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# Advances in **Social Science, Education and Humanities Research**



Series: *Advances in Social Science, Education and Humanities Research*

# Proceedings of the International Conference on Educational Sciences and Teacher Profession (ICETeP 2018)

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Welcome to the 1st International Conference on Educational Sciences and Teacher Profession (ICETeP 2018) It is a great honor and pleasure to bring you the collection of articles from the ICETeP 2018. This conference was organized by the Faculty of Education and Teacher Training - University of Bengkulu, Indonesia, and was held on University Bengkulu campus on October 26-28, 2018.

Please click [here](#) for the conference website.

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Series: Advances in Social Science, Education and Humanities Research

# Proceedings of the International Conference on Educational Sciences and Teacher Profession (ICETeP 2018)

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Welcome to the 1st International Conference on Educational Sciences and Teacher Profession (ICETeP 2018). It is a great honor and pleasure to bring you the collection of articles from the ICETeP 2018. This conference was organized by the Faculty of Education and Teacher Training - University of Bengkulu, Indonesia, and was held at University Bengkulu campus on October 19-20, 2018.

The current condition of educational sciences and teaching profession in Indonesia, particularly in educational management, learning & teaching process, still requires revitalization. Interaction and communication between researchers from many regions in Indonesia can generate ideas and research collaborations to address actual issues in educational sciences and educational teacher profession. The researches formed from such collaborations will be able not only to improve an institution but also to improve self-creativity, innovativeness, and competitiveness to continue providing competence human resources. Therefore, the conference theme is "Revitalization in Educational Sciences and Teaching Profession toward Industry Revolution 4.0 Era".

We would like to express our gratitude to all keynote speakers and presenters from around the world who traveled to Bengkulu to deliver and exchange their ideas. Our appreciation goes to all the committee members who have worked hard to make this event possible. This volume of proceedings provides an opportunity for readers to engage with a selection of refereed papers that were presented during the ICETeP 2018 conference. Scopes of the conference are ranged from, but not limited to Educational Management and Policy, Curriculum and Educational Technology, Teaching Profession, Specific Education, Science Education, Other Areas of Education.

We wish scholars, professionals, and stakeholders from all parts of society and all regions of the world enjoy and discover valuable engagement with authors' ideas in sustaining professional development in the area of Educational Sciences and Teacher Profession.

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# Proceedings of the International Conference on Educational Sciences and Teacher Profession (ICETeP 2018)

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83 articles

## [Effectiveness of the Student Council Programs in Vocational High School](#)

Anisah Anisah, Tia Ayu Ningrum, Yulia Ulfa

Student council is problem solving for that. The Purpose of this study is to describe the effectiveness of the implementation program student council in Vocational High School with indicator plan/program, efficiency facilities and infrastructure, and goal. The method is qualitative. Questionnaire has...

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## [Increasing the Competence of Scientific Publications of Technology-based Primary School Teachers in Indonesia](#)

Dihamri Dihamri, Haimah Haimah, Abditama Srifitriani

The purpose of the study is to increase the competencies of scientific teacher's publication. Teachers are not hampered in promotion and other position. The method used to achieve the goal is Training for 36 hours. Face to face for 6 times of meetings, individual guidance by WhatsApp (WA) through chat...

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## [Constructing the Test for Describing the Students' Problem Solving Skill to Mitigate the Earthquake Disaster](#)

Henny Johan, Eko Swistoro, Syaiful Rohman, Deny Parlindungan, Sipriyadi Sipriyadi

A set of problem solving test had been constructed to describe the problem solving skill to mitigate the earthquake disaster emergency conditions of the junior high

school in the coastal area of the city of Bengkulu. The method which is utilized in this study is R and D, quasi experimental was conducted...

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## [Ethnomathematics and Outdoor Learning to Improve Problem Solving Ability](#)

Wahyu Widada, Dewi Herawaty, Abdurrobbil Falaq Dwi Anggoro, Azes Yudha, Misi Kurnia Hayati

Students often have difficulty doing mathematical problems. The outdoor learning with ethnomathematics approach is one solution. The purpose of this study was to determine the increase of the problem solving ability of senior high school students through the application of outdoor learning model based...

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## [Increasing the Students' Learning Motivation and Understanding of Concept by Using Examples and Non-Examples Learning](#)

Nurul Astuty Yensy

Learning motivation is very necessary as an encouragement for someone to do learning activity so that learning achievements can be achieved and it can be influenced by the method or learning strategy used, and then previous research examining the learning method of Example and Non-Example had never discussed...

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## [The Improvement of the Understanding of Mathematical Concepts through the Implementation of Realistic Mathematics Learning and Ethnomathematics](#)

Dewi Herawaty, Wahyu Widada, Khathibul Umam Zaid Nugroho, Abdurrobbil Falaq Dwi Anggoro

The easiness of learning can be experienced if learning contents and contexts are related to students' daily activities. One of them is a learning approach that has realistic characters based on ethnomathematics. The purpose of the study was to determine the influence of ethnomathematics and realistic...

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## [Internal and External Quality Audit in Efforts to Build High Quality in the College of Poltekkes Kemenkes Bengkulu](#)

Darwis Darwis

Abstract Higher Education has the responsibility to carry out quality assurance activities autonomously and independently. In improving the quality, Poltekkes Kemenkes Bengkulu has conducted Internal Quality Audit (AMI) by Auditor and External Quality Audit with ISO 9001 by SAI Global. This research...

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## [Design of Internet Integrated Students Worksheet for Developing the Ability of Mathematical Reasoning](#)

Selvi Riwayati, Yuriska Destania

The learning process is the availability of adequate learning resources to support student learning activities. Learning resources that are often used in lecture activities so far are textbooks of publishers that were also used in the course of Introduction to Probability. However, the use of the book...

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## [Academic Supervision by School Principals at State Elementary Schools in Indonesia](#)

Haimah Haimah

This study was aimed to examine the implementation of academic supervision planning program, including the follow-up activity of academic supervision and the constraints faced by principals in conducting academic supervision. This study was conducted at one elementary school in Bengkulu, Indonesia and...

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## [Abstract Thesis Analysis in Linguistics, Literature, and Language Teaching Fields](#)

Arono Arono

Not all abstracts written by students are in accordance with systematic abstract in a related field of science. In fact, abstracts are the main and important part in the description of the contents of a scientific work so the reader becomes interested in continuing his reading. This article aims to describe...

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## [Character Education through People's Story](#)

Aceng Joyo

The purpose of writing is to describe and integrate teaching material with learning materials for students by utilizing folklore for students in the material to preserve the value of local wisdom through folklore. Based on the results of the learning process in class X of Seluma Bengkulu 1 Vocational...

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## [Improve Language Learning in Early Childhood](#)

Lydia Margaretha

Does this study raise the problem of how to improve children's language skills by telling stories in PAUD Dahlia Kota Bengkulu? And the child's response to storytelling activities? This study aims to improve children's language skills through storytelling in PAUD Dahlia Kota Bengkulu. This study uses...

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## [The Influence of Job Satisfaction, Organizational Commitment, and Team Work on the Elementary School Supervisor Performance](#)

Sumarsih Sumarsih

The objective of this research is to analyze the influence of the job satisfaction, organizational commitment, and team work on the elementary school supervisor Performance. The research was conducted by using survey. The population are the elementary school supervisors in Bengkulu Province. The sample...

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## [The Effects of Learning Resilience and Stress on Student Learning Achievement](#)

Zakaria Zakaria

The purpose of this study is to know the effects of learning resilience and stress on student learning achievement. Samples were selected by random technique, as many as 32 students. Data collection was carried out using two questionnaire instruments (i.e. resilience questionnaire and stress questionnaire),...

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## [The Development of Dual Mode Experiment Model Based on Physics Problem Solving: Comparing learning achievements between real and virtual experiment](#)

Desy Hanisa Putri, Sutarno Sutarno, Eko Risdianto, Dedy Hamdani

Experimental models based on physics problem solving to enhance critical thinking and problem solving skills (CTS and PSS) have been successfully developed, both real and virtual experiments. The experimental stages consist of problem descriptions, understanding problems, method questions, predictions,...

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## [The Cognitive Structure of Students in Understanding Mathematical Concepts](#)

Suharto Suharto, Wahyu Widada

The mathematics was a difficult subject for students to study in senior high school. The purpose of this study was to determine the role of cognitive structure of students in understanding mathematical concepts. The Samples were randomly selected as many as 140 students from the whole students of senior...

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## [The Role of Self-Efficacy and Mathematics ability in the Problem Solving Mathematics](#)

Syaipul Amri, Wahyu Widada

The problem solving skills are part of learning mathematics and an important component of 21st century education. But students often experience success doing it. The purpose of this study was to determine the relationship between mathematical abilities, self-efficacy and problem solving abilities. This...

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## [Determining Factors of Success of Character Education Management and its Implementation Facing of the Era of Industrial Revolution 4.0: An analysis at elementary school, Province of Bengkulu](#)

Rambat Nur Sasongko

Character education has been carried out in elementary schools, both public and private. But in reality there are still many students who have less commendable characters. This condition is suspected to be less successful character education. There are a number of determinants of the success of character...



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## [The Relationship between Motivation, Engagement and Performance of Employee](#)

Bustasar Bustasar, Sumarsih Sumarsih, Khathibul Umam Zaid Nugroho

The purpose of this study was to find out the relationship of motivation, engagement and performance of employees. The study is a survey. Samples were randomly selected as many as 200 employees. The population is whole employees at Office of the Ministry of Religion throughout Bengkulu Province. There...

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## [The Influence of Students Sentence Structure Knowledge on Writing Essays](#)

Linda Silawati

The Influence of Students Sentence Structure Knowledge on Writing Essays. This study uses survey methods with path analysis techniques. The population of this study is students of Sekolah Dasar Negeri Bengkulu Tengah school year 2017/2018, and a sample of 5th grade students, totaling 150 people, on average...

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## [The Influence of Principal Leadership and Organizational Culture on the Teachers' Performance](#)

Renni Yourneli

Optimal teacher's performance is one of the main factors in the student's learning achievement. Therefore, the study of variables that are thought to have an influence on teacher's performance is very important. The purpose of this study is to analyze the influence of (1) principal's leadership on...

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## [The Effect of Thematic Learning Based on Rural and Urban Environment on the Elementary School Students' Knowledge about Their Living Place](#)

Dwi Anggraini, Ansyori Gunawan, Sri Dadi

The purpose of this study was to determine the effect of thematic learning based on rural and urban environments on the elementary school students' knowledge in

Bengkulu about my Living Place. The research design used in this study was the only matching pretest - posttest control group design. The population...

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## [Impact of Learning Assistance on Improving the Pedagogic Competence of Tutors](#)

Anan Sutisna, Henny Herawati B. R. Dalimunthe, Ahmad Tijari

This study aims to describe the impact of learning assistance on enhancing pedagogical competence of tutors in non-formal education program for adult, especially inequality education learning at the Community Learning Center (CLC). The implementation of this learning activity tutor competency standards....

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## [The Influence of Project Based Learning Model in Thematic Learning by Using Scientific Approach on the Elementary School Students](#)

Neza Agusdianita, Victoria Karjiyati, Hasnawati Hasnawati, Dalifa Dalifa

The purpose of this study was to examine the effect of Project Based Learning model in thematic learning by using a scientific approach to the knowledge, skills and students' environmental care attitudes on the elementary school students in IV grade Bengkulu. This research was quantitative research....

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## [Teaching Oceanography Using Ocean Data View Software](#)

M. Lutfi Firdaus, Deni Parlindungan, Rina Elvia, Eko Swistoro, Agus Sundaryono, Lena Rahmidar

The purpose of this study was to improve students understanding of introductory oceanography with the aid of a computer program. The software that we used is Ocean Data View, abbreviated as ODV, which is proprietary yet freely available software for the analysis and visualization of oceanographic and...

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## [Building Critical, Tenacious, and Confident Characters through Application of APOS Model: Case study in integral calculus learning](#)

Hanifah Hanifah

APOS Model is a model of Mathematics Learning Based on APOS Theory, which is student-centered and has syntax with phases: Orientation, Practicum, Small Group Discussion, Class Discussion, Exercise and Evaluation. The Worksheet is designed to support the APOS model, which is contain activities for each...

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## [Development of Economic Mathematics Learning Materials Based on Problem Based Learning](#)

Farida Kohar, Kuswanto Kuswanto

The purpose of this study was to produce teaching materials for economics based on Problem Based Learning in an effective and interest-oriented Economic Education Study Program based on an enhanced contextual and ICT-based economic education program curriculum. This study uses the Borg and Gall model...

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## [Increasing Self-efficacy through Inclusive Education for Autistic Children](#)

Dewi Krisnawati, Khathibul Umam Zaid Nugroho

The purpose of this study was to determine the self-confidence of autistic children through inclusive education. The population of autistic elementary school students in the Kota Bengkulu with a sample of 37 students (SD) in the Kota Bengkulu was chosen randomly. The test results were analyzed using...

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## [Improving Children's Fine Motor Skills through Pencil Skills](#)

Sri Saparhayuningsih, Badeni Badeni

This study aims to determine fine motor skills in activities through pencil skills in children. This study used a classroom action research approach with a collaborative approach consisting of several cycles. Data collection methods used observation techniques and student work. Actions to improve fine...

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## [Strategy in Improving Research Productivity of the Lecturers](#)

Muhamad Suhardi, Nurhattati Fuad, Unifah Rosyidi

This study aims to express comprehensively about motivation in lecturers' research, institutional policies in supporting the research process, and lecturers' research productivity in teacher training and education science Mataram. This research is a qualitative research by using the intrinsic case study...

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## [Rasch Model Analysis on Grammar Tests of “Stepping the 5 Stairs A” Technique for College Students](#)

Satria Agust, Gatot Subroto

This research is aimed at: (1) explaining the role of Rasch model to analyze research instrument used in research and development on grammar technique “Stepping the 5 Stairs A” for college students; and (2) analyzing research instrument used in research and development on grammar technique “Stepping...

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## [Ethnobotanical Study of Medicinal Plants by Lembak Ethnic Bengkulu as a Source of Learning Biology](#)

Kasrina Kasrina, Endang Widi Winarni, Bhakti Karyadi, Aceng Ruyani

This research aimed to study diseases can be healing by Lembak Ethnic and to document potential plant for diseases healing. Medical Plants has been determinate. 62 species medical plants documented are used by local people as alternative medicine. The diseases that can be treated include: kidney, cancer,...

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## [Dualism System of Higher Education in Indonesia](#)

Moch Iqbal

The higher education system in Indonesia still adheres to two sides, namely science education and religious education on the other side. The separation of the two parts of science between science and religion seems to have not found a common ground. Until now, the integration between the two continues...

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## [Effect of Self Efficacy and Emotional Intelligence on Teacher Performance](#)

Saipul Efendi, Khathibul Umam Zaid Nugroho

The purpose of this study was to determine the effect of self-efficacy and emotional intelligence on teacher performance. The population of this research were the teachers of province of South Sumatra which were a teacher of vocational high schools in South Sumatra. Test results were analyzed using inferential...

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## [Development of Blended Learning based on Web and Augmented Reality](#)

Eko Risdianto

In this 4.0 revolution era - the cyber physical, internet of thing, big data and cloud computing- everyone will face disruptive era. A university as a producer of educated human resources should be able to produce a high quality graduates. One of the solutions to reach the goal is by using augmented...

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## [Character Indexes of the People in the Works of Raja Ali Haji](#)

Abdul Malik, Isnaini Leo Shanty

Character education has been re-implemented in every level of educational institutions in Indonesia. This paper is a result of the research of character indexes to the people in the works of Raja Ali Haji. Five works of Raja Ali Haji, namely Syair Abdul Muluk, Gurindam Dua Belas, Thamarat al-Muhimmah,...

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## [The Impact of Principal Leadership Dimensions on School Capacity](#)

Wildansyah Lubis, Gaffar Hafiz Sagala

On the preliminary study, it was found that there were five critical dimensions of Principal Leadership based on sample perceptions in North Sumatra. Following those findings, this study aims to further investigate the influence of those five dimensions on school capacity. The impact of these dimensions...

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## [The Implementation of Inquiry Training Model to Improve Student's Independency Learning](#)

Bambang Sahono, Lis Erna Tri Maryanti

The purpose of this research is to find inquiry training instructional model in order to improve student's independency learning. Classroom action research approach was implemented in this research. The subjects of this research were students of class or grade VI at Public Elementary School IX in South...

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## [The Models of Assessment to Accommodate Instructional Domain in Blended Blended Learning](#)

Alwen Bentri, Ulfia Rahmi, Abna Hidayati, Dedi Supendra

This article is written as a report of the design phase of assessment instrument models of blended learning in higher education. This study is to identify the assessment models which accommodate three instructional domains, namely: cognitive, affective, and psychomotor. It is important work to be designed...

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## [An assessment of Higher Order Thinking Skills \(HOTS\) Based on Rasch Models of Student in Physics Learning](#)

Nirwana Nirwana, Syaiful Rochman, Alif Yanuar Zukmadini

This study I am instrument used for high-level learning at senior high school. Type of research is development of three stages, namely: initial development of instruments, content and empirical validation, and measurement. Instruments that have been validated by experts, tested on 95 students. The next...

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## [Student's Problem in Writing Results and Discussion Section of Research Articles for International Journals](#)

Dian Eka Chandra Wardhana, Nafri Yanti, Susetyo Susetyo, Suhartono Suhartono

In writing a research article student are expected to be able to write a good result and discussion in fact, they tend to use descriptive style which cannot categorize as a good result and discussion. Therefore, this research is aimed at describing students learning model in writing result and discussion....

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## [The Impact of Contextual Teaching and Learning \(CTL\) Ability in Understanding Mathematical Concepts](#)

Azes Yudha, Sufianto Sufianto, Boby Engga Putra Damara, Budi Taqwan, Saleh Haji

The purpose of this research was to identify the impact of Contextual Teaching and Learning (CTL) on the ability of understand of mathematical concepts. This study used a qualitative descriptive approach to the type of study is a library research, the data obtained from various sources related to the...

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## [Profile of Prospective Teacher in the Special Capital Region of Jakarta](#)

Gantina Komalasari, Devie Yundianto, Lussy Dwiutami Wahyuni, Wening Cahyawulan

The purpose of this study was to find out and obtain empirical data about the profile of teacher's candidates regarding gender, teaching experience, teaching attitudes, social competencies, personality competencies, and teaching interests. The method used in this study is the descriptive method with...

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## [Equating Method for Small Sample: Comparative research on nominal weight mean and linear method](#)

Deni Iriyadi, Wardani Rahayu, Dali S. Naga

The purpose of this study was to determine the effectiveness of the Nominal Weight Mean Equating and Linear methods on equating using a small sample as a tool for teachers to equate students' scores in the class. This research is included in comparative research comparing two equating methods. The number...

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## [Investigating the Impact of Hard Work on the Achievement of Islamic Education and Discipline: Focus on the cognitive abilities of vocational high school students](#)

Agus Jayadi, Gaguk Margon, Suyono Suyono

Islamic religious education (PAI) subjects are the main subjects in high school and have different characteristics from other subjects. However, there is very little research on PAI learning outcomes. The purpose of this study was to determine the effect of the character of discipline, and hard work...

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## [English for Specific Purposes in Geography Learning](#)

Yosi Marita, Mirna Yunita, Ade Hidayat

If a lecturer applies a less precise and boring method, the teaching and learning process will not go well. Thus, it is necessary to improve the teaching of English for students by developing more appropriate learning model focusing on learners' needs. It is in line with the application of the English...

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## [Implementing Realistic Mathematics Education for Elementary Schools in Indonesia](#)

Anselmus Inharjanto, Lisnani Lisnani

In mathematics learning, concepts and contexts are required that students are able to learn from real-life environment. However, teachers generally equip students with formulas without being accompanied by the ability to comprehend basic concepts. Mathematics learning will indeed be enjoyable if it is...

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## [Exploring EFL Teachers' Perception of Pedagogical Task](#)

Erwin Pohan, Muhammad Candra, Suhardi Suhardi

Pedagogic competence is one of the competences that should be owned, comprehended, and mastered by teachers and lecturers to conducting professional job in Indonesian context and Bintan Regency particularly. It can be seen from their ability to help students to practice target language through pedagogical...

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## [Mapping Teacher Distribution Analysis with Digitation Technology Implementation to Improve Education Management in Bengkulu City](#)

Nirwana Nirwana, Arie Vatesia, F. P. Utama

Embedded technology in education management is one of the most important things as an aid for Education Department. Not only help in learning process, the use of technology has been also used in many part of education to improve learning process. In this paper, we proposed the idea of mapping the digitation...

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## [The Effect of Fable on Increasing Students' Understanding of Plane Figure Concept](#)

Lisnani Lisnani

Fables are stories that tell the lives of animals behaving like humans and having moral message. Fable is a media in learning mathematics about plane figure. The purpose of the study was to improve students' concept understanding and learning motivation in plane figure topic. The types of the research...

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## [Using Teaching Materials Outdoor Learning to Improve Mathematical Problem Solving Ability](#)

Wanti Asmara, Lia Waroka, Eka Novrianti Prana Putri, Detty Syefriyani, Tanti Novita, Saleh Haji

The purpose of this study is to determine the improvement of students' mathematical problem solving. The teaching materials consist of textbooks and LKPD. This type of research is quasi experiment (quasi-experimental) with the research population, namely grade VII students of Bengkulu City 19 Middle...

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## [The Development of Blended Learning Media for Flipped Classroom Model on Direct Learning in Process Evaluation Courses and Chemistry Learning Outcomes](#)

Hairida Hairida

The development of knowledge and technology is a challenge for educators to be creative in learning. Innovative and interesting learning media is needed now to anticipate the times. This study aimed to develop blended learning media with a flipped classroom model on direct learning in the course of evaluating...

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## [The Application of Dick and Carey Learning Design toward Student's Independence and Learning Outcome](#)

Johanes Sapri, Nesna Agustriana, Raden Gamal Tamrin Kusumah

The purpose of this research was to describe the application of Dick and learning design in the course of ICT Design and Multimedia as well as instructional impact and it's accompanied as learning outcomes for students. The design used in this study is Classroom Action Research (CAR) with steps of planning,...

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## [Development of Laboratory Worksheet with Argument-Driven Inquiry Model to Enhance the Student's Argumentation Skills](#)

Neni Hasnunidah, Undang Rosidin

Successful investigation in the laboratory was supported by a student worksheet. This study aims to measure the validity and effectiveness of laboratory worksheet on a topic the Excretory Systems in Humans that has been developed based on the Argument-Driven Inquiry Model. The result of the research...

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## [Student's Interest and Creativity in Cultural Art and Craft Lessons](#)

Ignasius Putera Setiahati, Lisnani Lisnani

The research objectives are to discover students' learning interest and to investigate students' creativity in creating mosaics, collages and montages by using leaves. These are quantitative and qualitative research. The participants were 25 students of grade IVA in an Elementary School. Data collection...

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## [Changes in the Behavior of Junior High School Students in the Learning Process](#)

Andika Nur Hardianto, Nevrita Nevrita, Nurul Asikin

Changes in learning outcomes from student changes, it is expected that future generations will emerge who are well-behaved, qualified and able to get along with the surrounding community. This research method uses cross section method in which research is based on data. Data analysis was carried out...

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## [Development of a Learning Module Based on Biofuel Synthesis Laboratory Research from CPO Residual of Palm Oil Mill Effluent \(POME\) with Ultrasonic Irradiation Assistance](#)

Agus Sundaryono, M. Lutfi Firdaus, Nurlia Latifah, Arsela Eko Listiono

Indonesia is the largest palm oil producer in the world, of which 19 Palm Oil Mills (POM) are in Bengkulu Province. POM in Bengkulu generally processes palm fruit bunches into Crude Palm Oil (CPO) with the by-products of Palm Oil Mill Effluent (POME) which contains CPO residues (CPO-res) as much as 0.6-1.2%....

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## [Analysis Study of Guidance and Counseling Teachers Competency](#)

Rita Sinthia, Mona Ardina, Anni Suprapti

The purpose of this study was to conduct an analysis of teacher competency guidance and counseling, with a case study in the city of Bengkulu. The methods used are developing study instruments for teacher competency analysis of guidance and counselling, develop scoring techniques and calculations and...

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## [The Implementation of Multicultural-Based Theological Education in Bengkulu City](#)

Desy Eka Citra Dewi, Elfahmi Lubis, Zubaedi Zubaedi

One of significant keys that contribute to the success of preserving the unity in cultural diversity of multiculturalism is to build respect and tolerance. This study aims at investigating the implementation of multicultural-based theological education and the barriers of its current practices at Sint...

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## [Organizational Culture and the Improvement of Teacher Performance](#)

Khairiah Khairiah, Zakaria Zakaria

This study aims at describing the efforts to improve teacher performance. The method used in this research is a quantitative, descriptive and verification approach. The type of investigation is kausalitas and Path Analysis techniques with the help of SPSS. The component that becomes a benchmark is the...

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## [A Teacher's Perception of Print and Digital Literacy in Early Childhood](#)

Mona Ardina, Rita Sinthia, Anni Suprapti

This paper describes the implementation of literacy used by early childhood teachers in language learning in schools. With the background of the modern era and globalization, the purpose of this study was whether print literacy is still necessary and important to be used in early childhood language learning...

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## [Development of Audiovisual Media Based on Local Excellences of South Sumatra for Science Learning](#)

Suratmi Suratmi, Lucia Maria Santoso, Laihat Laihat

This study aims to develop audiovisual media based on the local excellences of South Sumatra for science learning in elementary school. The method used were research and development methods. The Research and Development methods used adopted steps from the ASSURE learning media development model. The...

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# Implementing Realistic Mathematics Education for Elementary Schools in Indonesia

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**Abstract**—In mathematics learning, concepts and contexts are required that students are able to learn from real-life environment. However, teachers generally equip students with formulas without being accompanied by the ability to comprehend basic concepts. Mathematics learning will indeed be enjoyable if it is not only textbook-based but also followed by real-life experience. This study aims to investigate whether local cultural context could foster students' concept understanding in mathematics learning, particularly plane figures. Therefore, the research will, firstly, describe plane figures learning that uses the Indonesian Realistic Mathematics Education approach via iceberg and, secondly, discover students' improvement in concept comprehension after applying the approach. 50 elementary school students participated in the research, which employed experimental and descriptive methods. Further, the study results demonstrate an increase in concept comprehension, indicated from the increase in student learning achievement based on the average score of the experimental class and of the control class (88.40 and 72.91 respectively). Next, the independent sample t-test suggests t-count is higher than t-table, therefore  $H_0$  is rejected and  $H_a$  accepted. Thus, the learning outcomes of the class using the PMRI approach linked to Palembang's cultural context has increased.

**Keywords**—realistic mathematics education; plane figures; Palembang culture

## I. INTRODUCTION

Mathematics is a science that necessitates to be perceived by everyone, especially students who are in formal education [1]. One of the topics in mathematics studied since the elementary level is plane figures. Plane figures are part of geometry in the form of two-dimensional constructs that have been learnt from elementary to high school level. The tendency that occurs while learning plane figures, as far as students are concerned, is that they only memorize formulas and solve simple questions.

Generally, there are two types of plane figures (i.e. straight and curved lines). So, a plane figure is possibly constructed from straight lines, curved lines, or both straight and curved lines. The straight-line plane figure consists of rectangles and triangles. Quadrilaterals such as parallelogram, rectangle, square, rhombus, kite and trapezoid are examples of concepts, while "parallelogram is a quadrilateral that has pairs of parallel

opposite sides," are an example of a definition [2]. Next, the curved-line plane figure includes a circle.

Plane figure learning is grounded on van Hiele's theory. This theory explains the development of students' way of thinking in geometry learning, which comprises five stages [3]. Table 1 describes the five thinking levels by van Hiele. It is shown that the thinking levels by van Hiele consist of: (1) ability to express mathematics ideas orally, in writing, and visually, (2) ability to interpret and evaluate mathematics ideas orally, in writing, and visually, (3) ability to apply terms, symbols, and structures to demonstrate situation and mathematical problems.

TABLE I. THINKING LEVELS BY VAN HIELE

| Thinking levels    | Objects of thinking                          |
|--------------------|--|
| Visualization      | Shape and shape types                        |
| Analysis           | Shape characteristic                         |
| Informal deduction | The relationship between the characteristics |
| Formal deduction   | Deduction systems and the characteristics    |
| Appropriateness    | Analysis of deductive systems                |

In fact, teachers rarely utilize certain contexts in mathematics learning. The use of context is actually important indeed, in accordance with the concept, when learning starts. It means that learning should begin with a situation known to students, so that it can motivate them to learn and learning mathematics does not seem difficult anymore [4]. An approach that underlines contexts is PMRI (*Pendidikan Matematika Realistik Indonesia*, or Indonesia's Realistic Mathematics Education) approach. PMRI is a mathematics approach that employs, in its learning, "real world" context, models, students' production and construction, interactive, intertwinement.

Furthermore, PMRI is adapted from RME (Realistic Mathematics Education) in the Netherlands that views mathematics as a human activity. RME emphasizes mathematics education as a process of performing mathematics in reality that leads to a result, mathematics as a product [5]. Despite the fact that PMRI is based on RME learning, it is developed and adapted in accord with Indonesia's context and culture. Consequently, the context used in questions or

problems is preferably some occurrences that students could imagine.

The researchers use the PMRI approach, which aims to improve students' conceptual understanding of plane figures. The context employed in this research is Palembang's culture. Palembang, which is located in Sumatra island, Indonesia and the capital city of South Sumatra Province, has a variety of cultures in the form of historical buildings, traditional houses, transportation, shopping centers including 'rumah limas' (Palembangnese traditional house), 'trans-musi' (a mode of public transportation in Palembang), and malls [6]. The overall context used aims to construct students' initial knowledge about two-dimensional figures.

The improvement of students' conceptual understanding is in line with the improvement of student learning achievement. The concept understanding is the student's ability to: (1) explain the concept, meaning the students are able to re-tell what has been communicated to them; (2) apply concepts in different situations; (3) develop some consequences of the concept's existence, meaning the students perceive a concept, and as a result, they have the ability to solve each problem correctly [7].

In order to achieve meaningful comprehension, it is imperative that mathematics learning is directed at developing mathematical connection capabilities between various ideas, understand how mathematical ideas are interrelated each other so that they construct a thorough comprehension, and use mathematics in contexts outside of mathematics [8]. The PMRI characteristics include: (1) the usage of the context in exploration; (2) the utilization of model; (3) the use of student creations and contributions; (4) interactivity; (5) linkages; and (6) employing Indonesian natural and cultural characteristics [9].

The reform of mathematics education is based on two pillars, namely: (1) the ability of teachers to create a problem-oriented classroom culture and invites students in interactive learning and (2) designing learning activities that can encourage re-invention of mathematics together with teachers' ability to help the rediscovery process. Thus, the PMRI requires a change in the attitude of teachers in teaching and treating students [10]. This realistic type is in the idea of iceberg floating in the middle of the sea. Concerning the iceberg model, there are four levels of activity, namely: (1) mathematical environmental orientation; (2) props model; (3) building stone; (4) formal mathematics [11], as in Fig. 1.

Fig. 1 is the example of iceberg in a multiplication operation that begins with an informal statement using objects around, then continues with a number line until finally the concept of multiplication is formulated.

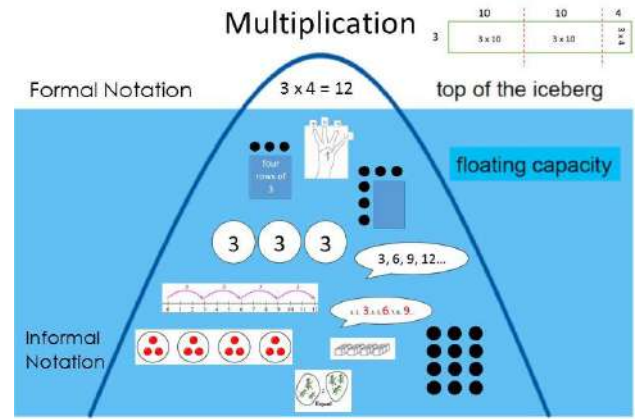
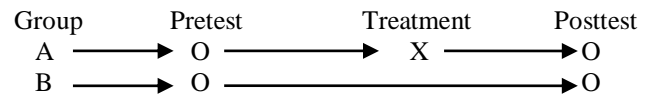


Fig. 1. Example of multiplication iceberg.

II. METHOD

The type of research used is experimental and descriptive research methods. The research design is Non-equivalent Groups Pretest-Posttest Design [12].



Annotation:

A : Experimental Class

B : Control Class

O : Pretest and posttest on mathematics concept comprehension

X : The treatment of mathematics learning using the PMRI approach in the context of Palembang culture.

The population of this study was all fourth grade students of one of elementary schools in Palembang in the 2018/2019 academic year, as shown in table 2. However, the research sample was the pupils in IVA and IVB classes, as in table 3.

TABLE II. RESEARCH POPULATION

| No    | Class | Male | Female | Amount |
|-------|-------|------|--------|--------|
| 1     | IV.A  | 15   | 10     | 25     |
| 2     | IV.B  | 14   | 11     | 25     |
| 3     | IV.C  | 17   | 9      | 26     |
| Total |       | 46   | 30     | 76     |

TABLE III. RESEARCH SAMPLE

| No | Class | Male | Female | Amount | Description        |
|----|-------|------|--------|--------|--------------------|
| 1  | IV.A  | 15   | 10     | 25     | Experimental class |
| 2  | IV.B  | 14   | 11     | 25     | Control class      |

Data collection technique employed the test of mathematics' concept comprehension on plane figures (i.e. eight written essay questions and interview sheets). Besides, there were also observation sheets to investigate the implementation of explorative learning in the experimental class. The instrument of the test was validated by a fellow mathematics lecturer and the teacher of the elementary school where the research would be conducted.

Furthermore, the test is a series of questions or exercises as well as other tools used to measure skills, intelligence, abilities or talents possessed by individuals or groups [8]. The questions provided had firstly been tested their validity and reliability. Data analysis technique used in this research was homogeneity test and statistical test of parameter t (t test). The t-test employed independent sample t-test using SPSS 19.

### III. RESULTS AND DISCUSSION

The results of this study are as follows: 1) The description of plane figure learning applying PMRI approach related to Palembang’s cultural context by using the iceberg phenomenon, 2) The increase in concept comprehension, indicated from the increase in student learning achievement based on the experimental class’ average score, compared to the control one’s.

Firstly, the description of plane figure learning applying PMRI approach, on the topic ‘Introducing Plane Figures’, is demonstrated in Fig. 2. It demonstrates clearly the iceberg of the plane figures. The stability of the floating iceberg is supported by a group of ice at the bottom of the sea. In the first stage, students are taught to solve daily difficulties (formal mathematics). This stage is referred to as a mathematical environment orientation stage. Doing mathematical activities is the basis of developing mathematical understanding that demands more proportions; by providing a number of mathematical activities in real-life context by looking at objects in their surrounding which have two-dimensional form (or plane figure), for instance doors, kites, and rhombuses.

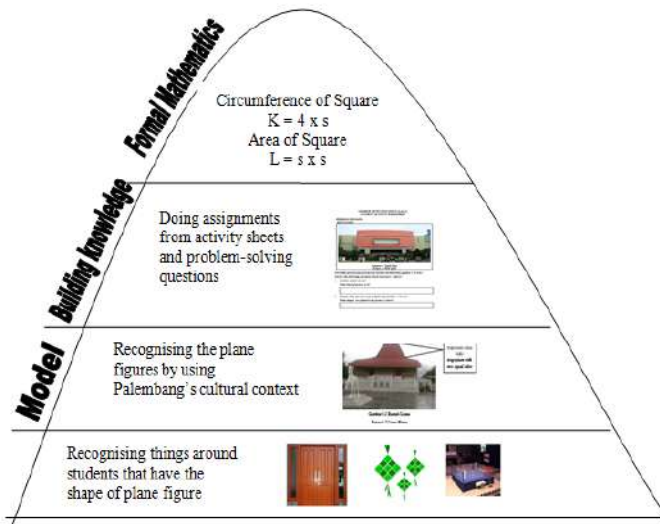


Fig. 2. Iceberg of plane figure.

The second stage is the use of Palembang’s cultural context to explore the students’ thinking ability. This stage emphasizes the students’ ability to understand the usage of context in plane figure learning in order to perceive mathematical principles. For example, what kinds of plane figures are in the picture of limas house, without having to describe it in mathematical language.

Next, the third stage is building stone, in which the students’ activities begin to lead to mathematical comprehension, in the form of activities to discover the plane figure’s characteristics and formulas. It is then followed by problem-solving questions as an important bridge to attain the conceptual understanding of plane figure.

The following stage is under the formal mathematics stage. During the training process of students’ ability, these pupils are at the stage of environmental orientation, for instance, the problems raised by them are as simple as possible. A number of two-dimensional figures in the context of local culture are presented as an instance. Students are assigned to describe the amount of the plane figures and their size by using a ruler. They are then directed to determine the circumference and area of plane figures of each picture. This sort of simple question raises various types of student answers.

Furthermore, the study results demonstrate an increase in concept comprehension, indicated from the increase in student learning achievement based on the average score of the experimental class ( $X1$ ) = 88.40 while in the control class ( $X2$ ) = 72.91. As well as that, the independent sample t-test suggests  $t_{count} \geq t_{table}$  (i.e.  $5.96 \geq 1.667$ ), therefore  $H_0$  is rejected and  $H_a$  accepted. Thus, the learning outcomes of the class using the PMRI approach linked to Palembang’s cultural context has increased.

Finally, the RME course participants also gained a better understanding of RME’s principle. Several researchers showed that RME materials had a positive influence on students and teachers in Indonesia as well [13–17].

### IV. CONCLUSION

Based on the discussion above, it can be concluded from this research that the use of the PMRI approach in the cultural context of Palembang is most likely to improve the students’ concept understanding of plane figures. It is evident from the differences in the students’ learning achievement between the control class and the experimental one.

### ACKNOWLEDGMENT

The researchers would like to express their deepest gratitude to the headmaster, the teachers, and the students of State’s Elementary School in Palembang, Indonesia who assisted the researchers in completing this study. The researchers also would like to extend their appreciation to Ministry of Research, Technology and Higher Education that had awarded the grant of beginner lecturer’s research to one of the researchers.

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