORS: Loreto Delizo, Joanne Olos

AFFILIATIONS: Saint Pedro Poveda College, HP Calculators, Saint Pedro Poveda College HP Calculators

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In response to the needs of the 21st century learners, efforts have been made to integrate technology in the High School Mathematics classroom. Various ways of teaching and learning linear and non-linear systems of equations have been done, which can be further deepened with the aid of graphing calculators. This paper explores the development of a module on linear and non-linear systems of equations, which aims to enhance the teaching-learning experience using the HP Prime. The teacher-made module intends to develop students' better understanding of the concepts involved in the given systems in order to solve real-life applications.

This presentation will consider how the use of technology provides a paradigmatic shift in the instructional focus of specific computer applications, to more sophisticated uses of general purpose software. Educational uses of technology will be examined as exemplars for a discussion of alternative modes of teaching to engage students.

ABSTRACT FOR 21169

The Occurrence of Passive Intermodulation and Troubleshooting in Thailand Mobile Industry

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This paper describes the problem of the passive intermodulation (PIM) in mobile communications. We focus the problem occur between the transmitter and antennas.

The paper start from the theory of intermodulation, mathematics concept and effect in mobile channels. The problem occurs when two or more signals frequencies are transmitted at the same time in the same passive device. The non-linear behavior produces spurious signals where frequencies are linear combinations of the frequencies of the original signals. Then we measure PIM level and find the problem solving methods. Finally, we got the PIM level that can be acceptable due to IEC 62037 standard.

ABSTRACT FOR 21176

Improving Primary Mathematics Teaching and Learning with ORIGO Stepping Stones Online Program

AUTHORS: Korakot Chonvichit,

AFFILIATIONS: Dara Academy, Thaialnd

This study investigated the impact of ORIGO Stepping Stones online program on the teaching and learning of mathematics at Dara Academy Chiang Mai, Thailand. The targeted population consisted of 400 students and 12 teachers in grade 2. To assess the effects of the intervention, a mix of classroom observation; semi-structured interviews with the mathematics teacher; and students' artifacts were used. The ten-month intervention of ORIGO Stepping Stones consisted of Lesson Study activities, and Mathematics Professional Leaning workshops. Even though this study was limited in duration and scope, the outcomes clearly support earlier research on positive effects of ORIGO Stepping Stones on teachers' mathematical content knowledge and student motivation. The study revealed that the students had positive attitudes toward Stepping Stones online program with increases in motivational intensity as well as their desire to learn the mathematics. The outcomes also showed some obstacles in implementing electronic and online program in Thai school with reference to both the teacher and the students. Based on these findings, some recommendations for better outcomes are discussed and a suggestion is included for future research.

ABSTRACT FOR 21213

On the Visualizing Activities of Analytic Expressions of Lines and Circles via DGS

AUTHORS: Minshik Cho, Minji Kim

AFFILIATIONS: Department of Mathematics, Korea National University of Education

The equations of straight line and circle are one of the most important contents of Korean high school mathematics courses. They are expressed analytically as the solutions of equations in the coordinate plane. Hence students mostly learn the topic only practicing and calculating equations. Some topics include parameters meaning pencil of lines like kx+k+y=0. Since they do not mention the geometric meaning of parameters of straight line and circle equations in Korean textbooks, many students don¡¯t understand involved geometric meanings in analytic problems.

The purpose of this study is to investigate, through case study, how to apply DGS(Dynamic Geometry Software) and to find out effective methods for learning equations of straight line and circle with technological assistance. We developed some problems in order to investigate students" level about connecting algebra with geometry. Only a few students could solve those problems analytically. Many students could not even understand written solutions. One of the reason is that the lack of understanding on the relation between analytic expression and its geometric meaning.

Learning worksheets including DGS activities were designed so that student's understanding of the straight lines and circles can be improved. During the class with DGS activities, students could correct their misconceptions and understand the geometric meanings of parameters of straight line and circle equations.

Analysis of data including worksheets, DGS activities, and interviews showed effects of geometric understanding as a result of utilizing DGS. During the students had personally composed problem situations on their own through DGS, they had intuitively recognized beneath geometric meaning.

ABSTRACT FOR 21218

Fostering a Teaching Culture with Technology in Mathematics

AUTHORS: Maree Skillen

AFFILIATIONS: UTS:Insearch, Australia

With education increasingly moving towards technology enhanced delivery we need to identify and use alternative approaches to teaching and learning to support our students. To sustain the engagement of students in mathematics classrooms, teachers are employing a pedagogical design capacity. This involves the mobilisation of mathematics and embedding of real-time assessments to transform the learning and application of concepts by students. Performance levels in Mathematics subjects have improved, and teachers have noted increased participation and commitment to learning by students.

This presentation will provide examples of teaching and learning approaches where technology has been incorporated to ensure that student-centred technology-enabled learning is occurring at UTS: INSEARCH, a pathways provider preparing students from diverse language and learning backgrounds for study in Australia.

ABSTRACT FOR 21220

Development Students'' Understanding the Formula of the Surface Area of Sphere through the SAK hands-on Activity

AUTHORS: Cherdsak Pakdeeviroch

AFFILIATIONS: King's College, Samphran, Nakhon Pathom, Thailand, Institute for Innovative Learning, Mahidol University, Thailand

Sphere is a three-dimensional geometric shape of which its formula of a surface area is difficult for students to understand. In this study, students in grade 9 were allowed to participate with the Surface Area Kit (SAK) as a hands-on activity integrating the POE strategy. The dynamic mathematics software GeoGebra was applied as learning tool and representative of the concrete entities. The results showed that student' developed understanding about the meaning of the surface area of the sphere formula and there are significantly different understanding between the students who did and did not study with SAK hands-on activity. Moreover, the three processes about the students' understanding gains were also identified and discussed.

ABSTRACT FOR 21223

Pre-service Teachers'' Designing of Mathematics Activities Integrated the Use of the Geometer''s Sketchpad Software

AUTHORS: Sasiwan Maluangnont, Pilaluck Thongtip, Teerawit Tinprapa, Poonyapon Chanfoy

AFFILIATIONS: The Institute for the Promotion of Teaching Science and Technology, Suan Sunandha Rajabhat University

The purpose of this study is to investigate how pre-service mathematics teachers could design activities that used the Geometer's Sketchpad software to teach mathematics. This study was conducted with a group of 20 pre-service mathematics teachers who enrolled in a mathematics teacher preparation program in Thailand. This mathematics preparation program provided a course for pre-service teachers to experience the use of technology, including the Geometer's Sketchpad, in mathematics classroom teaching. As pre-service mathematics teachers learned to use the Geometer's Sketchpad software, they were provided opportunities to experience a set of mathematics activities that used the Geometer's Sketchpad software to enhance mathematical learning. At the end of the intervention, pre-service mathematics teachers had to design mathematics activities that integrated the use of the Geometer's Sketchpad. Results of this study showed that pre-service mathematics teachers, who learned to use the Geometer's Sketchpad software and experienced the mathematics activities that integrated the use of the Geometer's Sketchpad software, were able to design mathematics activities that used the Geometer's Sketchpad software to enhance students' mathematical learning. Besides the activities in geometry, the pre-service mathematics teachers were able to design mathematics activities in other mathematical areas such as numbers and algebra.

ABSTRACT FOR 21229

STEM in Mathematics

AUTHOR: Thomas Yeo

AFFILIATIONS: Texas Instruments

With the increasing popularity of STEM education around the world, educators are now more interested in how a STEM activity or lesson looks like. In this session, participants will hear the perspective of a Math educator implementing a STEM activity and how can STEM education help teach Math more effectively.

ABSTRACT FOR 21253

The Art of Using Modern Communication Technologies in Mathematics Teaching-Learning Process: Facebook and Text-Messaging

AUTHOR: Rodulfo T. Aunzo, Jr.

AFFILIATIONS: Faculty, USC Cebu Philippines

Communication is vital tool towards progress. Nowadays, varied mode of communications have surfaced even in the educational arena. A lot ot educators have already been utilizing facebook and text-messaging in facilitating teaching-learning process. In this paper, techniques and strategies were developed and tested in Mathematics teaching-learning process. Results of the investigations will be presented in this paper.

ABSTRACT FOR 21270

Multiple Language Converter

AUTHORS: Joe Marlou Opella

AFFILIATIONS: Cavite State University - Carmona Campus, Philippines

The developed Programming Language Converter serves as an important tool to students, researchers, professors and to anyone who wants to learn different programming languages because it allows various programming constructs to be differentiated. It is a standalone programming platform that allows user to create, edit, and compile three different programming languages. It can convert Java to C++ programming source code and C++ to C programming source code and vice versa. For easy and fast construction of program source code an auto help function that lists down correct suggested syntax is designed which also contains program samples in data

structures. A menu bar is included for the user to easily create, open and save file and a help tool that guides the users on how to use the programming platform. It can be run on Windows based operating system not older than Windows 7. The software was developed using Python 64 bit 3.4.1.1 as the main programming language and Adobe Photoshop CS6 for design and stitching. A hardware specification of at least dual core processor and 2GB RAM for faster and efficient performance are required. The developed software was assessed according to Technological University of the Philippines (TUP) instrument on software evaluation and obtained a mean rating of 4.31 with an adjectival description of very good which signifies that the platform performs according to the desired functionality and specifications for a helpful programming environment.

ABSTRACT FOR 21276

Knowledge for early childhood educators to facilitate children's mathematics learning under the influence of technology

AUTHORS: Kam Ling Lao

AFFILIATIONS: Open University of Hong Kong

Teacher knowledge is always one of the research focuses in education. Shulman drew our attention to the importance of pedagogical content knowledge (PCK) (1986). Ball, Thames and Phelps (2008) attempted to refine Shulman's proposed categories and introduced the concept of Mathematical Knowledge for Teaching (MKT). In response to the rapid growth of technology, teachers' knowledge in technology integration is also a concern. Based on Shulman's category, Koehler and Mishra (2009) put forward a unique construct of teacher knowledge, technological pedagogical content knowledge (TPACK) and research related to the TPACK framework has been proliferating. Since learning and teaching of mathematics in primary and secondary education are different from those kindergartens, the two teacher knowledge frameworks may not applicable to early childhood education. A teacher knowledge framework with consideration of the unique early childhood context is necessary for and beneficial to the developmental needs of teacher education.

In this presentation, a research project aims at investigating the knowledge early childhood educators require to develop children's mathematics concepts under the influence of technology will be presented. This project modifies Ball's (2008) bottom-up approach in framework development. In this session, the preliminary teacher knowledge framework (MtEceK framework) and its development process will also be introduced.

Acknowledgements:

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ABSTRACT FOR 21286

Online Interactive Visualization Tools for Learning Linear Algebra

AUTHORS: Victor Tan, Bao Rong Cham

AFFILIATIONS: National University of Singapore, Singapore Mathematical Society

Linear algebra is a subject that lends itself well to visualisation, through its relationships with objects in the 2-dimensional and 3-dimensional world, such as lines, planes, points and vectors. In many tertiary textbooks covering the subjects, there is also an emphasis on helping students to visualise the geometrical properties of Linear Algebra, especially the more abstract concepts such as vector spaces, linear independence, basis, span and dimension.

Traditional ways of visualisation are limited to the 2-dimensional space. This may pose difficulties in students' visualisation of 3-dimensional representations on the 2-dimensional space. There are many visualisation tools for linear algebra concepts being developed and available on the internet. However, many of them are not interactive. This limits the effectiveness on the learning of the subject.

This paper aims to introduce a series of online interactive visualisation tools that we have developed. We also describe a preliminary study on the use of these tools in a first undergraduate linear algebra course.

ABSTRACT FOR 21292

PERFORMANCE-BASED LEARNING EXPERIENCES ALGEBRA 1: INPUTS FOR THE ENHANCEMENT OF THE K-12 GRADE 7 TEACHING GUIDE

AUTHOR: Maris Lasco

AFFILIATIONS: Couples for Christ Member, Mathematics Society of the Philippines-Caraga Chapter Member

This study sought to determine the performance-based learning experiences and achievement in Elementary Algebra 1 of the Grade VII freshmen. The said study was conducted during the second quarter or grading period in. The descriptive method of research was used as it looked into the profile of the respondents in terms of age, Math VI grade and English VI grade. The achievement of the students in the learning experiences such as board work, seat work, group activity, oral recitation, journal writing and reporting were gathered to determine possible effects on the performance and achievement of the respondents in the different domains of learning which are the knowledge, process, understanding and performance in Elementary Algebra I. The

statistical tools used in this research were frequency, percentage, arithmetic mean, correlation analysis and partial correlation.

The personal profile of the students in terms of age shows that majority are aged 12 years old the typical age. The majority of the respondents Math VI and English VI obtained the very satisfactory level performance. The data on the students' performance in board work, seat work, group activity, oral recitation, journal writing and math reporting activities showed that majority achieved a very satisfactory performance rating. The data on the level of performance of the respondents in Elementary Algebra indicated in the data that majority of the student-respondents obtained a very satisfactory performance in the knowledge domain of learning but poor in the over-all performance. Oral recitation, group activity, board work and seatwork were found to be highly correlated with the students' performance in Elementary Algebra 1. When Math grade was held constant the degree of relationship was reduced such that only group activity and board work activities remained to have a high correlation with the students' performance in Elementary Algebra 1. The result conveyed the scenario that makes it imperative to formulate an enhancement of the current K-12 Teaching Guide for teachers handling Grade 7 mathematics.

ABSTRACT FOR 20929

The Application and Analysis of the Function Calculator FX-991ESPLUS

AUTHOR: TAO YU

AFFILIATIONS: Jianping High School

My report is intended to introduce the application of the new calculator in Function, Sequences, Complex number, Statistics, Equation and its function in such aspects as verification, exploration and assumption, which is of practical value when teachers instruct students to use the calculator in exams.

ABSTRACT FOR 21293

Applying math software to the real world

AUTHOR: Ogose Shigeki

AFFILIATIONS: High School Attached to Northwest Normal University

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Unlike main stream subjects- like algebra, analysis, or geometry, probability & statistics have a greater potential to appeal to general public. But, even then students often in the class room think those subjects have nothing to do with their real life. This time I will use Mathematica & Geogebra to help students visualize this connection and have them consider probability & statistics as useful subjects to learn...

ABSTRACT FOR 21295

PUPILS" GEOMETRICAL ACHIEVEMENT USING VAN HIELE"S PHASE BASED INSTRUCTION

AUTHOR: Kwan Eu Leong, Geik Tieng Poh

AFFILIATIONS: University of Malaya

It is pertinent to develop pupils geometrical understanding at the primary level. Using dynamical software like Geometers" Sketchpad would not only help pupils" visualise the shapes but also improve their understanding in geometry. This study investigated the impact of Van Hiele"s phase-based instruction using Geometer's Sketchpad on pupils' geometrical achievement in angles. This study utilised a quasi experimental research design. The participants were 73 Year Four pupils from a primary school in Malaysia. Eight different pre-sketched phase-based activities were designed to guide the students in the experimental group. The experimental group were taught using the phase based instruction while the control group using the chalk and talk approach. The analysis was done using the mean difference test. Result of the pretests showed that there was no significant differences in both groups. After the intervention, the pupils in the experimental group performed statistically significant better than the pupils in the control group. In short, phase-based instruction using Geometer's Sketchpad was useful in assisting students improve their geometrical achievement in angles.

ABSTRACT FOR 21325

Discover Pythagoras triangles in WASAN-The role of the technology in the problem discovery

AUTHOR: Shin Watanabe

AFFILIATIONS: The Mathematics Certification Institute of Japan

Do you know the Japanese mathematics? WASAN? About 500 years ago, Japanese mathematics was made by mathematics lovers. The mathematics lovers were not professors at university. They only enjoyed learning mathematics. This Japanese mathematical knowledge was close to western mathematics but the WASAN had no axiom, no theorem and no proof. The scholarly system of mathematics was different from the western mathematics. But they had no the society of mathematics. They learned mathematics diligently and often discuss mathematics among them. After they solved a mathematical problem, they displayed the problem and its solution at the precincts of the shrine. This kind of displaying mathematics was named SANGAKU. In Japan, many mathematical loners studied WASAN, but modern Japanese changed from WASAN to western mathematics.

ABSTRACT FOR 31000

Proving Apps via Mobile Technology

AUTHOR: Debbie Marie Verzosa*, Alva Aberin** and Ma. Louise D Las Peñas**

AFFILIATIONS: Ateneo de Davao University*Ateneo de Manila University**

Do you know the Japanese mathematics? WASAN? About 500 years ago, Japanese mathematics was made by mathematics lovers. The mathematics lovers were not professors at university. They only enjoyed learning mathematics. This Japanese mathematical knowledge was close to western mathematics but the WASAN had no axiom, no theorem and no proof. The scholarly system of mathematics was different from the western mathematics. But they had no the society of mathematics. They learned mathematics diligently and often discuss mathematics among them. After they solved a mathematical problem, they displayed the problem and its solution at the precincts of the shrine.

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