Fakultas Keguruan dan Ilmu Pendidikan

UNIVERSITAS PATTIMURA

"Implementation of Teaching and Learning Mathematics in the Era of Independent Curriculum"

BOOK OF ABSTRACT

Presented in

The 2nd International Conference on Mathematics and Mathematics Education (ICMMEd) 2023

Organized by:

Department of Mathematics Education

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Barekeng jurnal ilmu matematika dan terapan
JURNAL PENDIDIKAN MATEMATIKA JUPITEK

BOOK OF ABSTRACT

THE 2nd INTERNATIONAL CONFERENCE ON MATHEMATICS AND MATHEMATICS EDUCATION

ICMMEd 2023
Implementation of Teaching and Learning Mathematics in the Era Of Independent Curriculum

Department of Mathematics Education, Universitas Pattimura
Ambon, Indonesia
October 2nd, 2023

OPENING SPEECH OF CHAIRMAN OF ORGANIZING COMMITTEE
The 2nd ICMMEd 2023 FKIP Universitas Pattimura

Dear participants,
It is my honour to welcome you all from nationwide and across the globe to take part as presenter or sit in participant in the second International Conference on Mathematics and Mathematics Education 2023 (The 2nd ICMMEd 2023 FKIP Unpatti). The current implementation of Kurikulum Merdeka, adapted from independent curriculum that applying in most schools and universities around Indonesia, has put major issue to deal with, especially in teaching and learning mathematics. This condition brings our focus to develop theme for the second edition of ICMMEd as **Implementation of Teaching and Learning Mathematics in The Era of Independent Curriculum.**

Following theme of the 2nd ICMMEd, the papers that presented are covering the topics of the conference which hopefully can enrich innovation for teaching and learning mathematics in terms of implementing methods, strategies, using proper tools, etc that fit to the character of independent curriculum. Participants of this conference are lecturers, scientists, teachers, undergraduate and graduate students which coming from various universities and schools in Indonesia and also overseas.

The committee wishes thank abundantly to Dean of Faculty of Teachers Training and Educational Sciences at Pattimura University for his support in any ways to this event. We also thank and appreciate the distinguished speakers from Germany, United States, Singapore, Australia, and Indonesia for their knowledge contribution in making the 2nd ICMMEd 2023 FKIP Unpatti as meaningful mathematics event.

I wish you have a wonderful experience and a lot of benefit through this conference. May God bless all of us.

Best regards,

Darma Andreas Ngilawajan, S.Pd., M.Pd
Chairman of Organizing Committee

Schedule of The 2nd International Conference on Mathematics andMathematics Education (ICMMEd) 2023

Zoom Link:
Time: October 2nd, 2023 08.30 Eastern Indonesia Time

Join Zoom Meeting:
https://zoom.us/j/93470592421?pwd=amc3WUx1R052c1pCNmJrYm1lcUFMZz09

Meeting ID: **934 7059 2421**
Passcode: **ICMMED**

Opening Ceremony Time:
09.00 am Eastern Indonesia Time (EIT) 08.00 am Central Indonesia Time (CIT) 07.00 am West Indonesia Time (WIT) 10.00 am AEST 02.00 am Germany Time 08.00 am Singapore Time 08.00 pm USA Time (October 1st , 2023)

Eastern IndonesiaTime (GMT+09.00)	**Local Times**	**Event**	**Information**
08.30 am - 09.00 am		Preparation (zoom link is opened for speakers and participants) and Registration	Committee
09.00 am - 10.00 am		**Opening:**	MC
		National Anthem of Indonesia (Instrumen of Indonesia Raya)	
		Chairman Speech	D. A. Ngilawajan, S.Pd., M.Pd.
		Opening speech (followed by official opening of the Conference)	Prof. Dr. Izaak H. Wenno, M.Pd. (Dean Faculty of Teacher Training and Education)
		Pray	Committee
10.00 am - 13.00 am 10.00 am - 11.00 am		**Plenary Session:**	
	03.00 am - 03.30 am Germany Time	Keynote speaker 1: **Prof. Dr. rer.nat. Benjamin Rott (Universitat Zu Kồln, Germany)**	Moderator : Darma A. Ngilawajan, M.Pd
	03.30 - 04.00 am	Question and Answer	

Eastern IndonesiaTime (GMT+09.00)	**Local Times**	**Event**	**Information**
11.00 am - 12.00 pm	Germany Time		
	10.00 am - 10.30 am Singapore Time	Keynote speaker 2: **Prof. Berinderjeet Kaur, Ph.D (Nanyang Technological University, Singapore)**	
	10.30 am - 11.00 am Singapore Time	Question and Answer	
	11.00 pm- 11.30 pm Ohio, USA Time (October 1st, 2023)	Keynote speaker 3: **Dr. Krystal Taylor, Ph.D (The Ohio State University, USA)**	
		Question and Answer	
12.00 pm - 01.00 pm 01.00 pm - 02.00 pm		Lunch (break time)	Committee
02.00 pm - 02.30 pm		**Invited Speaker Session:**	
	03.00 pm - 03.30 pm AEST	STEM in Mathematics Education: **Sitti Maesuri Patahuddin, Ph.D (University of Canberra, Australia)**	Moderator : Patcrick Elisa Tuasela, S.Pd., M.Pd.
	01.00 pm - 01.30 pm CIT	Mathematics Education: **Dr. sc. ed. Safrudiannur (Universitas Mulawarman, Indonesia)**	Moderator : Henry Latuheru, S.Pd., M.Pd.
	02.00 pm - 02.30 pm EIT	HOTS in Mathematics Education: **Prof. Dr. Theresia Laurens, M.Pd. (Universitas Pattimura, Indonesia)**	Moderator : Bella C. F. Camerling, S.Pd., M.Pd.
02.30 pm - 05.00 pm		Parallel Session	Committee

Eastern IndonesiaTime (GMT+09.00)	Local Times	Event	Information
05.00 pm - 05.30 pm		**Closing**	Dr. Anderson L. Palinussa, M.Pd (Head of Departement of Mathematics and Natural Sciences)

LIST OF THE ZOOM LINK
PLENARY SESSION AND PARALLEL SESSION
OCTOBER 2nd, 2023

No	Session	Class Code	Zoom Link
1	Plenary Session	-	The 2nd International Conference on Mathematics and Mathematics Education (ICMMED) 2023 Time: Oct 2, 2023 06:30 am Jakarta Join Zoom Meeting https://zoom.us/j/93470592421?pwd=amc3WUx1R052c1pCNmJrYm1lcUFMZz09 Meeting ID: 934 7059 2421 Passcode: ICMMED
2	Parallel Session STEM in Mathematics Education (Invited Speaker)	**SM**	Class SM (STEM in Mathematics Education), ADP (Algebra, Discrete Mathematics, Mathematics Modelling in Physics) Time: Oct 2, 2023 11:30 am Jakarta Join Zoom Meeting https://zoom.us/j/98128067312?pwd=ODhOVHgwckJmYnhxaExReHYxbUQxUT09 Meeting ID: 981 2806 7312 Passcode: STEM
3	Parallel Session Mathematics Education (Invited Speaker)	**ME.1**	Class AI (AI in Mathematics Education), ICT (ICT in Mathematics Education) Time: Oct 2, 2023 11:30 am Jakarta Join Zoom Meeting https://us06web.zoom.us/j/82308645251?pwd=nHxm0IFZnaaU8PEFLaAMFzmG2eouTd.1 Meeting ID: 823 0864 5251 Passcode: mathedu1

No	Session	Class Code	Zoom Link
4	Parallel Session Mathematics Education (Invited Speaker)	**ME.2**	Class HM (HOTS in Mathematics Education), ML (Mathematics Literacy) Time: Oct 2, 2023 11:30 am Jakarta Join Zoom Meeting https://us06web.zoom.us/j/89700710859?pwd=UxObzd99rM3noUbj7zDXGuKJZAiAX1.1 Meeting ID: 897 0071 0859 Passcode: mathedu2
5a	Parallel Session HOTS in Mathematics Education (breakout room)	**HM**	Class HM (HOTS in Mathematics Education) Time: Oct 2, 2023 12:30 pm Jakarta Join Zoom Meeting https://zoom.us/j/97026898588?pwd=VnlSU3A2MmlSeVVNSFBGSmZrWVFUdz09 Meeting ID: 970 2689 8588 Passcode: HMAI Room : 01
5b	Parallel Session AI in Mathematics Education (breakout room)	**AI**	Class AI (AI in Mathematics Education) Time: Oct 2, 2023 12:30 pm Jakarta Join Zoom Meeting https://zoom.us/j/97026898588?pwd=VnlSU3A2MmlSeVVNSFBGSmZrWVFUdz09 Meeting ID: 970 2689 8588 Passcode: HMAI Room : 02
5c	Parallel Session ICT in Mathematics Education (breakout room)	**ICT**	Class ICT (ICT in Mathematics Education) Time: Oct 2, 2023 12:30 pm Jakarta Join Zoom Meeting

No	Session	Class Code	Zoom Link
			https://us06web.zoom.us/j/83956270660?pwd=k30KgCJkYcb8H9KSsxPrZX1vDxcith.1 Meeting ID: 839 5627 0660 Passcode: ICTADP Room : 01
5d	Parallel Session Algebra, Discrete Mathematics, Mathematics Modelling in Physics (breakout room)	**ADP**	Class ADP (Algebra, Discrete Mathematics, Mathematics Modelling in Physics) Time: Oct 2, 2023 12:30 pm Jakarta Join Zoom Meeting https://us06web.zoom.us/j/83956270660?pwd=k30KgCJkYcb8H9KSsxPrZX1vDxcith.1 Meeting ID: 839 5627 0660 Passcode: ICTADP Room : 02
5e	Parallel Session Mathematics Literacy	**ML**	Class ML (Mathematics Literacy) Time: Oct 2, 2023 12:30 pm Jakarta Join Zoom Meeting https://us06web.zoom.us/j/86484590591?pwd=qcbRwoJkKn1t7DbiPm5V8KFQrZR6sx.1 Meeting ID: 864 8459 0591 Passcode: literacy
6	Closing	-	The 2nd International Conference on Mathematics and Mathematics Education (ICMMED) 2023 Time: Oct 2, 2023 03:00 pm Jakarta Join Zoom Meeting https://zoom.us/j/93470592421?pwd=amc3WUx1R052c1pCNmJrYm1lcUFMZz09 Meeting ID: 934 7059 2421 Passcode: ICMMED

PARALLEL SESSION

Class HM (HOTS in Mathematics Education)

Moderator : R. H. Yanti Silitonga, M.Pd.
Host : Fausto Karuna, S.Kom
Join Zoom Meeting : https://zoom.us/j/97026898588?pwd=VnlSU3A2MmlSeVVNSFBGSmZrWVFUdz09
Meeting ID : 970 2689 8588
Passcode : HMAI
Room : 01

Time	Number	Name Class Code HM + (Sequence Number)	Affiliation	Title of Manuscripts
02.30 pm	1	Dwi Yulia Ningsih, Ahmad Rafly, Berliana Putri Melati, Inaroh Ghoisani Amahsyah, Ravi Akmar Ramadhani, and Farida Nursyahidah	Universitas PGRI Semarang	Designing Learning Trajectory of Three-Dimensional Shape Using Realistic Mathematics Education
02.40 pm	2	Maulani Meutia Rani, Sri Novia Martin, and Rahmat Hidayat	Universitas Negeri Padang	Analysis of Problem Solving Abilities based on Polya Steps if Viewed from Students' Initial Mathematics Abilities
02.50 pm	3	Juliana S. Molle	Universitas Pattimura	Developing Reasoning Ability of Students Through Three-Dimensional Figures Learning
03.00 pm	**Discussion**			
03.10 pm	4	Zetra Hainul Putra, Neni Hermita, Jesi Alexander Alim, Riyan Hidayat, Dahnilsyah, Lara Oktarisa, and Astri Widyathi	Universitas Riau	Ethno-Didactics of Mathematics: an Approach of Learning Mathematic
03.20 pm	5	Nadya Syifa Andzin, Putri Yulia Puspita Sari, Ridwan Cahyo Widodo, Dinda Iren Sukowati, Sabrina Indriastuti, and Farida Nursyahidah	Universitas PGRI Semarang	Developing Hypothetical Learning Trajectory of Arithmetic Sequence Using Realistic Mathematics
03.30 pm	6	Wilmintje Mataheru, N. C. Huwaa, Andre L.	Universitas Pattimura	The Effect of Realistic Mathematics Approach to

Time	Number	Name Class Code HM + (Sequence Number)	Affiliation	Title of Manuscripts
		Palinussa, and Vederico Pitsalitz Sabandar		Solve Higher Order Thinking Skils (HOTS) Problems On Three-Dimensional Shapes with Curved Surfaces
03.40 pm	**Discussion**			
03.50 pm	7	Sri Novia Martin, Lili Mulyani, and Yerizon	Universitas Negeri Padang	Analysis of Student Thinking Structure Errors in Solving Problems in Vector
04.00 pm	8	La Moma and Hanisa Tamalene	Universitas Pattimura	Improving Students' High-Level Mathematical Thinking Skills Through Generative Learning Models
04.10 pm	9	Ely Susanti, Trisna Wulandari, Hapizah, Indaryanti, Isrok'atun, and Ruth Helen	Universitas Sriwijaya	Design of Number Pattern Questions for Measuring the Mathematical Thinking Ability of Audio Visual Learning Style Students
04.20 pm	**Discussion**			
04.30 pm	10	Rita Desfitri	Universitas Bung Hatta	Students' Ability to Explain Derivative Concepts Through Graph Analysis
04.40 pm	11	Susanah, Evangelista Lus Windyana Palupi, and Dini Kinati Fardah	Universitas Negeri Surabaya	Prospective Teachers' Mathematical Communication Profile in Solving Geometry Proof Problems
04.50 pm	12	R. H. Yanti Silitonga and Widya Putri Ramadhani	Universitas Pattimura	Exploring The Correlation Between Differential And Integral Calculus Study Results And Advanced Calculus Performance Of Students
05.00 pm	**Discussion**			

Class AI (AI in Mathematics Education)

Moderator : Lianca Ilela
Host : Fausto Karuna, S.Kom
Join Zoom Meeting : https://zoom.us/j/97026898588?pwd=VnlSU3A2MmlSeVVNSFBGSmZrWVFUdz09
Meeting ID : 970 2689 8588
Passcode : HMAI
Room : 02

Time	Number	Name Class Code HM + (Sequence Number)	Affiliation	Title of Manuscripts
02.30 pm	1	Saddam Al Aziz, Khairani, Trysa Gustya Manda	Universitas Negeri Padang	The 4C Skills Profile of Prospective Pre-service Professional Mathematics Teacher as Guidelines for Implementing Case Method and Team-Based Project Lesson Study for Learning Community (LSLC) Based Learning in Calculus Courses According to University IKU-7
02.40 pm	2	Lathifaturrahmah, Toto Nusantara, Subanji, and Makbul Muksar	Universitas Negeri Malang	Investigate the Accuracy of Student Predictions in Solving Graphic Problems
02.50 pm	3	Citra Fathia Palembang, Novita Serly Laamena, Novita Dahoklory, Yopi Andry Lesnussa, Jefri E. T. Radjabaycolle, and Venn Y. I. Ilwaru	Universitas Pattimura	Exploring The Potential Of Chatgpt In Mathematics Education with An Adaptive and Interactive Approach
03.00 pm	**Discussion**			
03.10 pm	4	Yuni Arrifadah, Abadi, and R. Sulaiman	Universitas Negeri Surabaya	Collective Argumentation in Defining and Classifying Parallelograms
03.20 pm	5	Yohanis Ndapa Deda and Hermina Disnawati	Universitas Timor	Bibliometric Analysis of Artificial Intelligence and Contribution to

Time	Number	Name Class Code HM + (Sequence Number)	Affiliation	Title of Manuscripts
				Mathematics Education
03.30 pm	6	Christi Matitaputty, Toto Nusantara, Erry Hidayanto, and Sukoriyanto	Universitas Pattimura	Examining Pre-service Mathematics Teacher Knowledge in Error Analysis of Students Work in Solving Quadratic Function
03.40 pm	**Discussion**			

Class ICT (ICT in Mathematics Education)

Moderator : Maeya Serang
Host : Yulian Hany Makaruku, S.Si., M.Kom
Join Zoom Meeting : https://us06web.zoom.us/j/83956270660?pwd=k30KgCJkYcb8H9KSsxPrZX1vDxcith.1
Meeting ID : 839 5627 0660
Passcode : ICTADP
Room : 01

Time	Number	Name Class Code HM + (Sequence Number)	Affiliation	Title of Manuscripts
02.30 pm	1	Andi Muhammad Irfan Taufan Asfar, Andi Trisnowali, Jarnawi Afgani Dahlan, Sufyani Prabawanto, Andi Muhamad Iqbal Akbar Asfar, and Andi Nurannisa	Universitas Muhammadiyah Bone	Indonesian Junior High School Students' Metacognition: Hybrid Learning Analysis
02.40 pm	2	Ana Paula Ferreira Fernandes Lopes	Polytechnic of Porto (P.PORTO)	Enhancing Achievement and Interest in Mathematics Learning Through Moodle
02.50 pm	3	Sri Wahyuni, Wilmintje Mataheru, and Ch. M. Laamena	Universitas Pattimura	Development of Android-Based Algebraic Form Application Learning Media Using Construct 3
03.00 pm	**Discussion**			
03.10 pm	4	Susanti, Mariyanti Elvi, Nur Asma Riani Siregar, Metta Liana, Nur Izzati, and Aang Yudho Prastowo	Universitas Maritim Raja Ali Haji	The Implementation of Differentiated Learning in Accordance with the Independent Curriculum by Mathematics Teachers in the Leading School Program in Bintan Regency
03.20 pm	5	Ni Wayan Suardiati Putri, I Nyoman Buda Hartawan and	Institut Bisnis dan Teknologi Indonesia	Development of Animation-Based Beginning

Time	Number	Name Class Code HM + (Sequence Number)	Affiliation	Title of Manuscripts
		Amadeus Veda Kanaka		Mathematics Learning Media in Early Childhood Education
03.30 pm	6	Suci Dahlya Narpila	UIN Sumatera Utara Medan	Using the Quizizz Application as an Evaluation Media for Numeration Literacy Based Mathematics Learning in MAN 2 Medan
03.40 pm	**Discussion**			
03.50 pm	7	Vina Lusiana	Universitas Wanita Internasional	Implementation of Problem Based Learning Assisted with the Geogebra Application to Improve Student's Mathematical Creative Thinking
04.00 pm	8	Darma Andreas Ngilawajan, Vederico Pitsalitz Sabandar, Taufan Talib, and Pieter Zakarias Tupamahu	Universitas Pattimura	HYBRID LEARNING: The Effect On Students'achievement In Numerical Method Course
04.10 pm	9	Theresia Laurens, Wilmintjie Mataheru, and John N. Lekitoo	Universitas Pattimura	Using GeoGebra Classroom to Learn Mathematics
04.20 pm	**Discussion**			
04.30 pm	10	Muhammad Fendrik, Zetra Hainul Putra, Zariul Antosa, Gustimal Witri, and Rahmat Rizal Andhi	Universitas Riau	Development of an Ethnomatematics-Based Hybrid Learning Model with Heutagogy and Cybergogy Approaches
04.40 pm	11	Susana Labuem	Universitas Pattimura	Employee Performance Appraisal Using Fuzzy Logic Mamdani Rules
04.50 pm	**Discussion**			

Class ADP (Algebra, Discrete Mathematics, Mathematics Modelling in Physics)

Moderator : Vicardy Kempa, S.Si., M.Si
Host : Yulian Hany Makaruku, S.Si., M.Kom
Join Zoom Meeting : https://us06web.zoom.us/j/83956270660?pwd=k30KgCJkYcb8H9KSsxPrZX1vDxcith.1
Meeting ID : 839 5627 0660
Passcode : ICTADP
Room : 02

Time	Number	Name Class Code HM + (Sequence Number)	Affiliation	Title of Manuscripts
02.30 pm	**1**	Zata Yumni Awanis, I Gede Adhitya Wisnu Wardhana, and Irwansyah	Universitas Mataram	Strong Rainbow Vertex-Connection Number of Comb Product of a Path and a Connected Graph
02.40 pm	**2**	Wiwin Apriani and Nurhayati	Universitas Sains Cut Nyak Dhien	Branch and Bound to Detect Clique in Syiah Kuala Sub-District, Banda Aceh City
02.50 pm	**3**	Branka Zekanović	University of Banja Luka	Some Proved Results About Kneser's Graphs And Stiefel's Manifolds
03.00 pm	**Discussion**			
03.10 pm	**4**	Novita Dahoklory, Citra Fathia Palembang, Novita Serly Laamena, Henry Willam Michel Patty, Dyana Patty, Berny Pebo Tomasouw, and Meilin Imelda Tilukay	Universitas Pattimura	Rings of Morita Contexts As Strongly Graded Rings Which are Maximal Orders
03.20 pm	**5**	Novita Serly Laamena, Novita Dahoklory, Citra F Palembang, Muhammad Y Matdoan, Norisca Lewaherila, Dyana Patty	Pattimura University	Time Series Modelling And Forecasting of Rainfall on Banda Neira Island Using Autoregressive Moving Average
03.30 pm	**Discussion**			

Class ML (Mathematics Literacy)

Moderator : Marlin Blandy Mananggel, M.Pd.
Host : Fentje J. Sapulette, M.Pd.
Join Zoom Meeting : https://us06web.zoom.us/j/86484590591?pwd=qcbRwoJkKn1t7DbiPm5V8KFQrZR6sx.1
Meeting ID : 864 8459 0591
Passcode : literacy

Time	Number	Name Class Code HM + (Sequence Number)	Affiliation	Title of Manuscripts
02.30 pm	**1**	Shinta Sari, Nurul Afifah Rusyda, Riski Gusri Utami	Universitas Negeri Padang	Describing Students' Self-Efficacy in Writing Mathematics Education Research Proposal
02.40 pm	**2**	Yosua Maryo Djapandjati , Tanwey Gerson Ratumanan and Henry Junus Wattimanela	Universitas Pattimura	Mathematical Literacy Ability Judging from Students' Cognitive Style in Algebraic Function Limits
02.50 pm	**3**	Marlyd Talakua, Tanwey G. Ratumanan, and Carolina S. Ayal	Universitas Pattimura	Metacognition Activity of Vocational High School Students In Statistical Problem Solving
03.00 pm	**Discussion**			
03.10 pm	**4**	Tanwey Gerson Ratumanan, Carolina S. Ayal, and John Lekitoo	Universitas Pattimura	Development of Learning Models Based on Problem Solving and Its Impact on Students' High Level Thinking Abilities
03.20 pm	**5**	Dian Riski Utami, Wilmintjie Mataheru, and Carolina Selfisina Ayal	Universitas Pattimura	Students Mathematical Literacy In Solving Operational Problems With Algebraic Forms In Calss VII SMP Angkasa Lanud Pattimura Ambon
03.30 pm	**6**	Mesra Darakay, Carolina Selfisina Ayal,	Universitas Pattimura	An Exploration of Ethnomathematics in

Time	Number	Name Class Code HM + (Sequence Number)	Affiliation	Title of Manuscripts
		Marlin Blandy Mananggel		The Activity of Making Tumang Sago in The Aru Community
03.40 pm	**Discussion**			
03.50 pm	**7**	Muhammad Aldo Febriansyah, Lattifah Tuni'mah, Dwi Hardiyanto, Mohammad Azis, Sekar Kusuma Andrini, and Farida Nursyahidah	Universitas PGRI Semarang	Designing of Hypothetical Learning Trajectory Lines and Angles using Ethnomathematical Context
04.00 pm	**8**	Tanwey Gerson Ratumanan and Reinhard Salamor	Universitas Pattimura	Numeracy Ability of SMP Students in Ambon City
04.10 pm	**9**	Marlin Blandy Mananggel, Theresia Laurens, Anderson Leonardo Palinussa, Taufan Talib, Merlin, Steffi Hukunala	Universitas Pattimura	Development of Mathematics Learning Design Based-on Realistic Mathematics Education Through Modified Traditional Game Gici-Gici
04.20 pm	**Discussion**			

TABLE OF CONTENT

KEYNOTE SPEAKER

Research on Mathematical Problem Solving -- Quo Vadis?

Benjamin Rott[1, a)]

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[1]*University zu Koln, Germany.*

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[a)]Corresponding author: brott@uni-koeln.de

Abstract. Technical progress has always influenced empirical educational research. In the 1960s it was the first sound recording devices and in the 1980s the first static video cameras that made process data accessible for more systematic evaluation. Today, mobile cameras, teaching-learning laboratories, and eye-tracking glasses are available that allow more, newer, and more precise data to be collected. There are also possibilities for computer-assisted evaluations based on self-learning algorithms. In addition to the influences on the work of researchers mentioned, new technologies can also influence the processes of problem-solvers: Among other things, there are apps to promote self-regulation as well as spreadsheet and dynamic geometry software that enable new approaches and heurisms and thus help able to discover connections and make assumptions.

KEYNOTE SPEAKER

Mathematical Literacy - A Cornerstone of School Mathematics

Berinderjeet Kaur[1, a)]

Author Affiliations
[1]*National Institute of Education, Nanyang Technological University, Singapore*.

Author Emails
[a)]Corresponding author: berinderjeet.kaur@nie.edu.sg

Abstract. Mathematical knowledge is an essential building block of learning for all in society. In many countries, it is a compulsory school subject framed by curriculum deemed fit by authorities in the country. So, in some ways the curriculum is dependent on societal and global needs. Therefore, it is critical that students acquire mathematical knowledge and skills for their present and future needs. As such mathematical literacy is a cornerstone of school mathematics. The Programme for International Student Assessment (PISA) carried out periodically for 15-year-olds by OECD encapsulates mathematical literacy as "an individual's capacity to reason mathematically and to formulate, employ, and interpret mathematics to solve problems in a variety of real-world contexts. It includes concepts, procedures, facts, and tools to describe, explain and predict phenomena". This lecture explores possibilities for nurturing such literacy amongst mathematics learners in elementary schools.

KEYNOTE SPEAKER

On the Interior of Unions of Circles with Centers in a Fractal Set from the View Point of Fourier Analysis and Projection Theory

Krystal Taylor[1, a)]

Author Affiliations
[1]*Department of Mathematics, The Ohio State University, USA*

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[a)]Corresponding author: taylor.2952@osu.edu

Abstract. It is a time honored and classic problem to ask for the properties of the algebraic sum $A + B$ given sets A and B in the Euclidean plane. We focus on the case when Γ is a piecewise C^2 curve (such as the unit circle). There is a natural guess what the size (Hausdorff dimension, Lebesgue measure) of $A + \Gamma$ should be. We verify this under some natural assumptions. We also address the more difficult question: under which condition does the set $A + \Gamma$ have non-empty interior? The results have some surprising consequences for distance sets: $\Delta_x(A) := \{|x - y| : y \in A\}$, where x is a fixed point and A is a fractal subset of $\mathbb{R}^d$ of sufficient Hausdorff dimension. The relation between structure within a fractal set (as measured by sufficient Hausdorff dimension or by the existence of geometric configurations within) and the Fourier decay of a measure supported on said set is implicit.

INVITED SPEAKER

Revitalising STEM Education Through the STEM Practices Framework: A Pathway to Research and Innovation

Sitti Maesuri Patahuddin[1, a)]

Author Affiliations
[1]*University of Canberra, Australia.*

Author Emails
[a)]Corresponding author: Sitti.Patahuddin@canberra.edu.au

Abstract. In an era driven by technological advancements and scientific discoveries, the need to revitalise STEM education has never been more pressing. This presentation explores the transformative potential of the STEM Practices Framework as a guiding philosophy to reshape STEM education. By focusing on the integration of authentic, inquiry-based practices, and values, this framework not only enhances students' understanding of STEM concepts but also nurtures critical thinking, problem-solving skills, and a passion for innovation. The presentation will also showcase the practical implementation of this framework, its impact on fostering research-oriented mindsets, and its pivotal role in preparing the next generation of innovators who will shape the future of science and technology.

INVITED SPEAKER

Pre-Service Teachers' Beliefs About Teaching Mathematics: a Pseudo-Longitudinal Study in Indonesia and Germany

Safrudiannur[1, a)]

Author Affiliations
[1]*Universitas Mulawarman, Indonesia.*

Author Emails
[a)]Corresponding author: safrudiannur@fkip.unmul.ac.id

Abstract. Several studies have explored pre-service' (PSTs') beliefs about the way to teach mathematics with a large sample size quantitatively. However, very few of the studies consider the effect of contexts on measuring beliefs, especially the context related to students' achievements. This pseudo-longitudinal study conducted in Indonesia and Germany aims to study PSTs' beliefs about teaching mathematics (particularly about the area of a trapezoid) which may be influenced by students' achievements (operationalized as high-achieving (HA) vs. low-achieving (LA) classes). The participants were 619 PSTs from four universities in Indonesia and one university in Germany. The results show that PSTs from Indonesia and Germany significantly hold different beliefs about teaching mathematics in HA and LA classes. For example, most PSTs consider that the teaching style promoting problem solving is only appropriate for HA classes and apparently not appropriate for LA classes. However, this study found that, unlike Indonesian PSTs' beliefs, German PSTs' beliefs about promoting problem solving in LA classes seem to develop. At the end of university study, German PSTs seem to consider the necessity of promoting problem solving in LA classes.

INVITED SPEAKER

Ethnopedagogy of Mathematics in the Context of the Independent Curriculum

Theresia Laurens[1, a)]

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Abstract. The emphasis on digital literacy aspects in 21st century learning suggests that one of the principles of learning is the integration of content with the learning context. This is important so that children understand from an early age that mathematics is a human activity, so it is important for children to learn mathematics. Apart from wisdom values that shape students' attitudes, there are mathematical values, a learning approach in the field of education which aims to provide educators with an understanding of the importance of local wisdom values as a bulwark in filtering the entry of foreign culture. Integrating local wisdom values can be done through integration in teaching materials, learning media and learning approaches. The use of constructivism-based learning models can be used in implementing mathematical ethnopedagogy. One approach that can be used is a culturally responsive learning approach or Cultural Response Teaching (CRT), namely teaching that is form learning pedagogy that uses habits, supporting characteristics draft learning differentiation with approach learning *Teaching at the Right Level (* TRL). In addition to CRT , practice learning mathematics in aspect teaching that is responsive to culture use inquiry approach and cooperative . In learning mathematics Teacher who responsive to culture capable know every student as individual with use excess And interest the mathematics he brought from environment his daily life. Introduction local wisdom of the Maluku people such as sasi jump , jump laor , tradition table Eat Tampa salt , dance bamboo Crazy And miscellaneous game traditional as well as craft hand can implemented as practice education ethnopedagogy, if linked with content mathematics.

PRESENTER

Time Series Modelling And Forecasting of Rainfall on Banda Neira Island Using Autoregressive Moving Average

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Abstract. Indonesia is located in the tropics and has two seasons, the dry season and the rainy season. This condition makes Indonesia's territory vulnerable to climate/weather changes, one of which is rainfall. Rainfall in a geograpichal area is influenced by many factors including the height of the area, distance from water source, mountain ranges and the area of land and water. One of the areas with high rainfall is Banda Neira Island. Extreme changes in rainfall can result in disasters and losses for communities. Therefore, It is necessary to forecast rainfall for the future to anticipate bad events that might occur. Rainfall forecasting can be done using time series modeling. A time series is a sequence of observations taken at regular intervals over time Time series forecasting is the use of a model to predict future values based on past values. ARMA model is a combination of two other models: an autoregressive (AR) model and a moving average (MA) model. AR model uses past values of the series to predict future values, while an MA model uses past errors to predict future values. An ARMA model combines these two approaches to make forecasting. Purposes of this research is Determine the time series model and rainfall forecasting on Banda Neira Island, Maluku Province using Autoregressive Moving Average Method. This research uses monthly rainfall data on Banda Neira Island from 2014 to 2022 sourced from BPS Maluku Province. At the model identification, the possible models are AR(1), MA(1) and ARMA(1,1). The ARMA modelling process continues to step parameter estimation and diagnostic check, and after going through these two steps, the best model for monthly rainfall data in Banda Neira Island is AR (1) with AIC 1.413, 28. The results of rainfall forecasting for the next three months are 286,99 mm; 263,87 mm and 252,37 mm.

An Exploration of Ethnomathematics in The Activity of Making Tumang Sago in The Aru Community

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Abstract. Ethnomathematics is a way to explore the presence of mathematics in culture, as well as the process of abstracting from real experiences in everyday life into mathematics or vice versa. Making tumang sago has become a daily activity of the Aru people, which without realizing it, they have used mathematical activities in making tumang sago. This study aims to 1) find out the ethnomathematics activities in the making of tumang sago in Aru society, and 2) to find out how the mathematical concepts contained in the making of tumang sago in Aru society. This research is a qualitative research with an ethnographic approach. Researchers conducted observations, documentation and interviews to obtain data related to the making of tumang sago. The data sources are the sago tumang makers in Marafenfen village, South Aru sub-district, Aru Islands district, Maluku, Indonesia. The results showed that: 1) ethnomathematical activities in tumang sago include: counting activities, measuring activities and design activities. 2) Mathematical concepts contained in tumang sago include: one-dimensional geometry, namely vertical lines and parallel lines found on the leaf bones of the tumang sago, two-dimensional geometry, namely circles found in the basic pattern, the base, the inside, the top and the shape of the rope used, and the concept of three-dimensional geometry, namely the tube which is the shape of the tumang sago.

Describing Students' Self-Efficacy in Writing Mathematics Education Research Proposal

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Abstract. Several studies have emphasized the importance of self-efficacy in scientific writing. One kind of scientific writing that should be completed by university students is a research proposal. This research proposal writing is a fundamental stage that determines students' success, either in academic life or in their future careers. Furthermore, this research aims to describe university students' self-efficacy in writing research proposals. This research is essential to conduct since it will give an initial picture of students' self-efficacy in writing research proposals. The purposive sampling technique was utilised to determine the sample of this research. There are 21 students from the Mathematics Education study program at Universitas Negeri Padang who enrolled in the Research Methodology course in 2023. The data of this research was obtained from the scientific writing self-efficacy questionnaire. After that, the data were analysed quantitatively. The findings of this study reveal that the average of the students has good self-efficacy in writing the research proposal. All students are in the range of good and very good self-efficacy; more than 76% of students have good self-efficacy, and almost 24% of students have very good criteria, while there are no students who have bad and very bad criteria.

Enhancing Achievement and Interest in Mathematics Learning Through Moodle

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Abstract. Despite the changes in the way of teaching that occurred during and after the pandemic crisis COVID19, traditional instruction still has a great weight in the majority of mathematics courses taught in higher education in Portugal. Thus, due to this teaching model, many students may continue to perform less than expected in mathematics and even lose interest in the subject and then give up trying to learn it. Consequently, one of the biggest challenges is how to improve students' performance and interest in mathematics, especially for those students with weak grades. In this study, in-class group assignments that require students to work in small groups with an online project in Moodle are used to complement traditional classes in Zero Mathematics Course. These assignments are given once a week throughout the semester. The results obtained in both continuous and final assessment are in line with the outcomes of the activities completed in-class group, enhancing the learning of high-risk students while having no impact on the learning of low-risk students. Additional research indicates that these group assignments are generally well-liked by students and that they make use of them to prepare for examinations. For high-risk, less motivated students taking Mathematics Zero and courses of a similar nature in other subjects, group assignments combined with the online Math project in Moodle may be an option for enhancing learning.

Development of Mathematics Learning Design Based-on Realistic Mathematics Education Through Modified Traditional Game Gici-Gici

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Abstract. Realistic Mathematics Education (RME) is one of the learning approaches that uses contextual problems as the starting point of learning to show that mathematics is actually close to students' daily lives. This research aims to develop the traditional game gici-gici into an math learning design based-on RME that can be applied in elementary schools. This research uses the approach of design research of ADDIE model (Analyze, Design, Development, Implement and Evaluate). Data sources came from the Maluku community, especially children in Ambon who often play gici-gici. Data sources also came from books/literature, validators, and students of SD N 1 Latihan SPG Ambon and SD Kristen Kalam Kudus Ambon. The data collected in the form of qualitative data related to the gici-gici game obtained from the results of literature review, observation, interviews, and documentation. Data on validation results were obtained from two validators, namely material experts and media experts. Data analysis focused on the quality of the prototype to see validity, practicality and effectiveness. The results of mathematics learning design in the form of activities in learning that follow the stages of the mathematization process in RME, namely the situational stage, model of situation, model for mathematics, and mathematics formal. The learning design focuses on geometry material especially shapes.

Designing of Hypothetical Learning Trajectory Lines and Angles using Ethnomathematical Context

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Abstract. The purpose of this research is to describe learning trajectories to encourage and help students learn to understand the concepts of lines and angles. This research uses the context of the Semarang Warak Ngendog tradition as a learning source. The research method used is design research with the RME approach. This design research method consists of three stages, namely preliminary design, design experiment, and retrospective analysis. The subjects in this research were grade 7th students at SMP Negeri 38 Semarang. In understanding the material about lines and angles, there are six series of learning activities in the context of the Warak Ngendog tradition. These activities are: 1) understanding the concepts of points, lines and angles; 2) determine the relationship between lines; 3) explain the position of two lines through a concrete object; 4) find the properties of angles if two parallel lines are cut by a transversal line; and 5) draw, measure, and categorize angles; 6) solve contextual problems related to lines and angles. This article presents the first stage of research design, namely preliminary design, which aims to detail the initial stages of research so that it is ready and suitable to be tested at the design experiment stage.

The 4C Skills Profile of Prospective Pre-service Professional Mathematics Teacher as Guidelines for Implementing Case Method and Team-Based Project Lesson Study for Learning Community (LSLC) Based Learning in Calculus Courses According to University IKU-7

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Abstract. As a prospective pre-service professional teacher, calculus course students must have the 4C skills, namely critical, creative, communicative, and collaborative thinking skills. However, based on observations and tests, it was concluded that this skill was still low. This happens because the existing learning methods in lectures generally do not facilitate the development of students' 4C skills. Lecture materials that support 4C are also not yet available. Based on the 7th Key Performance Indicator (IKU-7), courses are expected to apply the case method or team-based project. Collaboration between lecturers in calculus courses is needed to overcome this problem. This only exists in Lesson Study For Learning Community (LSLC). The expected solution is to apply the case method and team-based project based on lesson study for the learning community (LSLC) by IKU-7. Lecture materials are designed according to 4C skills. Before this solution is implemented, preliminary research is needed to analyze students' initial 4C skill profiles so that they become the basis for designing LSLC-based case methods and team-based project learning. The type of research is descriptive research. Two sample classes were selected with 58 students using purposive sampling. Data was collected using mathematics test questions that test critical, creative and communicative thinking skills, while data on collaboration skills was collected through observation. Data were analyzed using an analytical rubric on a scale of 0-4, with 4C skills in the good and very good categories on a scale of 3 and 4 gaining an average of 9% on critical thinking skills, 5% on creative thinking skills, 17% on communication skills, and 14% on collaboration skills. It can be seen that the average 4C capability is less than 50%. It was concluded that students' 4C abilities were still very low. By analyzing this data, a 4C skills profile of calculus course students is obtained to become a guideline in designing learning according to IKU-7.

Developing Hypothetical Learning Trajectory of Arithmetic Sequence Using Realistic Mathematics

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Abstract. This study aims to describe the trajectory of learning to help students understand the material for arithmetic sequences and be motivated to learn. The context used in this study is the Borobudur Temple as a learning resource. This study used a design research method with a PMRI learning approach which consisted of three stages, namely preliminary design, experimental design (pilot experiment and teaching experiment), and retrospective analysis. The subjects in this study were 8th grade students of SMP Negeri 04 Semarang. The learning trajectory with the context of the Borobudur Temple on arithmetic sequence material consists of 3 series of activities, namely: (1) explaining the meaning of arithmetic sequences and series, (2) determining the formula for arithmetic sequences and series, and (3) solving contextual problems related to sequences and series arithmetic. This article presents the first phase of the research design, namely the preliminary design to provide a detailed explanation at the initial stages of design research so that it is ready and feasible to be tested at the experimental design stage.

Analysis of Problem Solving Abilities based on Polya Steps if Viewed from Students' Initial Mathematics Abilities

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Abstract. The importance of mathematical problem solving skills in learning so that students are able to analyze and solve problems mathematically in different situations. However, students' ability to solve mathematical problem solving problems is still low. This research aims to analyze and describe problem solving abilities based on polya steps in terms of students' initial mathematical abilities (IAM). The research method uses a qualitative approach with descriptive methods. The data instruments used were mathematical problem solving ability tests and interviews. The results of the research show that students with high IAM are able to understand the problems, but the devise a plan, carry out the plan steps and look back are still not accurate, while students at medium IAM and low IAM still make many mistakes in the steps of understanding the problem, devise a plan, carry out the plan and look back.

Designing Learning Trajectory of Three-Dimensional Shape Using Realistic Mathematics Education

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Abstract. This research aims to describe learning trajectories to help students understand the position of three-dimensional elements and be motivated to learn. The context used in this research is the "Little Netherlands" cultural heritage or the Old City of Semarang as a learning resource. This research uses a design research method with a PMRI learning approach which consists of three stages, namely preliminary design, experimental design (pilot experiments and teaching experiments), and retrospective analysis. The subjects in this research were class 12 students at SMA N 3 Semarang. The learning trajectory in the context of the cultural heritage of "Little Netherlands" or the Old City of Semarang in three-dimensional material consists of 8 series of activities, namely: (1) identifying the types and characteristics of curved side shapes, (2) determining the distance from point to point in space, (3) determine the distance from a point to a line in space, (4) determine the distance from a point to a plane in space, (5) determine the distance from a line to a line in space, (6) determine the distance from a line to a plane in space, (7) determine the distance from a plane to fields in space, and (8) solving contextual problems related to three dimensions. This article introduces the first stage of research design, or pre-design, which aims to provide a detailed explanation at the beginning of the design study, so that it is ready and can be tested in the experimental design stage.

Strong Rainbow Vertex-Connection Number of Comb Product of a Path and a Connected Graph

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Abstract. A vertex-colored connected graph G is strongly rainbow vertex-connected if every two vertices of G are connected by a shortest path whose internal vertices have distinct colors. Such a path is called a rainbow geodesic. The strong rainbow vertex-connection number of G, denoted by $srvc(G)$, is known as the minimum number of colors needed in order to make G strongly rainbow vertex-connected. In this paper, we estimate sharp lower and upper bounds of the strong rainbow vertex-connection number of comb product $P_n \rhd_o H$ and characterize connected graphs H so that the strong rainbow vertex-connection number of $P_n \rhd_o H$ attains the lower bound. We also determine the exact values of the strong rainbow vertex-connection number of $P_n \rhd_o H$ for some connected graphs H.

Analysis of Student Thinking Structure Errors in Solving Problems in Vector

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Abstract. Vector Calculus is one of the mandatory courses that must be taken by Mathematics Education Students in semester 5. One of the achievements of learning Vector Calculus is how students can solve problems related to vector calculus. However, in its application, students still experience many difficulties when solving problem-solving questions. This research aims to determine the structure of students' thinking in solving problems related to vector material. So that further analysis can be carried out to overcome these problems. This research method is qualitative. Data was obtained from test results and interviews. Next, the data was analyzed through 3 stages: data condensation, data presentation, and drawing conclusions. In this study, errors made by students were grouped into 3: high error (critical) levels, medium error levels and low error levels (not too critical). At a high error level, the mistake made by students is that students are not correct in choosing a solution strategy. The problem-solving presented by this group shows errors in pseudo-construction and Mis-logical construction. The mistakes that occur at a medium error level are Mis-analogical construction. In this case, students have started to use logical strategies but are wrong in applying the concept. Students equate the ideas used with other ideas. Students at the low error level (not critical) indicate that errors occur in pseudo-construction. The student's answer is correct, but the student cannot explain the answer correctly. The mistakes students make are errors in the structure of thinking in solving problems.

Development of Learning Models Based on Problem Solving and Its Impact on Students' High Level Thinking Abilities

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Abstract. This research was conducted in 2 (two) stages. The first stage is research and development and the second stage is the experimental stage. In the first stage a learning model was developed, which was called the Problem Solving Based Learning Model (PBPM model). The development of this model refers to The General Model of Education Problem Solving from Tjeerd Plomp. While the second stage aims to test the effectiveness of the PBPM model. Research in the first stage produced a problem-solving based learning model (PBPM). The syntax of this model consists of 7 (seven) phases, namely (1): Introduction, (2) discussion of material, (3) problem solving, (4) presentation and discussion, (5) expansion of problem solving, (6) presentation and discussion (continued), and (7) closing. From testing this model, a validation score of 94.29 was obtained, which means it is very valid, and a model implementation score of 88.84, which means the level of implementation of the PBPM model is very good (very high). Research in the second phase, using a quasi-experimental research type, with a focus on testing the effectiveness of the PBPM model. Two relatively equivalent classes were selected as samples. The first class as an experimental class uses the PBPM model, while the second class as a control class applies learning models in implementing the 2013 curriculum, as designed by the subject teacher. The results of statistical tests show that there are significant differences in high-level thinking abilities in the two classes. The calculated t value = 4.496 is greater than t table = 2.0076. The average score for the ability to solve questions in the form of reasoning in the experimental class was 50.61, while the control class was 32.84. Thus, the PBPM model meets the three quality criteria for learning models according to Nieveen (1999), namely validity, practicality and effectiveness. The PBPM model can be used as an alternative model in mathematics learning, which is effective in developing students' high-level thinking abilities

Developing Reasoning Ability of Students Through Three-Dimensional Figures Learning

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Abstract. Teaching is a process of delivering information in the form of knowledge possessed by the teacher to students, with the aim that students can understand the knowledge. Therefore, teaching is effective only if student learning outcomes are good. This can be done if the teacher provides students with conducive learning facilities. Mathematics, in terms of its object, is not a concrete object but an object of thought. Mathematical objects in the form of facts, concepts, operations, and principles only exist in the human mind. This paper aims to improve students' reasoning power to learn three-dimensional figures. It is because students find it challenging to learn spatial shapes. In learning about three-dimensional figures, students are expected to be able to draw geometric shapes and make nets. Also, students must have a visual perspective to quickly accept concepts and information packaged in image form. Reasoning is also an aspect of high-level mathematical thinking skills, categorized as essential student competencies. Through reasoning activities, students are trained to draw a conclusion or make a new statement based on several facts. So that, when learning mathematics, they will always think logically. Then, students who learn to use this reasoning ability will develop and improve their adaptation skills to a dynamic and continuously changing environment. Thus, reasoning is vital for critical and creative thinking processes that sharpen analytical thinking patterns.

Ethno-Didactics of Mathematics: an Approach of Learning Mathematics

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Abstract. The study of the connection between mathematics and culture has been well known as ethnomathematics. This theory was firstly introduced by Brazilian mathematician of D'Ambrosio. However, to use ethnomathematics in the learning and teaching mathematics in the classroom is still not well defined by many researchers and educational developers. Therefore, there is a need of didactical theory, strongly well developed in European tradition and also influencing mathematics education in Indonesia through historical and philosophical education from Dutch colonial in Indonesia. In that sense, the authors try to introduce etho-didactics of mathematics as a theoretical lens to develop a learning instruction of mathematics in Indonesia. We try to apply this idea on supporting prospective elementary teachers in designing mathematical tasks based on the cultural experiences, especially Malay culture.

Numeracy Ability of SMP Students in Ambon City

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Abstract. Numeracy is an important ability that needs to be developed is school. Numeration is also one of the components measured in the Minimum Competency Assessment (AKM). Objectives of this research is to analyze the numeracy ability of SMP students in Ambon City. This research is expected to contribute the improvement of education, especially in terms of learning and assessment. This research was conducted at 7 SMP in Ambon City, consisting of 5 State SMP and 2 private SMP. At each SMP were taken 18-20 students as sample. The number of students involved as sample in this research was 134 students. Data collection used the test method. A test instrument was developed that measures students' numeracy abilities. Data were analyzed using Descriptive statistics and five scale conversions according to Ratumanan and Laurens (2015). The results of this research showed that the students numeracy ability was relatively low. Only 1,49% of students had very good numeravy ability, and 2,99% of students had good numeracy ability. The majority, namely 52,99% hadvery low numeracy ability and 31,34% had low numercy ability. The average score of students' numeracy ability was 34,33, which was in the very low category. 80% of the numeration components measured were in the low or very low category. These components were (1) estimating and calculating with whole numbers and (2) components using fractions, decimals, percent, and comparisons were in the low category. Meanwhile, components (1) recognizing and using patterns and (2) relationships and components of using spatial reasoning were in the very low category..

Indonesian Junior High School Students' Metacognition: Hybrid Learning Analysis

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Abstract. Metacognition ability is one of the abilities that involve students' thinking processes in processing existing information to determine problem-solving solutions. Facts in the field show that students are still fragile in their metacognitive abilities in solving mathematical problems. One solution that can be applied to overcome students' low metacognitive knowledge is using the LAPS-Heuristics learning model with local wisdom. However, learning in schools currently still applies a hybrid learning model. This study aims to determine the effectiveness of the LAPS-Heuristics learning model with the hybrid learning method on students' metacognitive abilities in solving mathematical problems. The type of research used is an experimental type of intact group comparison. The research subjects included class IX F students at SMP Negeri 1 Kahu who were divided into two groups: shift A using online learning and shift B using face-to-face learning (offline). The data collection technique was used to test the learning outcomes of the two groups to determine the differences in students' metacognitive abilities given online and offline learning. The results showed that the local wisdom LAPS-Heuristics learning model with the hybrid learning method improved students' metacognition skills in solving mathematical problems 75% in online classes and 88% in offline classes.

HYBRID LEARNING: The Effect On Students'achievement In Numerical Method Course

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Abstract. The purpose of this research is to find out the effect of hybrid learning on college students' achievement in numerical method course. This research is a qualitative study which conducted on college students at Department of Mathematics Education, Universitas Pattimura, in the academic year 2022/2023. There were 50 students which selected randomly and divided in two groups, hybrid and conventional, each group has 25 students. Research data is collected in two stages: pre- and post-tests. Data from pre-test is analyzed using homogeneity and normality tests, show that two groups have the same abilities. On the contrary, posttest which analyzed using t-test show that group of students which treated using hybrid learning have better achievement compared to group of conventional method.

Investigate the Accuracy of Student Predictions in Solving Graphic Problems

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Abstract. The accuracy of predictions plays an important role in problem-solving. The accuracy of predictions is necessary for better decision-making, especially in graphic problems. This research aims to describe the accuracy of students in solving graphic problems. The accuracy of predictions is reviewed from the level of coordination between variables. This research uses a qualitative approach involving 28 students. The data analysis used is Content Analysis, which involves the identification, categorization, and interpretation of content from qualitative data. The results show that students who can make accurate predictions can not only coordinating the direction of change of one variable with changes in the other but coordinating the amount of change of one variable with changes in the other variable. These findings indicate that coordinating changes in the direction and amount of variables plays an important role in the accuracy of predictions.

Branch and Bound to Detect Clique in Syiah Kuala Sub-District, Banda Aceh City

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Abstract. Banda Aceh City is the capital of Aceh province which has a lot of road access, both main roads and small roads that connect between villages (Gampong). and thus it is necessary to know which areas have many road access, so there won't be any repetition of crossing the same road if you want to move from one area to another. Therefore, it is necessary to classify which areas are directly connected and form a cycle (clique) and look for groups with maximum value based on the distance value owned by each group, which is called the maximum clique. Next, a maximum clique search is performed where each clique group will record the number of vertices connected to each other and the clique with the most number of vertices will be obtained (Maximum). This process is known as the bounding process. In the Syiah Kuala sub-district, Banda Aceh City, there were 3 clique namely 2 clique of size 4 {E, G, F, H}, {E, G, F, D}, and 1 clique of size 3 {E, G, I}. The maximum clique obtained is a clique of size 4 where the number of connected vertices is 4 vertices. In this study also obtained the maximum clique of EGFD, that is the maximum clique that has the greatest weight value.

Rings of Morita Contexts As Strongly Graded Rings Which are Maximal Orders

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Abstract. Let $T = \begin{bmatrix} R & V \\ W & S \end{bmatrix}$ be a ring of a Morita context where R and S are rings, V is a (R, S) −bimodule, and W is a (S, R) −bimodule. We know that T can be viewed as a graded ring type$-\mathbb{Z}$ that is $T = \bigoplus_{n\in\mathbb{Z}} T_n$ where $T_{-1} = \begin{bmatrix} 0 & 0 \\ W & 0 \end{bmatrix}$, $T_0 = \begin{bmatrix} R & 0 \\ 0 & S \end{bmatrix}$, $T_1 = \begin{bmatrix} 0 & V \\ 0 & 0 \end{bmatrix}$, and $T_i = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ for all $i \notin \{-1,0,1\}$. In this paper, we will assume that T is an order in $Q(T) = \begin{bmatrix} Q(R) & Q(V) \\ Q(W) & Q(S) \end{bmatrix}$. Using the term of $\mathbb{Z}$ −invariant maximal order, we will give some necessary and sufficient conditions for T to be a maximal order in $Q(T)$.

Metacognition Activity of Vocational High School Students In Statistical Problem Solving

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Abstract. Metacognition activity is related to students awareness and regulation in planning, monitoring, and evaluating their thinking process to solve mathematical problems. This study aims to describe students' metacognitive activities in solving problems in statistical material. This research is a descriptive study with a qualitative approach that was carried out at SMK Negeri 1 Ambon in the 2022/2023 academic year. The research subjects were 5 students of class XII. Based on the results of the problem solving ability test, one person was selected each representing a group of students with very high, high, medium, low and very low ability categories. To collect data, test instruments and interview guidelines were developed. Data analyzed using the stages of reduction, presentation, and conclusions. Based on data analyzed, the following results were obtained: (1) students in the very high category were able to carry out planning, monitoring and evaluation activity on the process and results of their thinking in every step of problem solving; (2) students in the high category are able to carry out planning, monitoring and evaluating the process and results of deep thinking but did not reflecting on every step of problem solving; (3) students in the moderate category are able to carry out planning, monitoring and evaluation metacognition activity on their thinking processes by revising to get the right results; (4) students in the low category carry out metacognition activity planning, but not optimal in monitoring and evaluation activity; and (5) students in the very low category are not able to carry out planning, monitoring and evaluation activity in solving mathematical problems properly.

Using GeoGebra Classroom to Learn Mathematics

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Abstract. This study aimed to determine whether or not there was an influence on the use of the GeoGebra Classroom in mathematics learning at the nineth grade of SMP Negeri 9 Ambon. The research design used the post-test-only group. The population in this study was at the nineth grade of SMP Negeri 9 Ambon and the sample was grade IX_7 and IX_{14} students. The statistical test used a free sample t-test. The results showed the value of sig. (2-tailed) = 0.00 < α=0.05 so it could be concluded that there was a positive influence on the use of GeoGebra Classroom in mathematics learning.

Development of Android-Based Algebraic Form Application Learning Media Using Construct 3

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Abstract. This study aims to develop an android-based algebraic form application learning media using construct 3 which is feasible to use for VII grade students of SMP Negeri 7 Ambon. This type of research is Research and Development using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The product produced in this media development is in the form of an algebraic form application. The results of this study obtained an average value of material expert validation of 100% and media experts of 99%, teacher responses based on practitioner testing of 100%, and student responses based on product trials in small group trials of 98.67%, and large group trials of 96%, as well as student learning outcomes of 73.33%. Based on the research results obtained, it can be concluded that developing an android-based algebraic form application learning media using construct 3 for VII grade students of SMP Negeri 7 Ambon is feasible to use.

The Effect of Realistic Mathematics Approach to Solve Higher Order Thinking Skils (HOTS) Problems On Three-Dimensional Shapes with Curved Surfaces

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Abstract. This study aims to determine whether there is an effect of Realistic Mathematics learning to solve HOTS problems on three dimensional shapes with curved surfaces. The research was conducted on ninth grade students of junior high school in Ambon city. Data were analyzed using ANACOVA inferential statistics to test the hypothesis. The data analyzed were pretest results (students' initial abilities) as covariate variables and posttest results (student learning outcomes) as the dependent variable. The results obtained are the respective regression models for the experimental class (realistic mathematics learning) and the control class (conventional learning), namely Y_E = 61.132 + Y_E = 61,132 + 0,724X_E dan Y_K = 32,143 + 1,423X_K. From the two regression models, it can be seen that the regression line constant for the experimental class is greater than the regression line constant for the control class. This indicates a significant difference. Geometrically, the regression line for the experimental class is above the regression line for the control class. This means that there is an effect of realistic mathematics learning to solve HOTS problems on three dimensional shapes with curved surfaces of ninth grade students of junior high schools in Ambon city.

Students Mathematical Literacy In Solving Operational Problems With Algebraic Forms In Calss VII SMP Angkasa Lanud Pattimura Ambon

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Abstrak. The purpose of this research for describe students' mathematical literacy in solving operational questions on algebraic forms in class VII SMP Angkasa Pattimura Ambon. This reseacrh was conducted for 20 student graders VII-2 SMP Angkasa Pattimura Ambon. Data were analyzed descriptive quantitative. The results showed that question number 1 the indicator of mathematical literacy that was most completed by students was an indicator of a problem-solving strategy, namely 40% or moderate interpretation, question number 2 the indicator of mathematical literacy that was most completed by students was an indicator of problem-solving strategies, namely 65% or moderate interpretation, and question number 3 the indicator of mathematical literacy that was most completed by students was communication, namely 15% or less.

Exploring The Potential Of Chatgpt In Mathematics Education with An Adaptive and Interactive Approach

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Abstract. Mathematics education is a critical aspect of students academic development, yet often some students face challenges in understanding complex mathematical concepts. Factors such as different learning styles, a one-size-fits-all approach to teaching that is not always effective, limited personal interaction with teachers due to teachers often having time constraints to provide in-depth explanations to each student, difficulties in comprehending mathematical literature, and discomfort in asking questions to teachers in front of the class can limit their understanding. Artificial Intelligence (AI) technology, like ChatGPT, has rapidly evolved in recent years and demonstrated significant potential in aiding education. ChatGPT is a language model based on Artificial Intelligence (AI) that can communicate with humans through text in a more natural and responsive manner. By leveraging AI technology like ChatGPT, students have the opportunity to ask questions without fear of judgment. ChatGPT can provide instant feedback on students' answers, helping them understand mistakes and needed improvements. Additionally, by using ChatGPT outside the classroom, students can receive supplementary assistance and deepen their comprehension.

Development of an Ethnomatematics-Based Hybrid Learning Model with Heutagogy and Cybergogy Approaches

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Abstract. This study aims to produce a valid and practical product for developing a hybrid learning model based on ethnomathematics with heutagogy and cybergogy approaches. The type of research used in this study is research and development. This study uses the Plomp development model which consists of three development stages including the preliminary research phase, prototyping phase, and assessment phase. The population in this study were prospective elementary teachers from three elementary teacher education study programs in Riau province. Meanwhile, the samples in this study were 38 fifth-semester of prospective elementary teachers from University of Riau how took the mathematics learning development course in elementary school. The object of this research is the artifacts in the Siak Sri Indrapura Palace, Siak Regency, Riau Province. The research data was collected by observation, interviews and questionnaires. Furthermore, the data is processed through quantitative and qualitative analysis techniques. Based on the validation results of the ethnomathematics-based hybrid learning model developed, the Aiken's V validity index was 0.88 with a very valid category. The aspects that are validated are material aspects, display aspects, and language aspects which contain the three indicators in it. Meanwhile, the practicality of the ethnomathematics-based hybrid learning model based on the lecturer practicality questionnaire data obtained an average percentage score of 92.02% in the very practical category. Likewise, based on the student practicality questionnaire, the average percentage score was 89.35% in the very practical category. Based on the results of this study, it can be concluded that the ethnomathematics-based hybrid learning model with heutagogy and cybergogy approaches has fulfilled the validity and practicality criteria so that this product can be used by lecturers and students in mathematics learning development courses.

Exploring The Correlation Between Differential And Integral Calculus Study Results And Advanced Calculus Performance Of Students

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Abstract. JPM Unpatti Calculus is a fundamental branch of mathematics that deals with the study of differentiation and integration. Differential and integral calculus serve as the foundation for higher branches of mathematics, including advanced calculus. In this study, we explored the relationship between differential calculus and integral calculus learning outcomes and students' advanced calculus learning outcomes. The population in this study were all Mathematics Education students of the Faculty of Teacher Training and Science, Pattimura University in 2020 who had taken differential calculus, integral calculus, and advanced calculus courses, with a total sample size of 36 people. The research method used is quantitative research with correlational methods. This study uses multiple regression analysis to determine the form and influence between the independent and dependent variables. Based on the results of data analysis, it is concluded that there is a significant contribution between differential calculus learning outcomes to advanced calculus learning outcomes. The contribution of the influence of differential calculus and integral calculus learning outcomes together (simultaneously) on advanced calculus learning outcomes is equal to 55.6%. Relative contribution of differential calculus learning outcomes to advanced calculus learning outcomes based on the calculation results obtained while the relative contribution of integral calculus learning outcomes reached 65.29% to the advanced calculus learning outcomes. So that it shows a significant influence between the learning outcomes of differential and integral calculus on the learning outcomes of advanced calculus. Students should strive to have a strong understanding of the concepts of differential and integral calculus to unlock success in advanced calculus studies.

The Implementation of Differentiated Learning in Accordance with the Independent Curriculum by Mathematics Teachers in the Leading School Program in Bintan Regency

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Abstract. Differentiated Learning is a cycle of investigating students and responding to their learning based on their differences and dynamism, adjusting to their interests, learning preferences, and readiness to achieve increased learning outcomes, thus making the teacher play an important role in it. The purpose of this study was to find out and obtain information about the implementation of differentiated learning in accordance with the independent curriculum of high school mathematics teachers at driving schools in Bintan Regency, so as to present and provide an overview of the extent to which high school mathematics teachers understand and apply differentiated learning in learning. in accordance with the independent curriculum in the flagship school program in Bintan Regency. Qualitative data for this study were collected through questionnaires, interviews, and observation. The research findings show that teachers have a good understanding of differentiated learning, but in practice there are several challenges they face in implementing it, such as managing time and planning learning activities that can meet all students' abilities, interests, and learning styles.

Development of Animation-Based Beginning Mathematics Learning Media in Early Childhood Education

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Abstract. This study aims to produce animation-based beginner mathematics learning media in early childhood education. The type of research carried out is development research, because in this research a video-based animation-based mathematics learning media for early childhood education was developed. The development research model used is the ADDIE development model which consists of 5 stages, namely Analysis, Design, Development, Implementation, and Evaluation. The media that has been successfully developed has been arranged so that students can easily learn beginner mathematics based on animated videos in a fun way. This causes the developed learning media to meet valid criteria. So that it can be said both in terms of content and construct the learning media developed have met the expected validity criteria. Judging from the teacher's response it shows 90%. This shows that the media can be implemented practically by the teacher. Teachers find it easy and smooth to operate interactive learning media, its application is very appropriate to the learning time and can be repeated according to the wishes of the users, able to help students understand the material, and makes it easier for teachers to teach. Thus, the video-based animation learning media for early childhood education has met the practicality of the media as expected.

Design of Number Pattern Questions for Measuring the Mathematical Thinking Ability of Audio Visual Learning Style Students

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Abstract. This study aims to describe the design of number pattern questions used to measure the mathematical thinking abilities of audio-visual learning style students. The subjects consisted of six students of eighth grade of junior high school with audio-visual learning style. This is a research design which consists of five stages, including Preliminary Design, Focus Group Discussion (FGD), Trial, Interview, and Retrospective Analysis. Data collection techniques in this study were learning styles questionnaire, tests, and interviews. The data analysis used is qualitative technique. Based on the results of the Focus Grup Discussion, the number pattern questions already could be categorized as questions that could measure the ability to think mathematically based on theory. Based on the test results, it can be seen that the questions developed are able to guide students with audio-visual learning style in specializing, generalizing, conjecturing, and convincing. This can be seen in the questions that contain a patterns of object configurations in the form of toy, match, and tile arrangements which can lead students to do specialization. This arrangement leads students to identify information and analyze the problems. In the editorial of each question, students are guided to generalize by looking for the next object configuration pattern through observing the relationship of each form of arrangement. However, this question has not guided students to do conjecturing. This can be seen from the fact that there are still many students who have not been able to make conjecture ideas to solve problems. Even though the convincing level is written on the question, in solving it students are still unable to prove the truth of general pattern.

Collective Argumentation in Defining and Classifying Parallelograms

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Abstract. Reasoning and proving are mathematical activities. However, engaging students in formal deductive proofs early is inappropriate for child development. Reasoning and proving the definition and classification of a parallelogram, which is simple and not as rigorous as formal evidence, is still difficult for students. This is due to students' limited understanding. Collective argumentation was chosen for defining and classifying parallelograms because it clearly illustrates the details of the proof process in defining and classifying parallelograms through argumentation. Argumentation as a starting point for learning proofs is important for building mathematical understanding. Learning through discussion benefits students, including exchanging opinions, negotiating, and agreeing on decisions. This study aims to investigate how students defining and classifying parallelograms in collective argumentation. This study uses a qualitative approach. The subjects were three groups; each group consisted of three students from grade 7 at a middle school in Gresik. Each group is tasked with defining and classifying quadrilaterals and discussing them. The teacher accompanies the discussions to a limited extent, and video recordings are made. This is done so that all arguments are observable and can be repeatedly observed to obtain data validity. The results of the video recordings were transcribed and analyzed using the Krummheuer diagram adapted from Toulmin. The research results show that (1) the student-made definition of aparallelogram still uses the wrong word because the constructed definition is observed through the student-made images; (2) The argument structures that appear in the classification of parallelograms are data, warrant, backing, and claim. Warrant used in collective argumentation are inductive warrant.

Students' Ability to Explain Derivative Concepts Through Graph Analysis

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Abstract. Graphs are visual representation of data and are important tool for understanding the relation between two things and concepts. Students' ability to work with graphs, such as analyzing information, making inferences from facts available on graphs, and explaining facts in graphs is considered one of the important skills that students need to acquire in todays' era. For a real-valued function of one variable, the derivative at a point is equal to the slope of the tangent line on the graph of a function at that point. This descriptive research aims to figure out students' ability to explain concepts related to derivative through graph analysis. The participants of this study were 15 students who took differential calculus at the mathematics education department, University of Bung Hatta. From two graphs given, participants were asked to answer questions and explain the derivative concepts related to the graphs. In analyzing a graph, there are three levels of ability are discussed, students' ability to reading the graph, reading within the graph, and reading beyond the graph. The findings addressed that students' ability in explaining the concepts related to derivative in general tends to be low. The majority of students also have difficulty in analyzing graphs, as well as when explaining and elaborating information from facts that are not explicitly shown in particular graphs (students' ability in reading beyond the graph).

Examining Pre-service Mathematics Teacher Knowledge in Error Analysis of Students Work in Solving Quadratic Function

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Abstract. This study investigates the level of knowledge and proficiency exhibited by pre-service mathematics teachers in analyzing errors within students' solutions to quadratic function problems. The effective teaching of quadratic functions requires educators to not only understand the subject matter themselves, but also to identify common misconceptions and errors that learners may encounter. Error analysis plays a pivotal role in fostering meaningful learning experiences. The research aims to examine pre-service mathematics teacher knowledge in respons students work. This study is categorized as a qualitative research endeavor that adopts a descriptive-narrative methodology. It encompasses twenty-two educators who are actively engaged in activities aimed at enhancing their professionalism within an Indonesian tertiary educational institution. The dataset is derived from the teachers' reactions to a specific vignette. For data analysis, the framework employed revolves around evaluating teachers' mathematical comprehension through error analysis.The findings demonstrate that a significant portion of the participating teachers encountered challenges in identifying, deciphering, and assessing errors inherent in comprehending the given questions. Furthermore, the teachers predominantly employ remedial strategies through reiterating fundamental concepts and furnishing guiding queries.

Improving Students' High-Level Mathematical Thinking Skills Through Generative Learning Models

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Abstract. Mathematics learning is currently more focused on procedural abilities, one-way communication, monotonous class arrangements, low-order thinking skills, and depending on textbooks, more dominant routine questions and low-level questions. Teachers and lecturers rarely provide high-order thinking skills to students in mathematics learning, so if given non-routine questions and questions that require critical and creative solutions, students have difficulty solving them. To overcome this, this study used a generative learning model. Learning with this model has succeeded in increasing student learning outcomes in mathematics. The purpose of this study was to (1) analyze the achievement of high-level mathematical thinking skills of students who received learning with generative models and learning with conventional models, (2) analyze the increase in students' high-level mathematical thinking skills between those who receive generative learning models and conventional learning models, (3) See the effect of students' KAM (Initial Mathematical Ability) levels in the high, medium, and low categories on the high-level mathematical thinking abilities of students who receive generative learning models and conventional learning models, and (4) The magnitude of the interaction between the generative learning model and the KAM (Initial Mathematical Ability) level of students in the high, medium, and low categories on the improvement of high-level mathematical thinking skills of students who received generative learning models and conventional learning models. This research is experimental with a pretest-posttest control group design. From the results of this study, it can be seen that (1) there are differences in the attainment of high-level mathematical thinking skills between students who are taught by generative learning models and conventional learning models, (2) There is a significant difference in the improvement of students' high-level mathematical thinking skills between students who are taught with generative learning models and students who are taught with conventional learning models, (3) For the KAM level of students in the high, medium, and low categories, it does not significantly affect the improvement of high-level mathematical thinking abilities of students who obtain generative learning models and conventional learning models, and (4) There is no interaction between the KAM level (high, medium, or low) and the learning model towards increasing the high-level thinking skills of students who receive generative learning models and conventional learning models.

Some Proved Results About Kneser's Graphs And Stiefel's Manifolds

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Abstract. Significance of Kneser graph in theory of graphs is obviously from the number of studies and scientists whose subject of interesting were these graphs. In the book Using the Borsuk-Ulam Theorem, the author showed interest for connecting Kneser graphs with combinatorial geometry of topological spaces, and showed that theory of graphs, theory of sets, and theory of combinatorial geometry can prove analogously using each other in n -dimensional topological spaces. One of problems the author imagined was the number of odd cycles of Kneser graph. He proposed the number and let the reader to think about way of solving this problem. Fractional chromatic number also was interesting thinking, and number of vertexes of complete bipartite sub graph which is maximal. We determined *ind* of Stiefel manifold, and construct some maps in our result. Kneser graph presents the model of graph with specific construction. We consider the set $[n]$, the set of numbers from 1 to *n*. We construct Kneser graph $KG_{n,k}$ on the next way: k – member subset of $[n]$ presents vertex of graph and vertexes of graph are connected with edge if their corresponding sets are disjoint. Cycle in graph is series of connected edges with same first and last vertex. Definition of chromatic number is given in the proof, and the complete maximal bipartite sub graph of Kneser's graph is described and explained in the proof too. The symplectic Stiefel manifold is the set of linear symplectic maps between the standard symplectic spaces, and it reduces to the well-known set of symplectic matrices. Problems I proved were at the end of chapters in the book Using the Borsuk-Ulam theorem, and the solving was interesting. I wanted to share my contemplations with other scientists, because that can be great opportunity for them to get inspiration in their contemplations.

Using the Quizizz Application as an Evaluation Media for Numeration Literacy Based Mathematics Learning in MAN 2 Medan

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Abstract. The use of technology in the learning evaluation process is an effective way to determine the learning outcomes that have been carried out. However, many teachers still experience problems related to the use of this technology. This study aims to determine the use of the Quizizz application as an evaluation media for learning mathematics based on numeracy literacy. This research is a type of quantitative descriptive research that can describe the condition of students' interest and concentration after using the quizizz application as a learning evaluation media. This research was conducted at MAN 2 Medan with 38 research subjects who were students of class XI F1 F for the 2023/2024 academic year. Some of the instruments used in this study were (1) observation sheets, (2) student response questionnaires, and (3) interview guide sheets. From the student response questionnaire, it was found that 72.1% of students stated that the quizizz application was able to increase interest and 70.6% of students stated that the quizizz application was able to increase concentration in taking the numeracy literacy test. The results of observations and interviews also stated the same thing that the quizizz application was able to increase students' interest and concentration. From these results, it can be stated that the quizizz application is effectively used as an evaluation media for learning mathematics based on numeracy literacy at MAN 2 Medan.

Prospective Teachers' Mathematical Communication Profile in Solving Geometry Proof Problems

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Abstract. Mathematical communication is one of the competency standards in learning mathematics. Mathematical communication is essential because this ability allows a person to convey ideas and thoughts and clarify understanding. Prospective mathematics teachers need to have this ability to ensure that the mathematical concepts taught later to students, especially geometry, are not wrong, both in terms of mathematical communication and the correctness of the concept. However, in geometry course for prospective mathematics teachers, there are still some students who have difficulty solving geometry proof problems and communicating their solutions. This study aims to describe the mathematical communication profiles of prospective teacher students in solving proof problems in Geometry. The subjects in this study were three undergraduate students of mathematics education who were programming the geometry course, each of whom had high, medium, and low mathematical communication ability. The instruments in this study were the researchers themselves and the proof problem sheet which contained 3 proof problems. Data on the results of solving the problem of proof from the subject were analyzed through data reduction techniques, data presentation, and drawing conclusions or data verification. Student mathematical communication is described based on aspects of accuracy, completeness, and fluency of the reasons given at each step used in proving problems in the results of their work. These steps include understanding the problem, executing the plan, and looking back. The results showed that students with high written mathematical communication skills wrote down the steps to solving problems (understanding the problem, carrying out the plan, looking back) completely and fluently. Symbols are written and used correctly. Irregularities are encountered only in a small number of steps in carrying out the plan and include errors, incomplete reasons, or unclear geometric objects in question. Students with moderate mathematical communication skills communicate their answers quite fluently, with 1-2 scribbles, but show more inaccuracies in terms of steps, reasons, and symbols than students with high written mathematical communication skills. Found inaccuracy in the use of symbols, the use of inappropriate reasons, and steps that are not appropriate and incomplete. Students with low mathematical communication skills do not communicate answers smoothly (lots of scribbles), and the answers given are incomplete and inaccurate both in the steps taken and the reasons that accompany these steps.

Bibliometric Analysis of Artificial Intelligence and Contribution to Mathematics Education

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Abstract. This study aims to investigate AI research trends through bibliometric analysis on widely distributed Google Scholar (GS) and Scopus databases. We reviewed 929 papers from GS and 40 documents from the Scopus database searched using Harzing's Publish on May 6 2023. A descriptive study approach was used to investigate the data. The result of this study is that the quantity of copies of AI from 2019 to 2023 has increased significantly in 2023 based on Scopus and GS databases. The top cited base on GS is Kung et al. in PLOS Digital Health source. The top authors most cited on the Scopus database are Salvagno, Taccone, and Gerli from the article in Critical Care source. Annals of Biomedical Engineering are the top journals that contribute the most to Scopus and GS. The VosViewer visualisation displays four clusters related to AI: Generative AI, Challenge, transformer, answer, and chatbot. The contribution of AI in mathematics education (ME) are to analyse transcript data automatically, assistants for teachers and pupils in learning and teaching mathematics, and AI as a calculator and intelligent tutoring systems. We strongly recommend ICT researchers in ME integrate AI into mathematics learning—for example, the application of AI in designing innovative mathematics learning media. The results can assist relevant researchers in understanding trends in AI research and recommend guidelines for other studies.

Implementation of Problem Based Learning Assisted with the Geogebra Application to Improve Student's Mathematical Creative Thinking

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Abstract. The problem of students in learning mathematics is the low literacy skills of the participants in translating mathematical problems in the form of text into mathematical symbols, sometimes students do not understand what the reading text means. This is caused by several factors, including related to the learning strategy implemented by the teacher and the media used is not appropriate for the material presented so that students' mathematical thinking skills are not well developed. Based on these problems, the researcher conducted research with the title application of problem based learning assisted by the GeoGebra application to improve students' mathematical thinking in the matter of two-variable Linear inequalities systems. This research was conducted in grade X SMA Islam Nurul Fikri Boarding School Lembang. The subjects in this study were students of class X3 and X4 SMA Islam Nurul Fikri Boarding School Lembang with a total of 40 female students. The approach taken by researchers in this study uses a quantitative approach. From the results of the pre-test and post-test students' mathematical ability data for the experimental class the ability to think mathematically during the post-test increased from the pre-test results with an increase of 19% and for students' very mathematical thinking abilities in the pre-test only 0% but after applying the model PBL with GeoGebra post-test scores increased to 42% which is a huge change. While the control class from pre-test to post-test did not change significantly. From the results of data analysis, the value (sig.2-tailed) with the t-test was 0.005. While the value (sig.1-tailed) is 0.0025.The Value is $0.0025 < 0.05$. Thus the null hypothesis (Ho) is rejected, which means the alternative hypothesis (H_1) is accepted. Therefore, students' mathematical creative thinking abilities taught problem based learning (PBL) model with the Geogebra are better than students' mathematical creative thinking abilities taught problem based learning (PBL) learning model on the matter of a two-variable linear inequality system.

Mathematical Literacy Ability Judging from Students' Cognitive Style in Algebraic Function Limits

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Abstract. This research aims to describe the mathematical literacy abilities of Class XI students at SMA Negeri 3 Aru Islands in terms of reflective cognitive style and impulsive cognitive style. The subjects in this study were 4 students consisting of two reflective cognitive style students (NK, RU) and two impulsive cognitive style students (P, AS) who were selected using purpose sampling techniques. The instruments used consisted of the MFFT test (matching familiar figure test), interview guide, and mathematical literacy ability test. Data collection techniques, namely tests, interviews and documentation. Data analysis techniques, namely data collection, data reduction, data presentation and drawing conclusions.

Employee Performance Appraisal Using Fuzzy Logic Mamdani Rules

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Abstract. This study aims to assess employee performance using Fuzzy logic Mamdani rules assisted by matlab. The research method used is survey research. The fuzzy variables (input variables) in this study consist of *Work Quality* value (denoted as L), *Work Quantity* value (denoted as N), and *Timeliness* value (denoted as W). Work quality is measured by an assessment of the quality of work produced and the perfection of tasks against the skills and abilities of employees. Work quantity is measured through an assessment of the amount of work completed according to the target. Timeliness (*on-time management*) is measured from the assessmentof timeliness in completing work. The results showed that the assessment conducted using fuzzy logic mamdanirules showed that 30 employees at PSDKU Pattimura University in Aru Islands Regency were in the good category.