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Motivated by the success of our MISEIC 2017 and 2018, the Faculty of Mathematics and Natural Sciences Universitas Negeri Surabaya proudly presents the Mathematics, Informatics, Science, and Education International Conference (MISEIC 2019), held on 28 September 2019 in Surabaya, Indonesia, with the theme: “Trends, Advancement, and Innovation in Mathematics, Informatics, Science and Education toward Sustainable Development Goals”. The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. The Goals interconnect and in order to leave

no one behind, it is important that we achieve each Goal and target by 2030 (The UN). This annual international conference aims to fade the frontier among the Scientists, Engineers, and Educators toward the achievement of the Goals through the breakthrough, progression, and revolution in Mathematics, Informatics, Science and Education.

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Assalamu'alaikum wr wb.

The honorable Keynote speakers: Prof. Hernando Ombao, Ph.D, Assoc. Prof. Boon Chuan Low, Prof. Tomonori Ichinose, and Dr. Yusuf Fuad, M.App.Sc.

Dearest guests, presenters, and participants of the Mathematics, Informatics, Science, and Education International Conference (MISEIC 2019).

Praise be to Allah SWT for His blessing moment, hence we can attend this valuable moment to share some ideas in this conference. It is my pleasure, as the Rector and on behalf of Universitas Negeri Surabaya to welcome all of you,

from abroad and within Indonesia, to participate in the Mathematics, Informatics, Science, and Education International Conference (MISEIC 2019).

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member, including Indonesia, as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The Global Goals address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice, which can be described in 17 Sustainable Development Goals (SDGs). We can play important role and do significant action to support the achievement of these goals as we are educator and researchers as well.

Inspired by the spirit of Sustainable Development Goals, the MISEIC 2019 brings the theme "Trends, Advancement, and Innovation in Mathematics, Informatics, Science and Education Toward Sustainable Development Goals". We do hope that this conference will be the home for the researchers, the lecturers, and the practitioners in Mathematics, Informatics, Science and Education to communicate their original scientific ideas based on their updated research. Their contribution will be valuable input for the development of these fields.

We are grateful to all institutions, sponsors, all organizing and scientific committee members, and all participants for making this conference possible and successful. We wish you all have a pleasant stay here in Surabaya, the Heroic City.

May you have a very successful conference.

Prof. Dr. Nur Hasan, M.Kes

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Biodiversity and Existing Condition of Coral Reef Ecosystem in Kondang Merak Beach Malang

Tarzan Purnomo

Coral reefs are one of the compilers of ecologically and economically important tropical marine ecosystems, but are very vulnerable to damage. Declining sea water quality due to climate change, coastal land use, and inaccurate coastal management patterns can threaten its sustainability. This study aims...

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Biodiversity of Invertebrates in Kemantren Coast, Lamongan

Dwi Rahayu, D A Rahayu, R Ambarwati, U Faizah

Kemantren beach is located in the Kemantren Village, Paciran District, Lamongan Regency. This beach is consists of sand and coral substrate. Kemantren beach is one of the small coastal islands of Java that has already reclaimed with spot of high ecotourism potency and habitat for numerous types of invertebrate....

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The Dynamics of Scientific Literacy Skills of Biology Students in Histology Lectures Using Scientific Literacy-Based Worksheet

Nur ducha, D Hariani, W Budijastuti

Scientific literacy skills are essential for students, as it related to how students can understand their environment and their various life problems. The

purpose of this research was to study the dynamics of scientific literacy skills of biology students in histology lectures. This research used a descriptive...

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Chlorogenic Acid Yacon Tubers [Smallanthus Sonchifolia (Poepp. Et Endl.) H. Robinson]. On The Use of Natural Inhibitors and Storage Temperature Variations

Leny Yuanita, Prima Retno Wikandari, Dhita Ayu Permata Sari, Wahyu Budi Sabtiawan

The aim of the study was to obtain the optimum content of chlorogenic acid (CA) yacon tubers on the use of natural inhibitors through a combination of immersion in natrium chloride, ascorbic acid and citric acid with 14 days storage at 5 and 15°C temperature variations. Yacon tubers are obtained from...

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The Study of Self-Cleaning Properties of TiO2 Coated on Cotton Fabrics

Dina Maharani, D K Maharani, M M S Basukiwardoyo, S T Alawiyah, Rusmini Rusmini

This research study about self cleaning activity of TiO2 coated on cotton fabric. TiO2 nanoparticles is known as good semiconductor which have photocatalytic properties. Cotton fabric was coated by TiO2 to produce self cleaning textiles. Coating of TiO2 nanoparticles on cotton fabrics was carried using...

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Constructing Recommendation about Skills Combinations Frequently Sought in IT Industries Based on Apriori Algorithm

Latifah, Tubagus Mohammad Akhriza, Laras Dewi Adistia

To adapt the IT curriculum to the requirements of the IT industry skills, several methods have been proposed. Among them is the method of mining job advertisement data to find skills that are being sought by the industry. However, so far no significant research has focused on providing recommendations...

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Analysis of the Effect of Temperature and Time for Ultrasonication on Graphite Structure

Diah Kusumawati, Diah Hari Kusumawati, Muhammad Nurhuda

Graphite is a carbon allotrope with special bonding characteristics. These bonds can be altered given ultrasonic waves to be another form of bond or loosened. Changes in bonds will cause changes in bond characteristics to other forms of carbon allotropes. By varying ultrasonication process (time and...

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Dynamical Analysis Discrete of Euler Scheme for Harvested Predator-Prey Model with Ratio-Dependent Response Function and Prey Refuge

A Hadi, Abdul Hadi, Siti Nurul Afiyah, Vivi Aida Fitria

In this research, Euler method is applied to discretize a harvested predator prey model with ratio-dependent response function and prey refuge. The existence and stability of fixed points has been analyzed. Stability of each fixed point shown that the fixed points are stable for small size of time step....

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Applying Spherical Triangle Concept in Simulator to Determine Distance and Direction of Ship

Damoyanto Purba, Novita Hindri Harini, Agus Dina Mirianto, Zainullah Zuhri

Since Electronic Chart Display and Information System (ECDIS) is a very important navigator for the safety of seafaring, a cadet of Seafaring Polytechnic should learn it at class. Cadet should master how to use it properly to improve effectiveness and efficiency in seafaring. But, ECDIS only in the ship...

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Risk and Return Portfolio of Food and Beverages Companies in

Ramadhan 2019

Achmad Kautsar, Nadia Asandimitra, RA Sista Paramita, Musdholifah Musdholifah, Ulil Hartono, Trias Madanika Kusumaningrum, Yuyum Isbanah

Ramadan Effect, one type of market anomaly, is a seasonal anomaly which shows a difference in average returns in the month of Ramadan compared to other months in one year. The phenomenon of increasing public consumption in the month of Ramadan is suspected to be a phenomenon that causes returns in Ramadan,...

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A Numerical Study of Diffusion-Convection Equations

Imam Solekhudin

In this paper, problems involving time-dependent diffusion-convection equation are studied. To study these problems, a numerical method is employed to solve the equation numerically. The method used in this research is a Laplace Transform Dual Reciprocity Method (LTDRM). Using this method, the time-dependent...

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The Fuzzy Optimal Solution of Fuzzy Transport Problems Using A New Fuzzy Least Cost Method

Farikhin Farikhin, Muhammad Sam'an, Bayu Surarso, Bambang Irwanto

The fuzzy transport algorithms is used by researchers for finding optimal

solution of Fuzzy Transport Problem (FTP), one of them is the Least Cost Method or LCM. The concept of LCM is to choose the least cost from the FTP table to be used as the base cell. If there is the same lowest cost, it is freely...

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The Layer Profile of the Students' Understanding of Image Making and Image Having in Completing Mathematical Problems

Alfian Abdillah, A. S. Abdillah, Mardiyana Mardiyana, Siswanto Siswanto

Mathematical understanding is an important aspect in learning mathematics. Pirie and Kieren's theory classified that eight layers of mathematical understanding, including image making and image having. In solving the problems, these layers can show the students such a way of solving problems. The purpose...

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Students' Proof Scheme for Mathematical Proving and Disproving of Divisibility Proposition

Ditya Rahmawati, Ditya Rifky Rahmawati, Yusuf Fuad, Endah Budi Rahaju

This study aimed to investigate and describe students' proof schemes for disproving mathematical proposition. Previous studies examined students' proof scheme of Calculus, Elementary Numbers Theory, Quadratic, and Geometry's Propositions. This study examined student proof schemes of Divisibility's Proposition...

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The Fraction Magnitude Knowledge through Representations at Students with Mathematics Difficulties

Ijtihadi Amalina, Ijtihadi Kamilia Amalina, Yusuf Fuad

Elementary school students' knowledge of fraction magnitude may predict their mathematics achievement. Students' mathematics achievement is influenced by their mathematics difficulties. This study exposes students' representations in estimating fractions to indicate their fraction magnitude knowledge....

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The Use of Educational Game Media and Its Effect on Student Achievement of 6th Grade Elementary School Students in Mathematics Learning

Aqsyari Syam, Agustan Syamsuddin, Aqsyari Pujian Syam, Irwan Akib

This study aims to find out the description of the use of educational game media and its impact on the mathematics learning outcomes of grade VI elementary school students. This study included quasi-experimental research with a pre-test-post-test control group design. This study involved 29 sixth grade...

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Hybrid Learning versus Traditional Course in Mathematics Classroom for Higher Education: Students' Achievement and Students' Experiences

Rudianto Artiono, Yuliani Puji Astuti, Mega Teguh Budiarto

This study aimed to examine the outcome of lectures conducted using hybrid learning in Integral Calculus courses. It focused on students' achievement and students' experiences. Teaching materials were developed using the Plomp development model in the form of learning videos which met valid, practical...

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Understanding the Quadrilateral Concept of Junior High School Students Based on APOS Theory in Terms of Differences in Cognitive Styles

Ahmad Anam, Achmad Choirul Anam, D Juniati, Pradnyo Wijayanti

This study was designed to describe the understanding of quadrilateral concepts in junior high school students based on the APOS theory (Action, Process, Objects, and Schemes). The research used qualitative approach to explain the understanding of two junior high school students who had equal mathematical...

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The Development of Cooperative Learning Tools with Teams Games Tournament (TGT) Types to Overcome Students' Mathematical Anxiety in Algebraic form Material for The Seventh Grades of Junior High School Students

Syahda Mahfudhoh, Syahda Umroh Mahfudhoh, Dwi Juniati, Agung Lukito

This research was aimed to (1) describe the development the good cooperative learning tools with TGT types on algebraic form material and (2) know the effectiveness of the learning on algebraic form material using TGT to reduce the students' mathematical anxiety. This research was a development research....

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Student's Mathematics Anxiety in Solving Mathematical Problems of Logarithms Material

Istifada Hayati, Istifada Nurul Hayati, Budiyono Budiyono, Isnandar Slamet

The process of learning mathematics, anxiety is a supporting and inhibiting factor for student learning achievement, especially in learning logarithm material. Difficulties in the form of anxiety are one of the emotional factors of students. Anxiety can also be a useful stimulus because each student...

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The validity of Teaching Materials Based on Hybrid Learning: The 21st Century Challenge

Budi Prawoto, Budi Priyo Prawoto, Rudianto Artiono, Dwi Nur Yunianti

This study aims to develop calculus teaching materials based on Hybrid Learning. It can be used to prepare students with the 21st-century challenge. This research is expected to help students in facing the learning process in the future. Also, this research aims to help the students to engage in the...

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Flexibility of Guardian and Artisan Selected Students in Solving Fraction Problems

Yenny Novitasari, R Setianingsih, Y F Novitasari

The aim of this study is to describe flexibility of students with guardian and artisan personality types in solving fraction problems. This study is a descriptive study using qualitative approach. The subjects consisted of two 8th grade students that were measured by Personality Classification Test (PCT)...

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Students' Ability to Arrange Learning Devices Using Discovery Learning Model in Innovative Learning II Course

Pradnyo Wijayanti, P Wijayanti, Ismail Ismail, I Kurniasari

Based on curriculum development in primary and secondary schools, Unesa Mathematics Department through the KKNI curriculum has tried to adjust 2013 curriculum, which is to teach students about learning with scientific and

constructivist approach. This is done in the subject of Innovative Learning II...

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Prospective Students' Math Talk in Solving Secondary School Mathematics Problem

Dini Fardah, Dini Kinati Fardah, Puspita Anggraini Setyaningrum, Evangelista Lus Windyana Palupi, Anggietyas Damaningrum, Ahmad Wachidul Kohar

To activate the cooperation or collaboration skill of the students, educator often make small groups of students and give some topics to be discussed. However, we often ignore the activities that occur within the group. This article describe the process of problem solving occurred in 3 groups of prospective...

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Development of Student Worksheet for Improving the Self-efficacy and Ability to Argue of Chemistry Teacher Candidates Study on Junior High School Students Behavior Based on Keirsey Personality Type

Farah Erika, Zainul Arifin Imam Supardi, Tukiran Tukiran

The purpose of this study is to explain the validity of student worksheets based on argumentation and self-efficacy learning that has been developed. The development of the student worksheets refers to the design of the Wademan model development research model. The student worksheet

applied phases of...

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Training Digital Literation by Digital Book Format Electronic Publisher Themes of Climate for Junior High School Students

Siti hidayati, Siti Nurul Hidayati, Siska Vernanda, I W Dasna, Munzil Munzil, S Wonoraharjo

This electronic document is a “live” template and already This study aims to train the digital literacy of seventh-grade junior high school students with electronic books in electronic publisher format. The book used in this study has been validated previously included in the category of very feasible....

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The Effectiveness of Predict-Observe-Explain Strategy to Reduce Misconception in Thermochemistry

Imroatuz Zakiyah, Wahono Widodo, Tukiran Tukiran

Thermochemistry is one of materials that had low student's understanding ability on National Examination in 2013-2015 which only gets 55.45%. This low percentage because of student still has misconception. Misconception can cause students having low ability to understand a concept. This misconception...

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The Role of Local Wisdom-based Student Worksheet on Scientific Reasoning

Noly Shofiyah, Enik Setiyawati, Nurdyansah Nurdyansah

The aim of this research is to analyze the students' scientific reasoning skill by the use of Students' Local Wisdom-based Worksheet. This is a Quasi Experimental research with One Group Pre-test Post-test design. Research population are the entire students of science education of UniversitasMuhammadiyahSidoarjo....

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Developing Instructional Video to EnhanceBiology Pre-Service

Teachers'Metacognitive Skills

Endang Susantini, Sifak Indana, Isnawati Isnawati, Sonia Dianita Sayitri

An instructional video might help learners to conceive learning attainment better or acquire specific skills. This study aimed to describe video quality, metacognitive skills, and responses of pre-service teachers. The video was developed using ASSURE model consisted of six stages; analyzing learner,...

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Improving Science Literacy Skills for High School Students Through Guided Inquiry-Based Learning

Ernita Aulia, Ernita Vika Aulia

The main objective of this study was to describe the effectiveness of guided inquiry-based learning to improve high school students' science literacy skills. The science literacy skills was the ability to engage with science-related issues, scientific ideas, and reflective thinking. Evaluation criteria...

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The Effectiveness of the Learning Devices Using Investigation-Based Multiple Representation to Improve Students' Problem Solving Ability on Reflection and Refraction Materials

Desfhie Yolenta, Budi Jatmiko, Tjipto Prastowo

The aim of this study was to explain the effectiveness of the Investigation-Based Multiple Representation (IBMR) learning model to improve the physics

problem solving abilities of high school students on reflection and refraction of light. The effectiveness of the learning device was analyzed based on...

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The Regularity of Science in Moonlight Sonata Instrument is used in The Design of Physics Learning

Sofa Maria

The main purpose of edutainment is to increase enthusiasm for learning. However, the implementation of physics learning still lacks emphasis on the learning process that meaningful and relevant, especially in Indonesia. This study were purposed to make the design of physics learning by integrating science...

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Integration of Scientific Article Writing in the Animal Systematics Course to Train Scientific Literacy

Ulfi Faizah, Reni Ambarwati, Dwi Anggorowati Rahayu

One of the 21st century skills needed by students is scientific literacy skill. Students who take Animal Systematics courses which are need to train in scientific literacy skills through scientific writing activities. This study aimed to describe about integration of writing scientific articles in systematic...

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The effect of problem based learning with gallery walk strategy to creativity and communication skills

Titin Sunarti, Dilla Ayu Septiana

This research aimed to analyze the effect of Problem Based Learning with Gallery Walk Strategy to creativity and communication skills in physics. This strategy was effective to conceptual topic. Therefore in this research, the chosen topic was global warming. This research was conducted to two groups...

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The Development of Learning Devices with the Etnoid (Ethnoscience Android) Assisted Guided Inquiry Model on

Vibration and Wave Materials

Faudina Permatasari, Madlazim Madlazim, Wahono Widodo

This research was conducted in two stages; preparation stage which was aimed to develop the device, followed by implementation stage of learning in classroom using the pretest posttest design. The validation test consisted of media validation tests by media expert lecturers from the chemistry department...

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The Development of Student Worksheets (LKPD) in Learning Science through Group Investigation Learning to Train Critical Thinking Skills of Junior High School Students

Enik Kurniawati, Tjandrakirana Tjandrakirana, Sifak Indana

The purpose of this study is to produce a Student Investigation Worksheet (LKPD) based on Group Investigation learning to train the appropriate Junior High School students'critical thinking skills based on validity, practicality, and effectiveness. LKPD was developed with a 4-D research design namely...

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Chemical Materials Mastery of High School Students in East Java

Bertha Yonata

This article reveals student achievement in the Indonesia National

Examination on Chemistry Material at the high school level in the East Java Province from 2015-2016, 2016-2017, and 2017-2018. The chemistry exam consists of Basic Chemistry, Analytical Chemistry, Inorganic Chemistry, Organic Chemistry,...

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Exploration of Balai Materia Medica Batu: Field-Trip Supporting Biotechnology Learning

Hasan Subekti, Herawati Susilo, Ibrohim Ibrohim, Hadi Suwono, Aris Rudi Purnomo

Field trips provide an opportunity to learn about life in the real world through exploration activities. This descriptive study aims to describe the process and response of students to the action of field trips to Materia Medica Batu (MMB) to support biotechnology courses. The participants in this study...

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Use of Computerized Games on Chemistry Learning

Achmad Lutfi, Rusly Hidayah, Ika Arum Hidayah

This study aimed to determine the impact of the use of computer-friendly games on Chemical Adventure as a medium to study Chemistry on learning outcomes, learning interests, and student responses. The form of research used was Pre-Experimental Research with a single group design Pretest-Posttest One...

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Enhancing the Digital Literacy of Pre-Service Biology Teacher through Animal Systematics Course

Reni Ambarwati, Ulfi Faizah, Dwi Anggorowati Rahayu

Digital literacy is one of the important skills that must be mastered by Biology Teacher. An effort has been applied to integrate the learning of Animal Systematics with the training of digital literacy for pre-service biology teachers. This research aimed to evaluate the digital literacy of pre-service...

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A Critical Analysis of Dramatization on Evacuation Drill

mita anggaryani

This paper presents a critical analysis of dramatization used in an evacuation drill in Indonesian elementary schools. Practical safety procedures become more prioritized than theoretical knowledge when it comes to saving a life from the risk of a natural disaster. Evacuation drill provides practice...

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Development of SEA-MEA (Self Efficacy Academic-Means

Ends Analysis) Learning Model to Increase Problem Solving Skills

Djoni Setiawan, Wasis Wasis, Budi Jatmiko

Problem solving skills are urgently needed in everyday life and teachers should train in this global era. One of the models that can train problem solving skills is problem based learning (PBL) model. PBL model still has some weaknesses. Students find difficulties in the learning, the result of learning...

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Competency Profile of Junior High School Teachers in Developing High Order Thinking Questions of Science Subject

Rinie Puspitawati, Rinie Pratiwi Puspitawati, Bil Bila Ade Laila, Nurul Hikmah

This research aim is to describe the ability profile of junior high school teachers in developing high-level thinking questions for science subjects. This research was a quantitative descriptive study of junior high school teachers from Java and Eastern Indonesia. Data was obtained by collecting questions...

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Student Response on Solving Waste Problem in Department of Biology through Conservation of Natural Resources and Environment Course

Winarsih Winarsih

Conservation of Natural Resources and Environment (CNRE) is mandatory course to be taken by all student in Faculty of Mathematics and Natural Sciences. Main learning outcome of this course is for students to be able to solve problem relating to application of natural resources and environment conservation...

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Development of OrSAEv Model Learning Materials to Improve Tsunami Disaster Mitigation Skills (Preliminary Study)

Sapitri Rahayu, Madlazim Madlazim, Tjipto Prastowo, Eko Hariyono

This study aims to determine the tsunami evacuation skills that have been applied in schools. This research is qualitative and quantitative. This trial phase was conducted at State Junior High School 1 Besuki, tested to 15 students of class VII. The sample selection is chosen from the population using...

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The Practicality of Scrap-mod as a Learning Media on Molecular Geometry

Rusly Hidayah, Tiara Yusi Destari

The aim of this research is to obtain the practicality of scrap-mod as a learning media on a molecular geometry matter. It is reviewed based on the

activities of the students and responses of the student. This research used the R&D (Research and Development) method which is a limited trial stage. Data...

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The Application of Rhizobacteria and Indigenous Microorganism on Cow Rumen in Soybean Plants (Glycine max L.)

Meli Astriani, Abdul Latief Abadi, Siti Zubaidah, Endang Suarsini

Soybeans are national food crop commodity with a high level of consumption per year. Efforts to increase soybean production are accomplished through fertilizer application. The utilization of chemical fertilizers, however, can negatively impact the environment. One alternative to the application of fertilizer...

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Analysis of Consumption Habits of PostPartum Herbal Concoction in Postpartum Mothers

sri banun istiqomah, Sri Banun Titi Istiqomah, Sri Fatmawati, Wiwit Denny Fitriana, Taslim Ersam

Postpartum period is the period after the fetus and placenta are born until the recovery of uterine devices such as the condition before pregnancy which lasts for about 42 days. During the puerperium, the body of a mother will experience physiological changes in the physical and psychological changes....

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In-vitro Propagation of Elephantopus scaber Using Seeds as Explants in Various Culture Growth Media

Yuliani, Fida Rachmadiarti, Sari Kusuma Dewi, Mahanani Tri Asri

Elephantopus scaber plant contains various secondary metabolites, such as flavonoids, phenolics, saponins, terpenes, triterpenoids, sesquiterpenes lactones, elephantopyns, and deoxyelephantopin, which can act as antimicrobial, antifungal, and bioinsecticides. Elephantopus scaber can be potentially grown...

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Hepar Histology of Mice(Mus musculus L) Indicated by Pre-Diabetes Mellitus Type 2 (Pre-Type 2 DM) After Red Rice Yeast Treatment

Rudiana Agustini, Erlix Rakhmad Purnomo, Agus Widodo

The hepar is an organ that has a complex and vital role, which can be damaged. Hepar damage can be seen from the condition of the cells. His study aimed to provide a histological description of mice hepar (Mus musculus L.) that was indicated by pre-type 2 DM (pre-type 2 DM) after the treatment of red...

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Endemic Bacteria Potential for Decomposing Pesticide Propineb-Sulphur and Chlorantraniliprole from Pesticide-Exposed Soybean Field in East Java

Mahanani Asri, Mahanani Tri Asri, Evie Ratnasari, Lilik Suyatmi, Yuliani Yuliani

Pest control in soybean field in general still uses synthetic pesticide. Soil bacteria from pesticide-exposed field are potentially able to decompose pesticide residue in during certain period of time. This research aimed to find out the potency of isolated endemic bacteria from soybean field in Jombang,...

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Synthesis and Characterization of Nanogold and Nanosilver as Leprosy Drug Candidates and Their Activity Tests in Leprosy Patients; Case Study

Titik Taufikurohmah, Djodjok Soepardjo, Hari Armadianto, Rusmini Rusmini

One of nanogold uses is as leprosy drug, because it has activity to increase cell proliferation and collagen biosynthesis. These two activities are necessary in the process of recovery and closure of wounds, including in leprosy. Nanosilver can act as anti-bacterial material, including against leprosy...

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The Effect Of Problem Based Learning With Gallery Walk Strategy To Creativity And Communication Skills

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***Abstract*— This research aimed to analyze the effect of Problem Based Learning with Gallery Walk Strategy to creativity and communication skills in physics. This strategy was effective in a conceptual topic. Therefore in this research, the chosen topic was global warming. This research was conducted on two groups of students that consisted of 30 students. The groups were assumed to have the same level of knowledge and skills. Data was gotten by observation, questionnaire and the learning outcomes. The learning outcome was a poster that was also used as the learning media. The results showed that the implementation of PBL with Gallery Walk strategy was able to enhance the creativity and communication skill of students. Using manual poster was more effective to enhance creativity and communication skills of students.**

Keywords—problem based learning, gallery walk strategy, creativity, communication skills

I. INTRODUCTION

Globalization that has grown rapidly in the 21st century makes Indonesia's economic growth increased significantly. It has shown the increasingly competitive workforce of the 21st century in Indonesia. Therefore, individuals are expected to have more skills to survive in the 21st century, '7Cs Skills'. These skills consist of (1) Critical Thinking and Problem Solving; (2) Creativity and Innovation; (3) Collaboration, teamwork, and leadership; (4) Cross-cultural Understanding; (5) Communication, Information, and Media Literacy; (6) Computing and ICT Literacy; (7) Care and Learning Self-reliance [1]. In other words, globalization also affects the development of Information and Technology (IT). Technology has developed quickly. It makes all human activities can be done on the internet. Moreover, the digital era constrains people by allowing communication through computer technology, not a real person. As the impact, it will lose some humanity or it forms social isolation [2]. The skills, that are important and always be used in daily life, are creativity and communication skill. These skills are so useful in work and daily life.

Previous research conducted by Jellen and Urban revealed that Indonesian students' creativity was still low compared to other countries [3]. Indonesian students' lack of creativity cannot be separated from the educational influences [3]. In a study of elementary school students who were assessed as being gifted, Karnes et al. (1961) found that creativity was related significantly to educational achievement [4]. Educational achievement is the major goal of education. According to Woodman and Schoenfeldt, every student has different creativity from one another [5]. The dimensions of creativity are a process, person and product [6]. For the dimension of the person, it includes creative thinking skills, which consists of fluency, flexibility, originality and elaboration [7]. Torrance also notes several signs that indicate when creative learning occurs, such as improved motivation, alertness, curiosity, concentration, and achievement [8]. Each aspect of creativity has several indicators. The indicators of creative thinking skills are shown in table 1 [7].

TABLE 1. THE INDICATORS OF CREATIVE THINKING SKILLS

Aspect	**Indicator**
Fluency	● Ask a lot of questions ● Answer the questions from others ● Express their ideas ● Work faster and do more than other students ● See the errors and solve it quickly
Flexibility	● Provide various interpretations of an image, video or problem ● Apply the concept or principle in different ways ● Able to classify things based on the categories ● Able to change the direction of thinking ● Have different ways to solve the problems
Originality	● Think about the possibilities that others don't think of a problem ● Have a lot of questions and try to solve it in different ways ● Able to create a new solution for the problem
Elaboration	● Seek deeper meaning for answer by carried the detailed steps out ● Develop or enrich other people's ideas

There are many suggestions in the literature on how to develop creative skills from childhood to adulthood. For example, Karnes et al. suggested that educational programs should be organized flexibly to provide better services, such as enrichment programs, to students. The teaching method that stimulates both convergent and divergent thinking are important for stimulating creative thinking and are more challenging to creative students [4]. Individual assignments base on problem-solving and problem finding also would

stimulate creativity [4, 9, and 10]. Teachers who enable choose teaching method that can change the divergent thinking of students seem the most effective in stimulating creativity in students [4]. Besides using individual assignments to stimulate creativity, teachers should provide situations for students to participate in group activities [10,11]. These group activities, in addition, to enhance creative thinking and academic performance should provide students with opportunities for developing peer acceptance [4]. Based on research by Guilford, most trainings for creativity was aimed to enhance divergent thinking and production skills [12]. One teaching method for developing creativity is a problem-solving approach, which is an indirect teaching method [13].

In the 2013 curriculum, the highlight of instructional methods is the activity and creativity, inspiring, fun, student-centred, authentic, contextual and meaningful learning [14]. PBL is also one of the teaching models that be suggested to be used in class, especially science. PBL is problem-based learning models that use authentic problems and product as the learning outcomes [15]. The syntax of PBL is (1) orientation to the problem, (2) organize students to learn, (3) assist individual and/or group investigation, (4) develop and present the product and (5) revision and reflection [15]. Based on previous researches in 2018, the results showed that the implementation of PBL was able to improve creative thinking skills student [16,17]. To give different experience with a fun atmosphere, this teaching method is implemented using the gallery walk strategy.

The gallery walk is a learning strategy that encourages participants of students to express opinions and ideas with a poster as media [18, 19]. Gallery walk has some steps, those are (1) determine the topics, (2) divide into small groups, (3) discussion, (4) exhibition and (5) reflection. Based on previous researches, a gallery walk was able to improve the communication and creativity ability of students [20, 21, and 22]. This strategy is effective in the conceptual topic [23, 24]. Therefore in this research, the chosen topic is global warming. Global warming is a conceptual topic that according to be used in PBL with gallery walk strategy [25].

This research aims to analyze the effect of Problem Based Learning with Gallery Walk Strategy to creativity and communication skills in physics. The hypothesis was made that the implementation of PBL with Gallery walk Strategy will be able to improve creativity and communication skills of students.

II. RESEARCH METHODS

The research was a quantitative descriptive research with non-equivalent design. Using non-equivalent research design is based on sample selection chosen by group/class (not taken randomly). This research was conducted with two groups of students that consisted of 30 students. The groups were assumed to have the same level of knowledge and skills. It held on even semester of 2018/2019. More specifically, the samples were XI Science 4 and XI Science 5. The chosen topic was global warming. Data were gotten from observation, questionnaire and the learning outcomes. The poster was the learning outcomes and also be used as the learning media.

III. RESULTS AND DISCUSSION

The research was conducted in 3 steps. The first step was the preliminary observation. In this step, researchers collected data by pre-observation. The second step, researchers implemented the treatment, PBL with Gallery Walk strategy. In this step, the observer observed and assessed the learning activities in class as post-observation. The last step was the questionnaire and learning outcomes. Observation is one of the efforts to supervise and assess the learning process, which is the dimension of creativity [6]. The results of observation, both pre and post, are described in table 2.

As the learning outcomes, the product was a poster. Product is one the dimension of creativity [6]. Based on previous research, most of the teachers agreed that the product was the main assessing goal of creativity [4]. The samples of the product are showed in figure 1 and 2, which class 1 chose digital poster and class 2 chose manual poster.

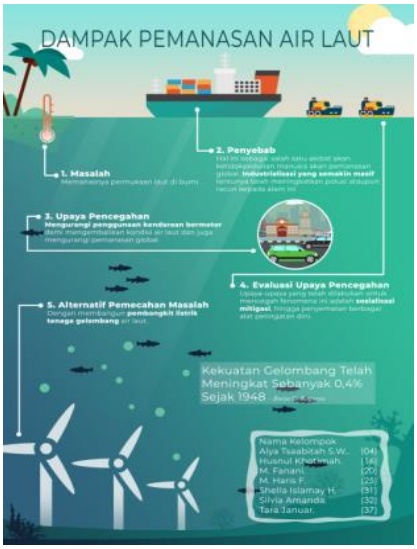

Fig 1. Digital Poster by Class 1

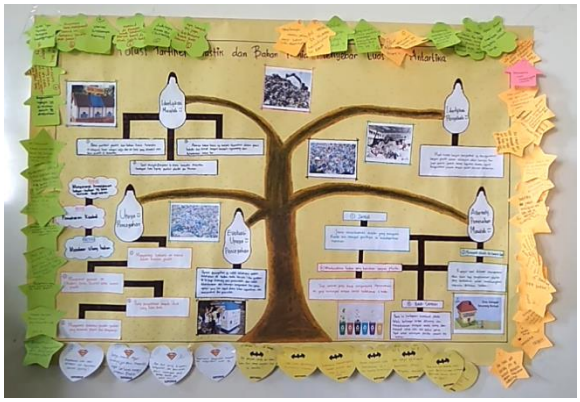

Fig 2. Manual Poster by Class 2

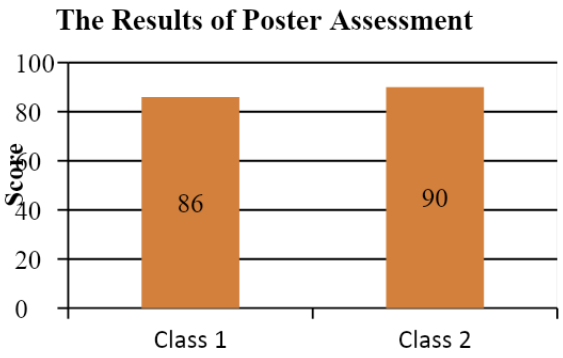

Fig 3. The results of the poster assessment

TABLE 2. THE RESULTS OF OBSERVATION

Indicator	Class 1		Class 2	
	Pre (%)	Post (%)	Pre (%)	Post (%)
Fluency	70	92	66	94
Flexibility	54	86	74	86
Originality	76	78	60	84
Elaboration	78	90	66	88

TABLE 3. THE RESULTS OF QUESTIONNAIRE

No	Statement	Class 1		Class 2	
		%	Category	%	Category
1	I enjoy the learning activity	80	Agree	84	Very agree
2	I feel happy to learn physics because the learning activity is interesting	80	Agree	88	Very agree
3	I become more active during the class	74	Agree	82	Very agree
4	This method gives chances me to know my deficiencies and revise it	84	Very agree	88	Very agree
5	This method makes the class be more fun and not bored	82	Very agree	88	Very agree
6	I feel more confident to express my opinions during the class	74	Agree	84	Very agree
7	This method makes it easier to express my opinions	84	Very agree	88	Very agree
8	I can collaborate well during class and doing the group assignment	84	Very agree	86	Very agree
9	The assignment is able to develop my creativity skill	80	Agree	88	Very agree
10	I am able to correlate the concept with other disciplinaries (such as biology, chemistry, economy etc)	78	Agree	82	Very agree
Mean		**80%**	**Good**	**86%**	**Very Good**

In the 20th century, teachers have preferred to use a variety of means to assess creativity, by monitoring students' work, behaviour and what they said [26]. However, as Fryer (1996) noted when considering the creativity of school students, there are some problems with such taxonomies of criteria. In Fryer's study of 1,000 teachers, most of them preferred judging students' work against each individual's past performance. Thus something might be deemed to be original for a particular student. Training in creative problem solving can enable people to be skilled in finding the best solution quickly [27].

The implementation of PBL with Gallery Walk strategy was conducted to two classes that had the same cognitive level. It was based on the pretest that was given on the preliminary. Based on the observation results in table 2, it can be observed that was enhancement percentage in each aspect of creativity. Pre-observation was conducted when the students were teaching by the physics teacher before the treatment given. Post-observation data was collected when the treatment given, the researchers were implementing the teaching method. The enhancement percentage of class 2 was more significant than class 1. The fluency of class 2 was the highest scores from all creativity aspects that were 94%. Fluency described the curiosity students in the class [7, 8]. It meant class 2 was more active and had more questions than class 1. Less than 10% of the students became passive learners. Flexibility is the ability to produce a large variety of ideas [8]. Students were not searching for a particular answer or the teacher's "correct" view; students were free to consider many ideas and perspectives. For flexibility, class 1 got higher enhancement than class 2. It enhanced by about 32%. It showed that class 1 got more various answer. Instead, class 2 got a higher enhancement for elaboration and originality. The enhancement was up to 20%. Elaboration is the ability to develop, embellish or fill out an idea [8]. Other words, originality is the ability to produce ideas that are unusual, statistically infrequent, not banal or obvious [8]. According

the observation, it showed that students communication enhanced when the method was applied. It showed the number of students who were more active during the class.

Students were more confident to express their opinions and questions during the discussion, especially when the exhibition. Supported by their internal motivation to collect more point by giving opinions in each stand, students were talk-active. In this stage, the competitive atmosphere showed up. Motivation is one of six sources that identified as facilitating creativity [28]. Sternberg and Lubart (1991) also indicated that there are two types of motivation important to creativity: intrinsic motivation and external motivation. Intrinsic motivation was motivation from internal factor to complete the assignments and get the best score [29].

The results were supported by the results of the questionnaire. The questionnaire showed that the students were more active in class, which was 74% for class 1 and 82% for class 2. Students also enjoyed the learning activity. Students also agreed that the learning activities were interesting, it makes the atmosphere in class was fun and not boring. It made students were easier to express their opinions during the class both oral and written. More than 80% of students agreed that this method gave chances to know their deficiencies and revise it. This method was conducted in a small group, therefore students should be able to collaborate with other students. About 84% of class 1 and 86% of class 2 agreed that they were able to collaborate in their groups well. In this stage, students had to adapt to their group and communicate well. In results, students got the best results of them. The assignment was designed to develop their creativity and HOTS. Because, students had to analysis the problems, then evaluate and create ideas to solve the problems. It was 88% of students who agreed that it can develop their creativity in class 2. While in class 1, it was 4% lower than class 2. Students also agreed that they were able to correlate the concept with other disciplinary, such as biology, chemistry, economy and etc. More specifically, the percentage of class 1 was 78% in the 'agree' category and class 2 was 82% in 'very agree' category. After all, class 2 got a higher percentage than class 1, which was 86% in 'very good' category. For class 1, it was 80% in the 'good' category.

Based on observation and questionnaire, students were more active and confident to express their ideas and opinions. Students were also more critical in class. There was an enhancement in pre and post-observation. Based on table 1, the fluency, flexibility and elaboration in the post were categorized in very agree and originality was categorized in agree for both experimental classes. For fluency, flexibility and elaboration, class 1 was higher than class 2. While originality, class 2 was higher than class 1. It could be caused by class 2 used manual posters that designed and made by drawing, cutting and sticking. For poster assessment, it showed that the average score of class 1 and 2 was 86 and 90. Class 2 got higher scores than class 1. It showed the user of the manual poster was more effective than the digital poster. It caused more senses you use, the deeper the information embedded [15, 30]. In making the manual poster, students used more senses than in digital poster. Besides that, in the manual poster, a student was freer and more original to design than using digital technology. The probability of plagiarism in the digital poster was also higher than the manual poster.

The results showed that the implementation of PBL with Gallery Walk strategy was able to enhance the creativity and communication skill of students. Using manual poster was more effective to enhance creativity and communication skills of students. The constraint in this research was the management class. Especially in the exhibition, students were more talk active and the class is crowded. Teachers have to direct the discussion to the topic and control it not until overcrowded. Besides, the teacher should have good relationships with students to build a fun atmosphere in class. Because these methods use a lot of interaction both peer students or teacher in the learning activities.

IV. DISCUSSION

Based on the results and discussion, it can be concluded that the implementation of PBL with Gallery Walk strategy was able to enhance creativity and communication skills. Students became more active during the learning activities. As a result, it increased the students' participation. Using manual poster was more effective to enhance creativity and communication skills of students.

REFERENCE

[1] B, Trilling & C, Fadel, ''21st-century skills: learning for life in our times", Jossey-Bass: San Francisco:', 2009.
[2] H M Huang, ''Toward constructivism for adult learners in online learning environment", British Journal of Educational Technology'', vol. 33, pp. 27-37, 2002
[3] H G Jellen & K K, ''Assessing creative potential world-wide: The first cross-cultural application of the Test for Creative Thinking-Drawing Production (TCT-DP)'', Gifted Education International, vol. 6, no. 2, pp. 78-86, 1989.
[4] M B Karnes, G. F McCoy, R R Zehrbach, J P Wollersheim, H F Clarizio, L Costin & L S Stanley, ''Factors associated with underachievement and overachievement of intellectually gifted children", Champaign IL: Champaign Community Unit Schools, 1961.
[5] R W Woodman & L F Schoenfeldt, '' Handbook of Creativity (3rd Edition) (New York: Spriger Business Media)'', 1989.
[6] D Supriadi, ''Kreativitas, kebudayaan dan perkembangan Iptek", Bandung: Alfabeta, 2002.
[7] Munandar U, "Pengembangan kreativitas anak berbakat", Jakarta: Rineka Cipta, 2002.
[8] E P Torrance, ''Education and the creative potential", Minneapolis: University of Minnesota Press, 1963.
[9] Davis G A and Rimm S B, "Education of the gifted and talented", Englewood Cliffs: Prentice Hall, 1985.
[10] R F Subotnik, ''Factors from the structure of intellect model associated with gifted adolescents' problem finding in science Journal of Creative Behavior'', vol. 22, pp. 42–54, 1988.
[11] G A Davis, ''Teaching creativity thinking. In N. Colangelo & G. A. Davis (Eds.)'', Handbook of gifted education (Boston: Allyn & Bacon), 1991.
[12] J P Guilford, ''Creativity American Psychologist'', vol. **5**, pp. 444–454, 1989
[13] J F Feldhusen & D J Treffinger, ''Creative thinking and problem solving in gifted education", Dubuque: Kendall/Hunt , 1980.
[14] Indonesian Ministry of Education and Culture 2013 Peraturan Menteri Pendidikan No. 65 tentang Standar Proses Pendidikan Dasar dan Menengah", Jakarta: Indonesian Ministry of Education and Culture.
[15] R I Arends, ''Learning to Teach (9th Edition)", New York: McGraw-Hill, 2012
[16] E.F Momo & S Wahyu, ''Skill analysis of students' creative thinking in implementation of problem based learning with plastic waste handling context'', Surabaya: Institute of Physics (IOP) Publishing, **p**p 1-5, 2015.

[17] Y N Widhitama, A Lukito & S Khabibah, "Problem solving-based learning materials on fraction for training creativity of elementary school students'', Surabaya: Institute of Physics (IOP) Publishing, pp. 1-5, 2015

[18] S L Bowman, ''The gallery walk: an opening, closing and review activity", Glenbrook: Bowperson Publishing, 2005.

[19] C Allen and J Larmer, ''Using Gallery Walks for Revision and Reflection (Boston: Buck Institute for Education (BIE)'', 2015.

[20] A Setyawati, M Syafar, A Majid and R Rachmawati ,''The effectiveness of Paired-Share Gallery Walk (PSGW) on students' Critical Appraisal Skill (CAS) improvement during the medical surgical nursing clinical placement'', Journal INJEC, vol.2, pp. 184-192, 2017.

[21] C S Pertiwi, L Lestari and I R Atmojo, ''The implementation og gallery walk learning model to improve verbal communicating skill of performance result thru thematic learning", Semarang: Universitas Sebelas Maret, pp. 151-158, 2018.

[22] D W Rodenbaugh, ''Maximize a team-based learning gallery walk experience : herding cats is easier than you think", the United States: American Psycologycal Society'', pp. 411-413, 2015.

[23] C K Chin, K H Khor, & T K The, '' Is gallery walk an effective teaching and learning strategy for biology?", Kuala Lumpur: Springer', pp. 55-59, 2015.

[24] Nurlaili S, ''Efektivitas model pembelajaran kooperatif tipe gallery walk ditinjau dari pemahaman konsep matematis siswa", Bandar Lampung: Universitas Lampung, 2017.

[25] D A Septiana, ''The implementation of problem based learning with gallery walk strategy on global warming'', IPF: Inovasi Pendidikan Fisika, vol. 8, pp. 692-695, 2019.

[26] M Fryer, ''Creative teaching and learning", London: Paul Chapman Publishing Ltd, 1996.

[27] D Jr Fasko, '' Education and creativity'', Creativity Reserch Journal, vol. 13, pp. 317-327, 2017.

[28] R J Sternberg and T I Lubart, ''Creating creative minds", Phi Delta Kappan, vol. 72, pp. 608–614, 1991.

[29] B A Hennessey and T M Amabile, ''Creativity and learning", Washington DC: NEA Professional Library, 1987.

[30] Rusman, "Belajar dan pembelajaran: berorientasi standar proses pendidikan", Jakarta: Kencana, 2017.