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DEVELOPMENT OF PLANT REPRODUCTION PROPS TO INCREASE MOTIVATION AND COMMUNICATION OF MENTALLY RETARDED STUDENTS IN SLB WIDYA BHAKTI SEMARANG

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Abstrak. This research aims are to determine the development of plant reproduction props to increase the motivation and communication of mentally retarded students in slb widya bhakti semarang. In this research, the population in this research was eighth grade students of SMPLB C Widya Bhakti Semarang. The research sample was determined by purposive sampling technique. Only 1 class of students is class VIII which contains 12 people. The research design used was One-Group Pretest-Posttest Design. Analysis of the data used was the data from the students pretest and posttest, observation sheet of communication skills, observation sheet of student motivation, and usage response questionnaires. A large analysis of the influence of props uses effect size because the number of students is less than 30 students. Communication skills from 49.3% in the first meeting reached 93.75% in the sixth meeting, learning motivation from 49.5% in the first meeting to 93.5% in the sixth meeting, the average result of the pretest was 7.8 and average the average posttest value is 8.5, and the magnitude of the influence of plant reproduction props uses an effect size of 4.6 which is included in the category very large. Based on the results of the study, it can be concluded that there is a very large influence between plant reproduction props on communication skills and learning motivation of mentally retarded students at SMPLB C Widya Bhakti Semarang.
Development of student worksheet using flipbook maker based on creative problem solving to increase the students’ critical thinking skill

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Abstract

This study aims to develop the student worksheet using flipbook maker in order to increase the students’ critical thinking skill. This development research was performed to the students at senior high school grade eleven, academic year 2017/2018 in SMA Kesatrian 2 Semarang. This study began from preliminary step and formative evaluation. The prototype of student worksheet was initially tested by the judgment expert. Learning material expert assessed the student worksheet with valid criteria of 86.44% while the media expert gave student worksheet the valid criteria of 83.12%. After the treatment to the students with pre-test and post-test one group design as well as gain test, it showed that the student worksheet using flipbook maker based on creative problem solving increased the students’ critical thinking skill.

Keyword: student worksheet, flipbook maker, creative problem solving, critical thinking skill.
PRIVATE DECISIONS TOWARDS GREEN TRANSPORTATION

AS EDUCATION-ORIENTED LEARNING TO BE

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ABSTRACT

The need for mode of transportation is proportional with urban population growth. The dependence of people using private transportation causes many problems. In addition to congestion, it can create environmental problems such as air quality deterioration and pollution in the cities. Learning to be in this research is the process of individual learning to move from private transportation to public transportation. The purpose of this study is to predict and opportunities for private decision using the public transportation toward green transportation in Semarang city. This research is designed using a quantitative approach and totally responden 100 workers using questionnaire. The samples are collected using proportional sampling technique. Data are analyzed with binary logistic regression. The results showed that the accessibility and tariff variables are significantly influence to predict private decision for using public transportation as an effort toward green transportation. Based on the policy simulation, the opportunity of using public transportation will be higher if the distance is closer and reachable. It will be getting lower if the tariff is raised when the other variables are constant. Therefore, to influence private decisions using the public transportation, the government must be oriented towards reachable distance and tariff.

Keywords: green transportation, opportunity, accessibility, tariff, binary logistic regression
PHOTOELECTROCHEMICAL DESTRUCTION OF METHYLENE BLUE USING CADMIUM SULFIDE PHOTOANODE

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ABSTRACT

Methylene blue destruction research carried out using cadmium sulfide (CdS) photoanode had been done. CdS synthesized by chemical bath deposition (CBD) was used as anode and platinum as a cathode in photoelectrochemical studies. Characterization with EDX indicated the presence of CdS with a composition of $\text{Cd}_{0.82}\text{S}_{0.18}$. The band gap measurement of CdS was obtained 2.38 eV. SEM image of CdS gave results in the form of crystals of less than 1 $\mu$m. XRD showed the presence of CdS crystals in cubic and hexagonal formations. From photocurrent test, the CdS had a $n$-type semiconductor property. The application of CdS as a photoanode in photocatalysis and photoelectrocatalysis of 100 mg/L methylene blue treatment showed destruction up to 48% for the samples for 2.5 hours. The maximum voltage measurement of 0.8 V from the PFC was obtained for the 1cm$^2$ photoandode system.

Keywords: CdS, Photo Fuel Cell, Chemical Bath Deposition.
ABSTRACT

The Direct-Instruction model which is still widely used in the learning of software modeling in higher education places more emphasis on classroom interactions initiated by the teacher. Generally, it only involves a small portion of student-to-student interaction. The direct learning systems that depend on the reflection ability of instructors only provide few opportunities for students to be actively involved in the learning process. Thus, it is different from software modeling which emphasizes Student-Centered Learning. Consequently, learning becomes ineffective and students cannot reach the minimum competency standard stated in the learning design. This paper proposes a Problem-Based Learning model that is integrated in software modeling learning at three segments: Curriculum segment, emphasizing the use of problems as the starting point of student learning; group segment, emphasizing collaboration systems (group discussion-based-learning); and student segment, stressing the Student-Directed Learning (SDL) system. The effectiveness test results show that the application of the PBL model in 3 segments (Curriculum, Individual, Group) in the learning design of Software Modeling, is effective in increasing the level of student mastery of a particular topic.

Keywords: Conceptual Model, Problem-Based Learning, Software Modeling
Batik Industry Wastewater Treatment Using Fito Remidiatin of Water Hyacinth

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Abstract

In general, one of the causes of pollution is the amount of waste water that is disposed of without processing or has undergone processing but has not met the requirements. It is possible because of reluctance to treat wastewater, besides that, there is also no availability of easy and efficient wastewater treatment technology. The use of textile dyes in the batik industry uses many chemical dyes rather than naturally. The washing water produced by this batik industry becomes very concentrated in color and is not easily broken down. This study used an experimental laboratory using a method of discoloration using rooting water hyacinth assistance where the color change was aided by the presence of sunlight so that it could produce clearer colors than the original color. Waste sampling locations are the home industry of batik Hayuningrum, Laweyan village, Laweyan sub-district, Surakarta, Indonesia. From the results of experiments that have been carried out through a reactor pond measuring 30 cm × 60 cm × 100 cm. Then the results of the graph can be obtained on the color parameters based on APHA 2012, in section 2120-C about waste water quality standards then based on the color parameter values do not have the maximum permissible limits according to existing wastewater quality standards. Based on Central Java Provincial Regulation No. 5 of 2012 concerning waste water quality standards, then based on the COD value it does not meet the waste water quality standard requirements because all samples have results that exceed the maximum permissible levels for COD parameters which are 150 mg / L. The BOD value does not meet the waste water quality standard requirements because all samples have results that exceed the maximum permissible level for the BOD parameter, which is 60 mg / L. The pH value fulfills the requirements as a waste water quality standard because all of the samples have results that do not exceed the maximum permissible level for pH parameters, 6.0 - 9.0. The DHL value fulfills the requirements as a waste water quality standard having the maximum yield permissible for DHL parameters, namely 20 – 1500 µmos/cm. The TSS value does not meet the waste water quality standard requirements because all samples have the maximum permissible results for TSS parameters which are 50 mg / L. The TDS value fulfilling the wastewater quality standard has the maximum yield permissible for TDS parameters, which is 2000 mg / L

Keyword: waste water, color gradation, water hyacinth, reactor pond
The Effect of Electric Voltage and Wastewater Flow Rate on the Electrooxidation Method with Continuous Systems for Textile Dyestuff Degradation.

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Research on the degradation of textile dyestuffs has been carried out using the electrooxidation method with a continuous system. The electrodes used are graphite rods from used batteries. The purpose of this research were to analyse the effect of electrical voltage and wastewater flow rate on the effectiveness of the electrooxidation method with a continuous system for degradation of textile dyestuffs, which is indicated by the percentage reduction in the absorbance/color intensity of artificial textile wastewater. Artificial textile wastewater is made by dissolving 5 kinds of synthetic textile substances. The experiment that has been done is to conduct an electrooxidation process against artificial wastewater at variations in electrical voltage and wastewater flow rate. The parameters of wastewater quality that have been analyzed are the absorbance/color intensity of wastewater before and after processing, then the percentage decrease in absorbance is calculated. The results showed that the electric voltage and wastewater flow rate affect the effectiveness of the continuous system electrooxidation method, where the higher of electricity voltage and the slower of wastewater flow rate will cause the electrooxidation method to be more effective. The optimum condition of electricity voltage and flow rate is 12 volts and 0.5 liters per minutes (LPM) with an effectiveness of 92.43%.

Keywords: degradation, deystuff, electrooxidation, continuous, absorbance
Optimization of NaCl Concentration and Electrocoagulation Processing Time to Reducing the Level of Chromium Heavy Metal Solutions

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Abstract. Heavy metal chrome (Cr) found in wastewater in the metal coating industry is highly toxic. Cr heavy metals need to be removed or at least reduced so that the levels meet the quality standards. The process of reduction or removal of Cr from the wastewater of the metal coating industry can be carried out by electrocoagulation process. The purpose of this research was to reduce the levels of heavy metal chrome (Cr) in solutions containing Cr as a preliminary study for the determination of NaCl levels added as electrolyte media and the determination of optimal electrocoagulation processing time. The research method used is laboratory experiments with a continuous electrocoagulation process using iron electrodes, with variations in addition of NaCl and variations in processing time. Determination of Cr heavy metal content in solutions was carried out before and after electrocoagulation using an Atomic Absorption Spectrophotometer (AAS). Two-way ANOVA was used to analyze the result. Two-way ANOVA test showed that the significance value of the variation of NaCl concentration and variation of electrocoagulation processing time are decrease concentration of heavy metal Cr in solutions was 0.001 (p <0.05). These results indicate that there is a significant difference in the concentration of Cr heavy metal which is significant in terms of variations in NaCl concentration and variations in electrocoagulation processing time. Based on these results, it can be concluded that the continuous system electrocoagulation process with the addition of 1.200 % w/v a time of 60 minutes gave the most optimum reduction of heavy metal Cr.
Analysis Of Quantity And Quality The Implementation of SMA (Senior High School) Chemical Practicum in Semarang City

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Abstract. The aims of this research are to analyze the quantity and quality of chemical practicum implementation in SMA / MA (Senior High School). The research method is a case study, percentage descriptive and direct observation in the school followed by cause interviews are rarely carried out or even why it is not implemented at all. The results of the study showed that the practicum of chemistry which should be done starting for class X, XI and XII had 25 practical subjects. There are schools that have determined the usual agenda from the beginning, so that they do not reach 25 practicum programs. The practicum program that has been chosen with consideration can be carried out, and even then only a part of it is implemented. As in SMA A, there have been 22 practicum programs analyzed, in fact only 8 were done, 3 were sometimes done and 11 were never done. Factors that do not implement the practicum are: 1. Less time in implementation, 2. The teacher's task is too much, 3. Chemicals and materials are expensive. The teacher wants: tools and materials provided neatly. Laboratory staff and technician / laboratory staff should be available, so as to assist teachers in guiding students. The results of this study will be very useful for the long term in overcoming problems not optimal implementation of high school chemistry labs. The practicum program that can always be done, the quality must also be analyzed.

Keywords: quality and quantity analysis, practicum skills, chemical learning
The Effect of Project Based Learning Model to Improve Students’ Learning Outcome in Animal Structure

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Abstract. Project based learning model is a model that is able to construct students’ knowledge in Animal Structure. With this project students are given the opportunity to understand the material by correlating the material at schools with the material lectured related to Animal Structure. Animal structure is a subject learning about material tissues and organ systems in humans and animals. With the project in a form of observation and misconception tasks existing at schools, students will comprehend the materials better and its needs in the community. This research was held in August-December 2018, and conducted in Banten Province. Based on the results of data analysis, it showed that the data for students’ learning outcomes were normal and homogeneous. The results of hypothesis testing also showed that there was an effect of the model on improving students’ learning outcomes (sig> 0.05), with a value of p = 0.000. The conclusion of this study is that there is an effect of the Problem Based Learning model in improving students’ learning outcomes.

Keywords: animal structure, learning outcome, and project based learning
THE INFLUENCE OF GUIDED-DISCOVERY AND INSTRUCTIONAL MEDIA ON EARLY MATH SKILLS

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Abstract

Early math skills are basic skills that children need to have to adapt to the external challenges of the 21st century. To empower early mathematical abilities, the guided discovery method works effectively. This research aimed to see the effectiveness of guided discovery and instructional media toward early math skills kindergarten student. This research was a quasi-experimental. The instrument for obtaining data on children’s early mathematical abilities is the observation sheet of early math abilities. The sampling technique employed was the multi stage random sampling method. The study was conducted on kindergarten children in West Java Province, Indonesia. The results showed that there were significant differences from guided discovery and instructional media to children’s mathematical abilities.

Keywords:
Guided-discovery, instructional media, early math.
The effect of problem-based learning model to students’ cognitive achievement on high and low students’ problem solving abilities

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Abstract. This study aimed to determine the effect of PBL model on students’ cognitive achievement on high and low students’ problem solving abilities. This study was quasi experiment research by using posttest only non-equivalent control group design with 22 students of X(3) grader science class as control class (conventional model ) and 21 students of X(4) as experiment class (using PBL model) at one of senior high school in Surakarta. Students’ problem solving abilities illustrated as abilities in four aspects: identification the problem, identification the cause of problem, create the method of problem solution, examine the result of problem solving by using 40 items of multiple choice question refers to Problem Solving Skill Test (Purnakanista, et al., 2014). Students’ problem solving abilities measured before the research is done and divided into high and low categories. Students’ cognitive achievement illustrated as students’ concept understanding and measured by using essay test was given after the PBL model used. Instrument had been validated by expert judgment and students. Data analyze by using t-test. The result showed: 1) Sig. (0,00<0,05) Ho rejected, there was difference of students’ achievement between experiment class and control class; 2) Sig (0,683 >0,05) H0 accepted, there wasn’t difference students’ achievement with high problem solving abilities between low problem solving abilities.

Keywords: problem-based learning model; cognitive achievement; problem solving abilities
Abstract. Learning paradigm in science, especially in biology are having transition, and today, the biology learning process are oriented in knowledge transformation in the real world. Indeed, the learned contents in biology are not being knowledge to students only, but also drive to the utilization of potency owned by that content in live. Because of that, in this paper, I presents the result of research about the development of Students lifelong learning after taking part in entrepreneurship oriented inquiry learning programme in plant diversity course. This research involved of 5th (n=31) semester undergraduate students in Biology Education Department in one teachers college in Central Java. The data are taken by lifelong learning rubric with 20 questions consist of 5 standards. Moreover, the data are taken by observation in learning process too. The result of this research showed that the mean score in student’s lifelong learning taken by rubric are increased, as 2.69 in pretest and achieving 3.22 in posttest with the maximum score as 4.00. The observation result showed that students become more skilled in complex thinking, accustomed to process the information systematically, being able to communicate, well collaborated, and being able to build habit of mind in every actions. Thus, it can be concluded that entrepreneurship oriented inquiry learning programme which is implemented in Plant diversity course provide best lifelong learning to students.

Keywords: lifelong learning, inquiry, entrepreneurship, plant diversity.
Comparison of ground-based and satellite-based CO2 data in Indonesia

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Abstract. For decades, human activities have led to a dramatic increase in greenhouse gas (GHG) and pollutant concentrations in the atmosphere, and a significant increase in GHGs, especially CO2, has had a significant impact on global climate. Therefore, major scientific research has focused on accurately measuring changes in atmospheric carbon dioxide concentration. At present, atmospheric CO2 observation mainly relies on passive detection technology, especially passive satellite remote sensing technology. CO2 is one of the most important greenhouse gases. Its concentration and distribution in the atmosphere have always been important in studying the carbon cycle and the greenhouse effect. This study is the first to validate the CO2 of satellite observations with total carbon column observing network data and to compare the ground data and AIRS measures the concentration of carbon dioxide (ppmv).
A Conceptual Model of The Integrated Science Learning Quality Assurance

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Abstract. The purpose of this study was to analyze: 1) an understanding of quality assurance in science teachers; 2) implementation of the integrated science learning quality assurance; 3) a conceptual model of the integrated science learning quality assurance. The Integrated science learning quality assurance model is a systematic, planned and sustainable process to ensure that learning is carried out according to process standards. This study use evaluation research. The approach use mix methods with the explanatory sequential design. The data collected by test, observation, documentary study, and literature review. Based on study result, a conceptual model of the integrated science learning quality assurance was proposed. The conclusion of the research is both the understanding and implementation of science teachers on quality assurance tends low. A conceptual model of the integrated science learning quality assurance was proposed with five stages. Quality mapping use an instrument. Planning was done by developing quality document. Implementation is doing quality procedures, consist of SKL-KI-KD analysis, integration analysis, preparation of indicator nets, syllabus, lesson plans, determination of learning prerequisites, implementation of learning, and assessment. Evaluation or audit is consist of preparation, implementation, follow-up, and reporting. Standard setting is set to increase indicators.

Keywords: a conceptual model, learning quality assurance, integrated science learning.
Development of Electronic Modules by Scientific Approach to Train Science Process Skills

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Abstract. The aims of this research were to design and implement the development of E-modules based on scientific approach and to analyse the effectiveness and feasibility of using e-modules in trying science process skills. This research is based on research and development. This study includes research and development of Borg and Gall models with steps: planning, initial product development, initial testing, major product revisions, large group trials, product operational revisions, operational trials, final product revisions, and dissemination and distribution. Results by experts obtained an average percentage of overall aspects 89% of contain material experts, 88% of media experts and 84% of teaching experts in the very good category. The effectiveness test results obtained by Gain of 0.710 that mean e-modules scientific can train the science process skill students in the high category. The results of the field test questionnaire filled out by students get a percentage of 80% with good interpretation based on the effectiveness and test feasibility is 84% with very feasible category that can be concluded that the e-modules by scientific approach is effective and very feasible to train the science process skills.
Abstract

Pedagogical Content Knowledge (PCK) is the teacher's expertise gained since becoming a student of the Educational Personnel Education Institute. There was a change in PCK for prospective teacher students during the lecture and the change can be seen based on the concept map. This study aims to analyze the profile of changes in prospective teacher PCK based on concept maps. The study was conducted for biology education students at one of the private universities in West Java during the 2017/2018 school year. Participants are 6 people. Participants were asked to make speciation concept maps during the evolution course, microteaching and PPL. Concept maps are analyzed using qualitative descriptive analysis. The results show a change in the concept map which includes changes in the form of concept maps from simple to complex, increasingly meaningful and easily understood as a proposition, and only essential concepts that emerge. Based on this, PCK changed from along with the increasing experience of prospective teacher education and training.

Keyword: profile of change, PCK, concept map
THE IMPACT OF LAND USE CHANGE
ON FOOD SECURITY
(IN GUNUNGPATI SUBDISTRICT, SEMARANG CITY)

By:
Hariyanto, Sudharto, Imam Buchori

GRADUATE SCHOOL
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2018

Abstract

Growth of population and urban activities require land to support these things. As the result, there will be tight competition in using the land among individual, group, or sector. Land necessity for settlement, industry, or services has taken over farm land so that the farm land has been converted intensively and massively. Chronologically, population growth will increase land necessity for various activities. This study will answer how land use change impacts on food security, and level of food security in Gunungpati subdistrict, Semarang city. The aim of the study is to find out the correlation between land use change and food security, how food self-sufficiency status in Gunungpati subdistrict, Semarang city is.

Method of the study is analytical descriptive with area of each land use and population in Gunungpati, Semarang city as population. Selected location sample is some villages in which they have the most land use change and rapid population growth, from 2000 to 2015. Main variables of the study are land area, land productivity, population, population growth, and food security.

The significant result of the study (land use change) shows that rice field has decreased drastically, almost 50% in 10 years. Besides, farm land has also decreased 30.8% of its area in 10 years. Meanwhile, land use for settlement, mixed land, farm, and shrub has increased. Land use for settlement has increased 11%. Based on farm land carrying capacity formula (Odum, Howard, and Issard), Supply = Farm productivity x planting area x conversion index = 7,740,208.7 kg. Whereas, Demand = Population x per capita necessity standard = 8,965,074 kg.

In conclusion, D > S (Demand is bigger than Supply), it means that necessity is bigger than the available land, therefore Gunungpati has to import rice from other subdistricts to fulfill its population need. It shows that Gunungpati has been deficit in terms of food security carrying capacity and also food self-sufficie

Key words : Land use, Food security
The development of interactive learning media with lectora inspire in gas kinetic theory subject to improve the result and students interest of the ninth grade students of senior high school

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Abstract. Education has an important role in the life a nation or a country. It is expected to become the main pillar of the nation in improving the quality of human resources in mastering the various branches of skills and expertise in accordance with the development of science and technology, especially in the field of physics. The use of interactive media that integrated with digital media including electronic combination of text, graphics, video, and sound. The aim of this study is to know the feasibility and the effectiveness of the application of interactive media with Inspire Lectora to increased result and students’ interest of class XI Senior High School. The method used is Research and Development with the development model of DDD-E (Decide, Design, Develop, and Evaluate). The design of this research uses ex-post facto. This developed interactive media is presented and applied by a software named Inspire Lectora, the interactive media development product presented online aided by web. The research subjects are all of the ninth grade science students of Samarinda 6th State Senior High School which is located in Samarinda, East Borneo. Developed interactive media is eligible to be applied in this Senior High School. Developed interactive media is considered to be effective to measure the result improvement and students interest in the subject of the gas kinetic theory.
The Role of Operators in Activating Scheme of Patterns by Students With Low Mathematical Ability

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ABSTRACT

This paper aims to describe the role of metasubjective operators in activating the pattern schemes by junior high school students with low mathematical ability. This research uses descriptive-qualitative method with data obtained from 7 students. The researcher supported by tests and interview guidance on repeating and growing patterns to explore activated scheme. The roles of M, C, I, and F operators are being explored in activating pattern schemes found in subjects. It shows distinction in subjects’ M-operator capacity that can be observed when subjects are given complicated tasks. C-operator has the role of encouraging subjects to create solutions that linearly fit the principles of repeating pattern and growing pattern; however, it may not appear in the quadratically growing pattern. I-operator has the role of diverting subjects’ attentions, either in-line with or deviated from the general principles of the patterns. The scheme of even and odd numbers is highly predominant in diverting some subjects’ attention from the regularity of number sequence. The role of F-operation is observed when subjects try to simplify pattern regularity, specifically in quadratically growing pattern. The limitation of subjects in identifying the growing pattern is the result of I-operator and F-operator’s roles, supported then by M-operator’s limitation.

Keywords: Theory of Construction Operators, scheme, pattern
EVALUATION SWIMMING TRAINING PROGRAM FOR COACH WITH PRINCIPLE COMPONENTS ANALYSIS IN SLEMAN DISTRICT

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Abstract

The coach as an important figure in sports coaching, has a great duty and responsibility towards the progress of the achievements of his athletes. The decline and failure of the achievements of his athletes had a major influence on the future development of his athletes. The purpose of this study is to evaluating the implementation effectiveness aspects principle components of swimming training program. There are 1.) quality of coaches, 2.) preparation of training programs, 3.) implementation of conditioning exercises, 4.) implementation of training programs, 5.) use of training methods, 6.) use of equipment and facilities, 7.) how to evaluate training programs. The benefit of this research is that it can provide information for coaches to analyze and evaluate how the principles of training, situations and conditions of the training process can be carried out better.

Key words: evaluation, swimming, training program, principal component
Developing Online Instructional Model for Auditor Basic Knowledge: Case Study of SAI of Indonesia

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Abstract.

Purpose - The acceleration of technology usage for daily activities has affected the learning process in SAI of Indonesia. This study presents the development of online instructional model with its content that relates to the auditor tasks. The purpose of the study is to seek knowledge whether the development of other instructional models and its content, will attract the interest of the auditor to learn and impact the knowledge of the auditor in managing the audit audit process.

Methodology/approach - This is R & D research with prototype product as the result. Four key factors were used during analysis. Respondents involved were represented the role of Team Member and Team Leader from different offices location.

Originality/value - This study has novelty in which it is conducted in the SAI where the CPE for auditor is obliged in order to comply to audit profession standard, therefore the chosen online instructional model and its content has an important role.

Findings – There are significant interest from the auditor to have online instructional model with specific content and a perception that the content will support the auditor's tasks. Yet, there are also some challenges regarding the evaluation model of training and how to improve the knowledge gap of the trainers/instructors so that they be able to develop the content for online instructional model.
Lead-polyester resin composite as an alternative material for radiation protection in radiography

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Abstract. This work presents synthesization and characterization of polyester resin doped with lead acetate (Pb(CH3COO)2) as an alternative material for radiation protection in radiography. Five samples were synthesized with various lead concentration which are 0%, 3.5%, 3.75%, 4% and 4.5%. The samples were characterized using X-ray, He-Ne laser, and FTIR. The results showed that as lead concentration was increased, optical density increased while X-ray transmission decreased. It were found that the attenuation coefficients for each samples were 0.132 cm\(^{-1}\), 0.435 cm\(^{-1}\), 0.543 cm\(^{-1}\), 0.691 cm\(^{-1}\), and 1.156 cm\(^{-1}\). In terms of transmission and attenuation coefficient, lead-polyester composite with lead concentration of 3.5% has an optimum performance.
Mapping the Indigenous Knowledge of People at 3 T (Frontier, Outermost, and Least Developed) Regions as an Ethnoscience Study

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Abstract. This research intended to map indigenous knowledge of people in frontier, outermost, and least developed regions or generally referred to as 3T (Terdepan, Terluar, Tertinggal) regions. Two exploration methods were adopted; observation and information collected from printed and electronic media. The target mapping area was Papua, Aceh, West Kalimantan, and East Nusa Tenggara. Geographical position, research funding, and time allocation became the main considerations in selecting these areas. The four 3T regions are said to be the most appropriate as the locals remain to believe and apply their indigenous knowledge. The mapping results found several indigenous knowledge that are potentially be tested scientifically in labs, they are: (1) bakar batu, tanam sasi, and honai in Papua; (2) rumoh Aceh and batu nisan in Aceh; (3) berjuluk batutuk and betang radakng in West Kalimantan; and (4) ebang and welang in East Nusa Tenggara. There are numerous traditions found in the research location, yet those that do not have met the criteria of scientific objects, such as myths and legends, were not included. The research concluded that the indigenous knowledge of people in 3T regions are unique and required to be further examined scientifically and reviewed as a source for Ethnoscience course.
The Role of Self Control to Mediate The Influence of Achievement Motivation towards Academic Procrastination

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Abstract

This bottleneck phenomenon also occurs at the Faculty of Economics of UNNES where based on these data shows that, on average, graduates of the Faculty of Economics do postponement of thesis work with a study period more than 4 years. Academic procrastination disposed delay to finishing the final project and did other’s activity, and thus makes obstruction and the final project can’t be accomplished on time. It causes the decrease of productivity and individual work ethic and to creates low human quality. This study aimes to analyze the theoretical influence and case study related achievement motivation toward academic procrastination and self control as intervening variable. Data is collected using questionnaires. Sample is obtained by employing convenience sampling technique. In addition, the data is analyzed using descriptive analysis and regression analysis. The result of the study showed that achievement motivation had not effect significantly on academic procrastination and this study finds that the role of self control to mediated the influence of achievement motivation toward academic procrastination. It is suggested that there should be a good employment creation which can lower the level of academic procrastination and propel the acceleration of country’s economy to decrease educated unemployed that may increase poverty.

Keywords: academic procrastination, achievement motivation, self control, students.
The Relationship of Academic Procrastination with Self Control in Entrepreneurship Education
(Case Studies on Science Students at SMA Negeri 3 Semarang)

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Abstract

The Challenges and opportunities of education are very diverse, human resources are required to compete with each other and have characteristics and skills beyond learning in schools (entrepreneurship). Academic procrastination is a procrastinating behavior towards academic activities that makes a person not achieve optimal performance, resulting in emotional, physical, and academic consequences. Academic procrastination is caused by a decrease in productivity and individual work ethic which ultimately causes the quality of human resources to be low. The purpose of this study was to examine the theory and case studies of the relationship between self control and academic procrastination in entrepreneurship education. This study revealed the relationship between the nature of delay in doing work assignments and entrepreneurship (academic procrastination) on students and aspects of self control. Methods of collecting data using a questionnaire with random sampling techniques. The method of data analysis uses descriptive. The results showed that self control had a relationship with academic procrastination, so it was suggested that there should be the creation of human resources with the power of day with good entrepreneurial learning and could reduce the level of academic procrastination and encourage the country’s economic acceleration to reduce educated unemployment.

Keywords: academic procrastination, achievement motivation, entrepreneurship, education.
Implementation of Hybrid Learning in Biosignal Measurement and Instrumentation Course to Improve Student Outcomes

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ABSTRACT

Biosignal Measurement and Instrumentation is a compulsory course for third year Biomedical Engineering undergraduate student in School of Electrical Engineering and Informatics ITB. The course is implemented for the first time in 2017/2018 academic year using the combination of traditional learning (lecture) and project-based learning. In 2018/2019 academic year implementation, hybrid learning that combined lecture; student presentation and discussion, literature review, mini project, and final project was introduced to the course. The goals are to enable the students to take initiative, identify and solve the problems, work and communicate ideas in team, build responsibility and confidence. This paper will focus on implementation of hybrid learning to improve the student. Besides that, the study also reports the comparison of instructor and student-based assessment in final project. Course questionnaire score is improved after implementing hybrid learning. Student questionnaire shows that the mini and final projects have highest score, continued with student presentation and discussion. Finally, the literature review and lecture has lower scores. According to the student questionnaire on student outcomes, there are no significant differences. The study suggests that higher proportion of student presentation, discussion, mini and final project in the hybrid learning approach may further improve student engagement and outcomes.

Keywords: active learning, student engagement, student outcome
PROFESSIONAL CERTIFICATION INSTITUTIONS (PCI) TEST MANAGEMENT IN FACING INDUSTRIAL REVOLUTION 4.0

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Abstract

The occurrence of the industrial revolution 4.0 workers globally requires very strict competency requirements. Skills competency certification is an absolute requirement, including the certification of the batik profession. Management and the implementation mechanism of competency tests at the Batik Professional Certification Institution involve assessors, participants candidate and administration, were simultaneously. This qualitative research, conducted in the Central Java Province, Indonesia, aims to reveal the management of the implementation of batik competency tests through field observations, questionnaires, interviews, observations of administrative staff, assessors and management of Batik Professional Certification Institutions (PCI). The majority of assessors and prospective assessment participants mostly came from various regions with varying ages, which resulted in the emergence of various technical problems in the field. Based on the data obtained, various weaknesses in the management of competency tests were found, the procedures were quite complicated, less standardized, incomplete documents for prospective participants during the assessment, batik workers competency test participants were dominated by workers over 40 years old, minimum coordination, participant has less information technology literacy, there is no information management system (MSI) support. Utilization of Information Systems in the management of PCI Batik is one solution in overcoming technical problems in the field, especially in facilitating the management of assessors and their assessment documents. The need for the coordinating role of the assessment participants to help prospective participants who do not have information technology literacy in the administrative technical process of competency testing in PCI Batik.

Keywords: industry 4.0, information system, assessment management, professional certification institution
Generic Skills Pattern of Physical Teacher’s Candidate through Design of School Physics Practicum Guidelines

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Abstract. The aim of the study is to describe the patterns of generic thinking skills of students through the design of physics practicum guidelines. The research method uses quasi-experimental using post-test only control group design. The research sample is a Physics Education study program student in ⁵th semester, taken by cluster random sampling technique. The experimental group carried out physics laboratory project learning with generic science skills while the control group studied physics laboratory projects. Data collection techniques are using observation and test sheets. Data analysis techniques using statistical tests with t test. The results of the study obtained observational data and test data, the data were tested for normality, reliability and statistical tests. The difference in generic science skill patterns was tested statistically, and then data were analyzed for each indicator of generic science skills. The product of this research is the school physics practicum guidelines. The results of the analysis of the generic science skills test showed that the generic science skills in the experimental class were better than the control class. Based on the generic science skill pattern, it is found that the physics teacher candidates are better on the aspects of direct and indirect observation.

Keywords: Generic Skills Pattern, Physical Teacher Candidate, Physics Practicum Guidelines, Physics Education.
Abstract. Coffee is one of the main commodities in Indonesia. In Indonesia, coffee plantations began to grow rapidly so that potential for the development of domestic coffee. The development of people's coffee plant required support of various factors such as availability of facilities, methods of processing and postharvest handling which suitable for the coffee plantations to produce excellent coffee beans according to Indonesian National Standard (SNI). Post-harvest processing has an influence on the quality and taste of coffee. The purpose of this research is finding the relationship between a wet processing system on postharvest processing with quality and taste of coffee. The design of research to improve the quality of these Arabica coffee (green coffee) with a wet processing system. 300 grams of coffee came from the Coffee Plantation of Durjo Village Village, and Kemiri Village, Panti District, Jember Regency - East Java, 2018. On the physical quality test the replication was carried out two times in four samples. Coffee flavor was analyzed to refer to the method of testing SCAA flavor test. Taste testing was conducted by expert and trained panelists from the Indonesian Coffee and Cocoa Research Center. The result of research show the wet processing coffee can produce coffee beans with better quality and better taste, than the dry processing.
Development of Collaborative Learning Materials to Facilitate Candidates Master Guide in Jakarta

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Abstract. The purpose of this study is to produce a product of collaborative learning materials for prospective master guides in the Adventist Church. Which can be used for independent learning. The methodology used is the method of research and development. This study uses a combination of Dick & Carey and Derek Rowntree's models. The product testing phase begins with testing material experts, media experts, and learning design experts. Then the product was tested to a number of master guide candidates, namely 3 people for individual evaluation, 8 people for small group evaluations and 20 people for large group evaluations. The results of the study showed the value of material experts, media experts and learning design experts was very good. Then at the trial stage of the average results for the individual test stage 3.57 which means the product is considered very good, the small group trial stage is 3.47 which means very good, and at this stage a large group trial test of 4.22 considered very good. In conclusion, collaborative media learning materials for prospective master guides can be said to be good but still need some improvements in accordance with expert advice, students as users, and teachers.

Keywords: research development, dick & carey model, rowntree model, collaborative learning material.
Multi Representation Approach to Increase the Students’ Conceptual Understanding of Work and Energy

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Abstract. This paper aims to reveal the effectiveness of a multi-representation approach in work and energy learning in improving students’ conceptual understanding. This research is an experimental study with the design of one group pretest-posttest design. The research subjects were 42 undergraduate students of Physics Education in the subject matter “physics material and learning I”. The test instrument consists of 15 reasoned multiple choices questions. Based on the results of data analysis using paired sample t-test obtained $t = -9.39$ (p = 0.00) so it can be concluded that the multi-representation approach in work and energy can significantly improve student understanding of concepts with N-gain of 0.41 and d-effect size of 1.76. Before learning with a multi-representation approach, many students had difficulties to interpret the diagram of kinetic-potential energy. But it have minimalized after instruction. Learning with a multi-representation approach is effective to increase the students conceptual understanding of work and energy because it helps students understand the concept of physics as a whole.
Implementing Higher-Order Thinking Skills Assessment
in Indonesian Elementary School

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This study aims to apply both quantitative and qualitative analysis which implement two-tier multiple-choice test developed on the basis of the need for applying higher-order thinking skills in Elementary Schools. This is mixed method research using concurrent triangulation strategy with quantitative data collection technique using test and survey, while, qualitative data using interview and observation involving students, teachers, principals, and experts in the field of education. The results showed that the two-tier multiple-choice test was validly tested, reflect good reliability, and item analysis after used Items of 3.0 analysis. This instrument applicable to Elementary School with high and medium criteria. The results of the assessment using a two-tier multiple-choice test can be a simple representation of the meaningfulness of teaching and learning in the classroom.

Keywords: assessment; Elementary School, higher-order thinking skills, two-tier multiple-choice test
THE EFFECTIVENESS OF GAME-BASED SCIENCE LEARNING (GBSL) TO IMPROVE STUDENTS’ LEARNING OUTCOME: A META-ANALYSIS OF CURRENT RESEARCH FROM 2010 TO 2017

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ABSTRACT

This study identifies the effectiveness of the game-based science learning (GBSL) for improving students’ learning outcomes by conducting a literature review of the current research from 2010 to 2017. This study also explores the correlation between variation in school level and year of publication on GBSL effect size. Method: data were collected from peer-reviewed journal articles published in educational databases including ERIC (Educational Research Information Centre), Springer Link, ProQuest education journal, and A+ education. Seven inclusion criteria were used to select relevant studies. Comprehensive Meta-Analysis (CMA 2.0) was used to analyze the data. Findings: (1) GBSL intervention has a statistically significant effect on students' learning outcomes with a higher average on the effect size of the experimental group (41.12) than the control group (37.07). The mean of the reviewed studies’ effect size is 0.667 in the medium category. (2) The implementation of GBSL in secondary school has a bigger average effect size than in elementary school. Year of publication and effect size has low positive correlation with a coefficient of correlation 0.40.

Keywords: game-based science learning, learning outcomes, meta-analysis.
Environmental Learning Model in Vocational Education Curriculum and The Effect on The Attitude of Choosing Green Product

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Abstract. Increased air pollution due to human behavior that does not care about technology products. To reduce the impact of severe ecosystem damage, environmental knowledge must be invested in the mindset and behavior of future generations in this case students. One of the formal schools that have potential in the use of technology and industry is the college of technology and vocational education in college. types of corelational survey research in two study programs namely cosmetology education and Home Economics education study programs in the State University of Jakarta as many as 60 respondents. retrieval of data using a questionnaire to measure the attitude of choosing green cosmetics products. the questionnaire was declared valid and reliable both checked contents and empirical. The result of this research is Environmental learning model that can be applied in the curriculum such as: learning to know, learning to do, learning to live together, and learning to be. Implementation of this learning model can change the behavior and awareness of students to the breaking of environmentally friendly products of 45.70%. Students can become agents of environmentally-friendly behavior change and reduce ecosystem damage while saving the Earth's biosphere from calamities caused by environmental pollution.

Keywords: the attitude of choosing green products, environmental science, enviromental health, environmental awarnese and vocational education.
Social Community Capital Model For Management of Sustainable River Ecosystem

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Abstract. The aims of this research are to examine about approaching model for Society adaptation in managing the quality of the river water. This research was done on Ciliwung Watershed DKI Jakarta and Citarum Watershed Bandung West Java. The result of the research shown that the citizen of Citarum were more succeed through the Socio–capital approach than the citizen of the Ciliwung Watershed. The implementation of Socio–capital correspondance level on Citarum Watershed groups has higher score (80%) than the Socio–capital correspondance level on Ciliwung Watershed (44.7%). Next is, the result of analyses shown there are Socio–capital approach elements such as: stakeholder’s participants, the economy water source, the involvement of society and the local culture development in reaching the succeed of the river environment quality improvement that has been done by the groups of society who’s lived in the river basin. The contribution of the Socio–Capital approach elements to the succeeding of the managing river environment in two research location were 38.50%. The system dynamics model can be constructed the diagram system of Socio–capital and others subsystem such as the government support, the involvement of the society and the privates support.
Student responses on the development of flash learning media in light material

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Abstract. This research aim was to know the student responses on the development of flash learning media in light material. The method of developing learning media used ADDIE which included 5 stages, namely Analysis, Design, Development, Implementation, and Evaluation. The instrument used to measure student responses to learning media used questionnaires. The sample used to retrieve student responses were 36 students. Analysis of student responses used descriptive statistics. Based on the results of data analysis, it can be seen that student interest in learning media was 85.94% with a very good category, students' conceptual understanding was 80.82% with very good categories, and assessment of the appearance of learning media was 77.22% with good categories. From these results, it can be concluded that the student responses to the media developed was very good with an average percentage of 81.33%.
The Effectiveness of Socio-Scientific Issues in Gadget to Increase Generation Z’s Scientific Literacy

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Abstract Scientific literacy is very important to generation Z (Gen-Z), so that scientific literacy in the Gen-z in Indonesia needs to be improved. The use of devices by Gen-Z almost all the time in their daily live allows research on improving scientific literacy by utilizing devices to be feasible. This study aims to determine the effectiveness of device-based interactive multimedia to improve Gen-Z scientific literacy and describe the Gen-Z response to interactive multimedia. This research is a pre-experimental research, using the design of one group pretest and posttest, which is part of research and development with the 4D model at the stage of validation testing, to develop device-based interactive multimedia utilizing social-scientific issues to improve Gen- Z. Interactive multimedia was created by utilizing presentation file creation, image, animator, and emulators programs. Multimedia was developed following patterns: social issues - scientific, discovery, and application of concepts. Scientific literacy was assessed using a scientific literacy test. Student responses were described based on the results of the questionnaire responses and interviews of selected students. The results showed that scientific literacy of students in both schools had increased. The N-gain score is 0.49 for Sepuluh Nopember Junior High School Sidoarjo and 0.42 Ma’arif 22 Islamic Junior High School Lamongan in the medium category. In addition, interactive multimedia developed can improve students’ scientific literacy. However, Gen-Z students cannot be satisfied with the multimedia. Students suggest several multimedia enhancements in terms of visual, audio, and music, so that they can enjoy the multimedia all the time by using the device.

Keywords: scientific literacy, Generation Z, gadget-based interactive multimedia, socio-scientific issues
Integration of Character Education in Chemistry Learning Process about Redox in Paket C Program

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Abstract. The chemistry curriculum about Redox is given to students in class X of paket C program. This study aims to obtain planning, implementation, and challenges in integrating character education in learning special chemistry for redox subjects in students of Paket C Pasca 45. The method used in this study is descriptive using qualitative data collected in the form of syllabus and redox material learning plans made by tutors, notes on the learning outcomes of redox material in the classroom and the results of interviews with tutors and students. The results of the syllabus analysis and tutor learning plan show that the tutor is not complete with learning planning with indicators of character education integration, but the implementation of chemical learning by tutors in Paket C Pasca 45 Demak has supported the integration of national cultural values and character of educational assistance programs and value assistance exchange the culture of the nation's character through chemicals described by the tutor.
Environmental Management based on the religious character of Pondok Pesantren Al-Hikmah 2 Benda

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Abstract. This research is motivated by the inability of society to cope with environmental and social damage, it is necessary for their religious character-based education efforts. The purpose of this study was to determine how the environmental management based on the religious character of Pondok Pesantren Al-Hikmah 2. The method used is a qualitative method of collecting data through observation, documentation, literature and interviews with a panel of caregivers, coaches, teachers, teachers and students. This research resulted in: first boarding school al-wisdom 2 objects included in the category ekopesantren. Second, aspects of which do ekopesantren located in the boarding school policy aspects of environmental and religious character-based curriculum development. Third,
Microgravity Method to Monitoring Subsidence in KOTA LAMA Area SEMARANG

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Abstract. The purpose of this study was to monitor the subsidence that occurred in the Kota Lama. The method used is the micro gravity method. Measurements were carried out 2 times in the period May and September 2017. The anomalous data obtained time lapse microgravity anomaly which were the weight difference between the period of September and May. This anomalous data still contains anomalous sources of groundwater leve changes which are then corrected with rainfall data for that time interval. Finally anomaly data were obtained which were the target of the study in the form of microgravity anomaly data due to subsidence. After being converted with a constant free air correction resulted in a maximum subsidence of 0.3 cm or 3 mm occurred in the north and south of the Kota Lama.
THE EFFECTIVENESS OF CHEMISTRY LEARNING STRATEGY IN
IMPROVING STUDENTS’ LEARNING PROCESS AND ACHIEVEMENT

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Abstract

This research aimed at describing and explaining the implementation results of learning strategy for senior high school chemistry based on starter experiment approach. This research was part of research and development conducted simultaneously in two different schools in the form of pre-experiment. Two chemistry teachers and 52 students were involved in this study. Mix methods consisted of observation and test were used to collect data. This study involved two topics of senior high school chemistry, namely Atomic Structure and Electron Configuration. This research focused on examining the effectiveness of learning process and learning achievement of students. The effectiveness of learning process was viewed from the involvement of students in learning obtained by observation techniques. The student learning achievement was viewed from the number of students achieving the minimum criteria of mastery learning set out by the schools. The result of this research revealed that learning process undergoes effectively which can be seen from students’ participation in learning, such as observing the starter experiment, promoting questions, discovering concepts, and applying concept to solve problems. In general, it can be stated that more than 90% students achieved the minimum standard of mastery learning set out by the schools.

Keywords: chemistry, learning strategy, starter experiment, learning process, learning achievement.
Learning innovation through digital crosswords puzzle in 21st century learning

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Abstract. Learning in the 21st century is a challenge that must be faced in the world of education. One of the characteristics of learning in the 21st century is thinking critically and being able to solve problems. Learning in the 21st century is student-centered. The purpose of this study is to find out the innovations that have been carried out in schools in the face of learning in the 21st century. The method of this research is qualitative methods. The study was conducted at SDN 04 Sidoharjo in Wonogiri district. The results of the study were obtained from interviews and observations at SDN 04 Sidoharjo, Wonogiri district. The results of the study indicate that learning at SDN 04 Sidoharjo Wonogiri district has led learners who are centered on learning but have not used media that supports students to develop the ability to think critically and be able to solve problems. This study provides a recommendation that one of the media used to train students to think critically is a crossword puzzle that is in accordance with learning in the 21st century, namely digital crosswords puzzle.
Analysis of Students’ Competence in Chemistry Cognitive Test Construction Based on Bloom’s Taxonomy Revised

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Abstract

The test is one of the tools used to measure the cognitive competence of students. The ability to develop tests is one of the competencies teachers and prospective teachers must possess. Bloom’s Taxonomy Revised combines cognitive levels and types of knowledge in constructing cognitive tests. The subject of this study was a postgraduate student in the Chemistry Education Study Program of Makassar State University consisting of 25 people. The purpose of this study was to analyze the students’ competence in construction of chemistry cognitive tests based on the Bloom’s Taxonomy Revised. This research is quantitative descriptive. Analysis of student competency in developing tests is measured by the test suitability indicators with cognitive levels and types of knowledge. The results of the analysis show that the students’ competence percentage construction questions level C1, C2, C3, C4, C5, C6 respectively: 98%, 89%, 96%, 89%, 65%, and 60%. The percentage of students’ competence in tests construction according to the type of knowledge for the types of factual, conceptual, procedural, and metacognitive knowledge are 84%, 83%, 85%, and 83%. Thus it can be concluded that the students’ competence in constructing Chemistry cognitive test based on Bloom’s Taxonomy Revised is in a good category.

Keywords: students’ competence, test, Bloom’s Taxonomy Revised
Discovery Learning Model in Learning Writing of Exposition Text

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Abstract. Learning of Indonesia language in school is based on the genre of the text. The type of the text presented can be both spoken and written. This learning is also carried out with certain stage, including the process of context building, text modelling, the creation of text together, and making of text independently. But students still have problems in learning. The students pouring their ideas into the form as for the written sentences are often ineffective. In fact their writing is not communicative which purpose of learning Indonesian. The purpose of this study is to describe the discovery learning model in exposition text. The type of this study is quantitative research with experimental method. The design of this study was static two groups. The sample of this study were 50 people, 26 experimental and 24 control class. The sample was taken by purposive sampling technique. The results showed the following. First, the expository writing skills of the students using the conventional method is at a more than adequate qualification (LdC) with an average of 68.44. Second, the skills of writing exposition texts using the discovery learning model are in Good qualification (B) with an average of 84.25. Based on the results of this study concluded that the skills of writing text using discovery learning model is better than using conventional method learning.
Effectiveness of Animation Using Pictorial Riddle Approach Toward Physics Concept Understanding at Senior High School

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The purpose of this study is to determine the effectiveness of animation using pictorial riddle approach toward physics concept understanding at Abul Faidl Senior High School, Wonodadi Blitar. The study applied experimental research with pretest-postest control group design. The result of the study indicate that the average pretest score for the experimental class is 67.4 while the posttest score is 83.04. The average score for the control class, for the pretest is 65.4 while for the posttest 72.38. The t-independent test result show that the value of sig (2-tailed) 0.000 < α (0.05), then H₀ is rejected and H₁ is accepted. Thus it can be concluded that there is a significant effect of the application of animation using Pictorial Riddle approach toward physics concept understanding in 2018/2019 Academic Year at Abul Faidl Senior High School, Wonodadi Blitar

Keywords: animation, pictorial riddle, physics concept understanding
Preparation of Bioplastic Film from Gadung Starch (Discoreahipida) and Chitosan Plasticized with Glycerol

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Abstract. Bioplastic film based on gadung starch (Discoreahipida) and chitosan plasticized by glycerol were prepared through solvent casting method. The aim of the study was to determine the effect of starch and chitosan composition on both mechanical properties and lyophobicity of the films. The results indicated that incorporating the chitosan in the starch matrix induced structural modification due to interaction between hydroxyl functional group and amino group of the starch and chitosan. The films produced in this research exhibit smooth surface, homogeneous and both porosity and cracks were not occurred which was evidenced by Atomic Force Microscopy (AFM) data. The findings also revealed that adding more chitosan in the starch matrix have significantly enhance tensile strength of the film while reduce the extension at break. Films with more chitosan absorbed more water compared to less chitosan film.

Key Word: film bioplastic, gadung starch, chitosan
The Synergy Model of Village Development Based on Environmental Education (Biotic Approach) in Indonesia Perspective of Law Number 6 of 2014

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ABSTRACT

This research came up from the ineffectiveness of village empowerment in North Coast Central Java (Pemalang, Regency of Tegal, Tegal City, Pekalongan, and Batang), and less on environmental education to develop the village. Even though, the environment is an important part of the village’s development and has the most important contribution to prosperous independent society according to Law Number 6 of 2014 concerning to Village (Village Act). In fact, in environmental development, two important elements (biotic and abiotic) have a very significant role, and humans as one of the biotic components place a strategic position in environmental development in the village. Therefore, the synergy between the implementation of Village Act and environmental development of village become an important point on village development. The objective of this study was to produce a synergy model combining legal instrument, implementation, and environment education on village development. Humans are put in the position of consumers or heterotrophs in the environment, so that in cases of environmental development often intersect with the daily needs and consumption of humans. This research used Chamblis and Seidman Theory (on Law and Society). This theory used as parameter for the effectiveness of laws and regulations in society, as well as, in this case the effectiveness of Village Act on promoting environmental approach in village development. The result showed that: (1) existing laws and regulations in practice are translated in such a way as to achieve social welfare and justice, (2) village development as a mandate from the Village Act on the North Coast has not been oriented towards environmental development, so the use of Village funds has become ineffective, and (3) a synergy model of village development conducted in this study accentuated the principle of progressive law as one of the tools to encourage more effective law enforcement. The study emphasized that environment education has a major contribution in influencing village development in North Coast.

Keywords: village act, environment education, village development, human, biotic
THE INFLUENCE OF LEARNING STRATEGIES AND SELF REGULATION ON ANTI-CORRUPTION KNOWLEDGE

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Abstract

This study aims to examine the effect of learning strategies and self regulation on anti-corruption knowledge in early childhood at TB QiTa and UMP TK, Banyumas Regency, Central Java. The research was conducted from July to September 2018, using a 2x2 factorial design experimental method with two-way ANAVA as the data analysis. The total sample in this study was 44 children. The collected data were in the form of anticorruption knowledge scores and anticorruption control. Then, they were analysed and interpreted. This study resulted (1) teaching anticorruption knowledge using high self regulation learning with role playing learning strategies was higher than storytelling strategies; (2) the knowledge of anti corruption of children with low self regulation taught by role playing strategies was higher than by the storytelling strategies. It can be concluded that role playing strategies is more suitable than story telling strategies to increase anticorruption knowledge for children with high self regulation.

Keywords: early childhood, anti-corruption, self regulation, story telling, role playing. 
Analysis Students’ Science Process Skills in Senior High School Practicum Based on Small Scale Chemistry (SSC)

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Experiment is integral part of chemistry. Through experiments, everyone can verify and or find something new as an alternative solution to attract interest in meaningful chemistry learning. Innovative experimental packaging can be done with Small Scale Chemistry (SSC) to establish the importance of understanding and application related to the use of small amounts of reagents and reduce waste produced during chemistry practicum. This study aims to explore and analyze the science process skills of the second semester students of Chemistry Education Study Program, Sanata Dharma University, which focused for chemistry grade 12 in water electrolysis using straws and mini test tubes as physical chemistry’s experiment and formation reaction of silver mirror uses vial bottle and mirror media as experiment of organic chemistry. The results show that students’ science process skills which includes observation skills with good average score, prediction skills with good enough average score, skills in interpreting data with good average scores, and communication skills with good average score for two kind of experiments conducted. In general, students were enthusiastic in carrying out the two SSC experiments. The students also evaluate the experiments to be able to help develop and improve their soft skills in chemistry learning.

Keywords: science process skills, senior high school practicum, small scale chemistry
The Relationship between Learners Perception on Competencies of Science Teacher with Motivation and Learning Outcomes of Students in Junior High School in Tual City

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Abstract

Teacher competence plays an important role in improving the learning outcomes of students. Learners who have a good perception on the competence of teachers and a positive attitude towards learning, then in it will arise the desire or motivation for achievement. Growth of achievement motivation in subjects which is learned will enhance the learning outcomes of students. This study aims to determine (1) Perceptions of students about the competence of a science teacher at Junior High School in Tual City, (2) learners’ motivation on science of students in Junior High School Tual City, (3) Learning outcomes result on science Junior High School in Tual City, (4) The relationship between perceptions of students about the science teacher competence and motivation of learners Junior High School in the city of Tual, (5) The relationship between the perception of the students about the competence of science teachers with the study of students Junior High School in Tual City, (6) The relationship between learning motivation and learning outcomes on science of students of Junior High School in Tual City. The results showed that (1) Perceptions of students about the competence of science teachers in middle category. (2) The motivation of learners included in the high category. (3) The results of learners to learn science, including in the poor category. (4) There is a significant relationship between the perception of the students about the science teacher competence and motivation of learners. (5) There is no significant relationship between the perception of the students about the competence of science teachers with learning outcomes of students. (6) There is no significant relationship between learning motivation and learning outcomes of students. Perception of students on teacher competence and motivation to learn are not the only factors that affect learning outcomes, but there are several factors that influence the learning outcomes of students.

Keywords: Perceptions of Learners, Teachers Competency, Motivation, Learning Outcomes.
New media has an impact on society. Instagram is widely used today by the public. Information on maintaining the environment is continuously disseminated by the Indonesian government to social media. The question of this research is how new media literacy for the intelligence of society on Instagram regarding information on protecting the environment. The concepts used in this study are environmental communication, development communication, new media. The method used is quantitative research with analysis factors. Instagram as the object of research studies. Respondents of this study are commentators on Instagram's government in protecting the environment from October to December 2018. The results of this study are that of the five new dimensions of media literacy factors, the most dominant factor is that respondents develop pleasure and respect for media content, amounting to \( r = .69 \), with a significance of .000. Factor awareness of the influence of the media on individuals and social (\( r = .51 \), significance = .000), understanding of the mass communication process (\( r = .53 \), significance = .000), development of strategies for analyzing and discussing media messages (\( r = .52 \), significance = .000), and the awareness that the contents of the media are texts that describe the culture and ourselves at this time; this all has a value (\( r = .50 \), significance .000). Need to be given fear appear in giving messages on Instagram. The suggestion of this research is that the community must be able to be given information on messages that can be immediately digested. Research impact is people must keeping how significant of content new media.

Keywords: fear attracted, keeping environment, media literacy
Think Pair Share to Improve Students Motivation to Learn in Mathematics

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Abstract

The 21\textsuperscript{st} century today requires not only students who have competences in mathematical fields, but also life skills. One of the life skills that must be mastered by students is motivation to learn. Motivation learning is an important personal skill so students are enjoy learning mathematics. Therefore, we need a learning method that is able to improve the students’ motivation to learn, namely the cooperative learning method Think Pair Share (TPS) type. This research aims to improve motivation learn with cooperative learning methods Think Pair Share type. The research design used was classroom action research. The research subjects were 28 VII grade students of MTs Hs Wadaslintang, Junior High School. This research was conducted in two cycles. The first cycle was obtained results of the self-regulated of students learning in the medium category with an average of 102,86 and learning outcomes obtained 43,8% of students who complete. The second cycle obtained the results of the self-regulated of students learning already in the high category with an average of 115,21 and learning outcomes obtained 80% of students who complete. Thus it can be concluded that the Think Pair Share type of cooperative learning method can improve student motivation to learn and learning outcomes.

Keywords:
Cooperative Learning, Think Pair Share, Motivation in learn.
Enhancing Abstract Reasoning in Science Learning through Interactive Multimedia Based on Augmented Reality in Elementary Schools

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ABSTRACT

The ability to reason rationally of elementary school students is terminated on concrete situations so as enhancing abstract reasoning becomes a prompt for students be more critical in solving science problems. The objective of the study was to enhance abstract reasoning in science learning using interactive multimedia based on augmented reality (AR) in the fifth grade students. This study used a Classroom Action Research design of Kemmis and McTaggart's Model. The study was conducted in two cycles for each cycle consisting of the stages of Plan, Act & Observe, and Reflect. Data collection techniques used tests, observations, and interviews involving 28 students. The credibility of the research data used technical triangulation and source triangulation. The collected data was analyzed using interactive models of Miles and Huberman. The results of the study showed that interactive multimedia based on augmented reality facilitates students to reason by exploring more realistic visual object about science material so that it eases student understanding science concept, associating inter-concepts and implementing on information analysis and science problem solving. Students' abstract reasoning in science learning enhanced by 24.20% (in the first cycle) and 23.08% (in the second cycle), so that the mean percentage of students' abstract reasoning enhancement after the action was 47.28%. The results of this study conclude that the use of interactive multimedia based on augmented reality enhances abstract reasoning in science learning in the fifth grade elementary school students.

Keywords: abstract reasoning, augmented reality, elementary school, interactive multimedia, science learning
DEVELOPING ELEMENTARY STUDENT'S ECOLITERACY AND ECOPRENEURSHIP THROUGH PROJECT-BASED THEMATIC LEARNING

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Abstract. The purpose of this study was to develop ecoliteration and ecopreneurship of elementary school students. An integrative thematic learning process through the application of this project-based learning model invites students to develop their entrepreneurial spirit while preserving the environment. This research supports students to be literate to the environment. Students are able to utilize the environment well through ecopreneurship activity with the projects to make products from used goods to become new items that have high selling value. The items made by students are "damarkurung" which are the output of a science experiment. Research conducted with a qualitative approach, the data were collected through validation sheets, observation sheets, and assessment of students’ecopreneurship products. The thematic learning was implemented through 6 steps according to the syntactic of project-based learning, namely determining basic questions, designing project planning, arranging schedules, monitoring project progress, testing learning processes and results and evaluating experiences. The results of this study indicate that the application of project-based learning in elementary schools can support ecopreneurship education and environmental literacy in elementary schools.

Keyword: ecopreneurship, ecoliteracy, project-based thematic learning
Exploring The Correlation Between Metacognitive Skills and Student Learning Outcomes On Ion Bond and Covalent Bond Materials

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Abstract. The purpose of this study was to determine correlation between the student metacognitive skills and learning outcomes. The sample of the study comprised of 180 grade 10 students in a high school in Indonesia. There are three indicators that focused in this study: conditional, planning and evaluation. Metacognitive Awareness Inventory (MAI) quissionaire was used to measure the level of student metacognitive skills developed by Schraw and Dennison (1994). The student learning outcomes were measured using the learning outcomes test instrument. The data were analyzed using R-program applications. Result of research indicated that there were very low correlation between metacognitive skills and student learning outcomes, \( r = 0.0759 \) (conditional), \( r = 0.0144 \) (planning), and \( r = 0.1165 \) (evaluation). It showed that the correlation between metacognitive skills and student learning outcomes significantly.

Keywords: metacognitive skills, learning outcomes, metacognitive knowledge, metacognitive regulation
Implementation of the Integrated Science Curriculum:

A Critical Review of the Literature

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ABSTRACT

Integrated Science Curriculum has been implemented in various countries. The purpose of this study is to review 23 empirical research articles regarding integrated science published in 1996 to 2018. This research is a descriptive study. The results of this study show that the implementation of integrated science is still not as expected and is still experiencing several problems. One of the problems is the quality of teachers that is yet to be eligible to teach integrated science. Learning science by using an integrated science approach has a positive impact on students, pre-service science teachers, science teachers, and other stakeholders. The advantage of implementing integrated science is that students can understand the connection of concepts in respective scientific disciplines. However, integrated science is difficult to apply in the classroom because teaching integrated science requires more skills if compared to teaching only one scientific discipline (Chemistry, Physics, or Biology). The results of this study can be reference material for future researchers or stakeholders in relation to integrated science.

Keywords: Integrated Science, Integrated Science Curriculum, Implementation, Literature.
Development of Physical Learning Teaching Materials Based on Science Technology Engineering and Mathematics to Develop 21st Century Learning Skills

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Abstract. This study aims to describe the characteristics of Physics Learning Teaching Material Based on Science Technology Engineering and Mathematics (STEM) to develop 21st Century Learning Skills, and testing readability and feasibility. The method of this study is research and development. The procedure of this study is divided into four stages, namely preliminary studies, planning, development and testing. The trial design uses One Group Pretest-Posttest Design. The subjects of the small and large group trials were students of the fifth semester Physics Education Study Program Universitas Negeri Semarang. The characteristics of teaching materials, containing material about the background of the importance of STEM and 21st century learning skills, STEM material and 21st Century Learning Skills, Physics Learning Teaching based STEM and examples. The results of the feasibility test using a questionnaire show that the teaching material is in the category of feasible. Readability test results using a cloze test and Raygor graphic show that the teaching material included in the easy to understand category.
EFFECTIVENESS OF STR (SCIENCE, TECHNOLOGY, AND RELIGION) TEACHING MATERIAL ON LEARNING OUTCOMES AND INTEGRATIVE KNOWLEDGE OF STUDENTS.

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This study aims to analyze the effectiveness of STR (Science, Technology and Religion) Teaching Material on learning outcomes and integrative knowledge of Science and Religion. The research method used is research & development methods. The Limited trial was carried out in biology education courses that take fundamental physics courses. The effectiveness of teaching material was analyzed using n-Gain. The results show that Teaching Material STR can improve student’s learning outcomes and integrative knowledge in the laws of motion material with an average n-gain of 3.33 with a moderate category while on the average knowledge of science and religion with an average n-gain 2.55 with a low category. The low level of integrative knowledge of science and religion is caused by the low literacy of student interpretations.

Keywords: Science, Technology, Religion, Teaching Material, integrative knowledge, Student’s learning outcomes.
Eco-literacy-Textbook: Instructional Need to Improve Students’ Environmental Awareness in a Primary Nature School

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Abstract. This study is aimed to identify the eco-literacy textbook as an instructional need to improve students’ environmental awareness so that it can be taken into consideration in the preparation of textbooks. One of the schools that need to improve students’ environmental awareness through textbook is a Primary Nature School in West Java, Indonesia. Qualitative descriptive method was used in this study. The data collection used observation, interview, and questionnaire. Participants were 15 students in fifth grade and 2 teachers. The result showed that instructional needs of the eco-literacy textbook are the textbook that has images used simple the language, it has material integrated with everyday life and the natural environment. It is equipped with an activity-based outdoor learning worksheet. The sustainable development will be achieved if the instructional needs through this eco-literacy textbook are fulfilled.
Analysis of Students’ Difficulties about Work and Energy

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Abstract. Identification of students’ difficulties is an important part of designing a quality learning. This research used survey method that aims to identify the difficulties experienced by students in understanding the concept of work and energy. The research subjects consisted of 142 undergraduate students in physics education (46 first-year students, 39 second-year students, and 57 third-year students). Data collection was carried out from 2018-2019. There are 10 multiple choices questions that are used to uncover the difficulties experienced by students. Based on the results obtained it can be concluded that many students still have difficulty in understanding the concepts of work and energy. The percentage of students who answered correctly are 20.42% in concept of work as a result of dot product multiplication; 11.26% in the work-energy theorem; 38.03% in the concept of spring potential energy, and 22.54% in the conservation law of mechanical energy.
Student’s critical thinking skills in interactive demonstration learning with web based formative assessment

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Abstract: Besides conceptual understanding, students are required to have good critical thinking skills because critical thinking skills is one of the important goals in educational world. By having good critical thinking skills, students can solve problems especially in Physics easily. The aim of this research was to study student’s critical thinking skills after experienced interactive demonstration learning with web based formative assessment in static fluid. This research used quasi-experimental with one group pre-test post-test design. The subject of this research was students in grade XI of Natural Science class in MAN 1 Pamekasan. The result of this research showed that interactive demonstration learning with web formative assessment could increase student’s critical thinking skills in static fluid. Based on n-Gain score, the improvement of student’s critical thinking skills in static fluid included in the medium category. This happens on all three indicators of critical thinking skills that have been used, namely reasoning, argument analysis and problem solving.

Keyword: Critical Thinking, Interactive Demonstration, Web Based Formative
Appreciation as a Form of Modeling to Practice the Skill of Arranging Learning Design

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This study aims to determine the correlation between the activity of appreciating the learning process that is followed by prospective teachers with the skills to develop Lesson Plan or Rencana Pengelolaan Pembelajaran (RPP). Research follows the method of one shoot case study, in three classes of biology education for the topic of plant anatomy through problem solving. Activities of appreciation are measured through indicators of the emergence of plant anatomy ideas, evaluating the implementation of the process, identifying the stages of the problem solving process, and identifying the advantages of the stages of the problem solving process. RPP is assessed based on RPP criteria that implement problem solving learning. Correlation test through the SPSS program shows that there is a significant correlation. The correlation coefficient obtained is positive, that is 0.563 for the P. Biology Superior class, 0.729 for the P. Biology B class, and 0.903 for P. Biology A.

Keywords:
Appreciation, Modeling, Learning Design
In the context of 21st century learning, lecturers encounter complex challenges in optimizing developing learning process which facilitate students’ critical thinking skills. Students are prepared to have 21st century skills and knowledge. The previous research reports that teaching method is considered as the right solution to overcome that problem. This quasi-experimental research aims to determine the effect of guided discovery learning (GDL) on 11th students’ critical thinking skills (CTS) of salt hydrolysis topic compare with traditional lecture. Both groups were chosen by cluster random sampling. Pre-test and post-test control group designs were applied to both groups contains 80 students 11th grade. The CTS two-tier was adapted from Ennis (2011) and face validity was conducted by the experts then obtained reliability coefficient of 0.96 respectively. The guided activity set was developed by researcher in line with GDL which has seven steps. The data was analyzed by using Mann-Whitney U-test at the significance level of 0.05. The findings revealed that there is significant difference CTS among experimental and control groups in favour of experimental group students. We recommend that lecturers need to improve students’ critical thinking skills by using Guided Discovery Learning.

**Keywords:**

Critical Thinking, Guided Discovery Learning, Salt Hydrolysis
Batik wastewater is one of the environmental problems which has become a big water pollution problem recently. It contains a large variety of dyes, chemicals and has high chemical oxygen demand (COD). Dyes are difficult to degrade and has recalcitrant and toxic characteristics. Dyes can be degraded by ligninolytic enzymes, include laccases (Lac), managanese peroxidise (MnP), dan lignin peroxidises (LnP). The degradation of the dye wastewater by the ligninolytic enzyme will be more efficient if first immobilization of the ligninolytic enzyme is used. Pleurotus ostreatus, the most abundant ligninolitic enzyme source, is the a candidate to regenerate fungal bimomass as the bioremediation agent. Immobilization of ligninolytic enzyme using alginate was observed in this study for its efficiency to decolorize and decrease COD values of RBBR dye and Naphtol batik wastewater on different time periode (0, 2, 4, 6, 24, 48, 72 h) and growth condition (static and agitated). The results showed that the Lac, MnP, LnP activities of P. ostreatus are 200.43, 9.714, 12938.60 U/l, respectively. Static conditions within 48 hours exhibited a highest percentage of decolorization of dye. Ligninolitic immobilized of its condition has decolorized RBBR dye up to 75.88%, while the percentage decolorization of agitated culture was 68.09%. These Ligninolitic immobilized has decolorized about 94.867% of batik wastewater within 24 hours under static condition. It was also able to to decrease the COD level of the batik wastewater containing Naphtol dye (504 to 233 mg/l) within 24 hours under shaking condition. Immobilization of enzyme has been an promising alternative on decolorization of dye and batik wastewater.

Keyword : COD, decolorization, immobilization, ligninolytic, Pleurotus ostreatus.
The Schoology-assisted discovery learning: improvement on critical thinking capabilities and mastery of concepts in senior high school

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Abstract. The aim of this study is to examine and explain the effect of Schoology-assisted discovery learning on critical thinking capabilities and mastery of concepts in a static fluid topic. The research design was used descriptive and quasi-experimental with the subject of class XI SMAN 1 Singosari. The research data was obtained using essay test instruments. The multivariate test shows that there was a difference between Schoology-assisted discovery learning and discovery learning. Based on the R squared value are indicates that the learning model has a low effect. The Mastery of concepts on B value of parameter estimates tables' is greater than critical thinking capabilities. The B value indicates that mastery of concepts contributed more to differences between both groups. The average of critical thinking capabilities and mastery of concepts, students using Schoology-assisted discovery learning are greater than discovery learning models'. The result of this study, Schoology-assisted discovery learning can improve critical thinking capabilities and mastery of concepts of a static fluid topic.
PROMOTING STUDENTS’ 4CS (CRITICAL THINKING, COMMUNICATION, COLLABORATION, AND CREATIVITY) SKILLS ON ANIMAL PHYSIOLOGY THROUGH PROJECT BASED LEARNING AND ENVIRONMENTAL APPROACHES

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Animal Physiology with Project Based Learning (Pj-BL) and Environmental Approaches (JAS) needs to be analyzed by 4Cs student thinking skills (critical thinking, communication, collaborative and creativity). The purpose of the study was to determine the ability of student 4Cs student thinking skills in Learning of Animal Physiology with PJ-BL and Environmental Approaches. This research is a descriptive qualitative study. The research subjects of Animal Physiology participants were 63 odd semester students and will be continued with 96 even semester Biology students at FMIPA UNNES 2018/2019 academic year. The data collected includes information about the implementation of learning, learning activities, and recognition of participants related to the 4Cs involved during learning. Data was collected by observation, interviews, and questionnaires. The research instrument consisted of observation sheets, interview guides, and questionnaires. Qualitative data analysis with triangulation and descriptive qualitative techniques. The hypothesis: Learning of Animal Physiology with Pj-BL and Environmental Approaches can develop the ability of 4Cs student thinking skills. Conclusion: the ability of 4Cs student thinking skills students develop well. The ability promotion of 4Cs student thinking skills take place in the material briefing stage, developing project proposals, conducting research, written-project result reporting, material enrichment, and presentation of project results.

Key word: animal physiology learning, 4-Cs student thinking skills, project based learning and environmental approaches
ANALYSIS OF STUDENTS' COMPUTATIONAL THINKING INITIAL SKILLS ON ELECTROLYTE AND NON-ELECTROLYTE SOLUTIONS

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ABSTRACT

The world is undergoing rapid changes, it can be seen from Information and Communication Technology (ICT) which has dominated in helping human activities in the 21st century. With the domination of ICTs, supporting skills are needed to solve a problem. One of the most important and potential skills is Computational Thinking (CT) skills. CT is a skill in solving a problem by using the principle of a computer scientist in designing a program. This study aims to measure students' initial CT skills. The method used was descriptive qualitative, with participants as many as 330 students of grade XI and XII in 5 high schools in Surakarta. The initial CT skills were measured using instruments in the form of interviews and essay questions of electrolyte and non-electrolyte solutions as many as 5 questions with indicators from each stage of CT skills, which included decomposition, pattern recognition, abstraction, and algorithm design. From this study, the results show that CT students' initial skills are still low and during the learning, students have not involved these skills to solve chemical problems. The results of this initial CT measurement skills analysis can help teachers to design learning strategies in practicing CT skills.

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Keywords: computational thinking, electrolyte and non-electrolyte solutions, initial skills
LANSLIDE RISK MANAGEMENT IN THE CITY OF SEMARANG IS STILL DOWNCAST: QUESTIONING THE ROLE OF EDUCATION

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Abstract. The objective of this research were (1) analyzing risk landslides disaster management in Semarang City, (2) analyzing how the role of education in the risk landslides disaster management in Semarang City. Population of this research are community who living in the Semarang City. The variables researched included 2 variables: (1) landslides disaster risk management variables; (2) The variable role of education in landslide disaster risk management in Semarang City. Research sample determined by purposive, it’s choosing people who live in areas that have experienced an avalanche or landslide potential in the region of 200 people. Data analysis was done by scoring. The results of the research show that (1) landslide disaster risk management that occurs in the research area has three variations, that low risk management level, medium risk, and high risk management level; (2) The role of education in landslide disaster risk management in Semarang City included in the medium criteria. The results of the interview explained that although the level of education was quite high, and the role of education in the medium criteria, but the level of public awareness of the disaster was still low.

Key word: Disaster risk management and the role of education
This study aims to develop eco-pesantren-based critical land disaster mitigation management models. This study uses the theory of community-based disaster risk management. The method used is a qualitative research method by collecting data through field observations, interviews, documentation, and literature. This study concludes, first, the eco-pesantren-based critical land disaster mitigation management model, the fundamental environmental problems faced by Hidayatullah Islamic boarding school are as follows, namely: Threats of land damage, Forest damage, Threat of death of water sources. Second, management of critical land disaster mitigation carried out by the Hidayatullah pesantren, namely; the involvement of the pesantren academic community actively in solving environmental problems in the surrounding community of pesantren such as reforestation, by changing settlements in the form of wilderness and swamps to make the pesantren and surrounding areas green, creating artificial lakes, plantation land and agriculture where the santri cultivate, as well as cattle farms which are all managed by santri, the success of the Hidayatullah Islamic Boarding School in Balikpapan contributes clean water to the communities around the pesantren location. The Hidayatullah Islamic Boarding School moves its santri to organize the environment in the Gunung Tembak area. The development of Islamic boarding schools in agriculture is also an example for other pesantren. Where in the Hidayatullah Islamic Boarding School an agribusiness center was developed. On 40 hectares of critical land planted with sweet orange, lemon, zalacca, and melinjo. While the rest of the total land is 120 hectares in addition to educational land and settlements, gold teak plantations are developed. The ability of students in the field of agriculture is not only explored from self-taught abilities but also supported by training and courses.

Keywords: management, eco-pesantren, mitigation.
Implementation of the sts (science technology society) learning model in pesantren-based environmental education

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Abstract. This research aims to determine the implementation of pesantren-based environmental education that uses the Science Technology Society (STS) learning model. The case study of this research is Pesantren Sumber Pendidikan Mental Agama Allah (SPMAA). This study uses a theory that refers to the initial theory of the STS approach in science education by John Ziman and also the ecopesantren theory especially on the ecopesantren indicator of the development of a pesantren-based curriculum. The method of this study is a qualitative research method. Data sources used are primary data derived from observation and interviews. Secondary data comes from the study of literature, journals, books and others. This research concludes, First Pesantren SPMAA uses this learning model and participates in solving problems in the community around the pesantren such as doing alternative energy processing such as processing plastic into gasoline, making organic fertilizers and others. Second, the implementation of this learning model influences students' attitudes and views on environmental problems.
The Correlation of Learning Interest and Creativity in Scientific Article Writing of Indonesian Pre-service Biology Teachers’ on Biotechnology Concept

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Abstract. Learning interest need more attention in learning development and it is very important in the learning process. Pre-service biology teachers will be good learners if they have a good interest in learning. Writing scientific articles needs to be explored continuously because students as academics. As we know that Indonesian students have low literacy, science and technology. This study aimed to investigate the relationship between learning interest and creativity in writing scientific articles for Indonesian pre-service biology teachers on the concept of biotechnology. Survey was employed for the study by investigating 30 Indonesian Pre-service Biology Teachers. The data collection technique used consisted of a questionnaire and a creativity instrument. Spearman's rank correlation was used in data analysis. The findings showed that \( \alpha = 1.08 > 0.05 \), it was concluded that there was no statistically significant correlation between learning interest and creativity in writing scientific articles for Indonesian pre-service biology teachers on the concept of biotechnology.
Implementation of Principles of Green Chemistry in teaching chemistry can be used as an essential approach to raising students' awareness of environmental problems. In contrast with the goal of sustainability, chemistry practicum is normally dealt with chemicals and waste management which contribute to environmental problems. A shift toward more sustainable and economical experiments is essential to maintain the existence of the practicum in senior high school curricula. Small Scale Chemistry (SSC) is one of the solutions to promote sustainability in chemistry practicum by using smaller scale and safer apparatus. It is expected to produce less waste, safer and more economical chemistry experiments. The aim of this research is to study the integration of principles of green chemistry into senior high school chemistry practicum through SSC experiments. This study investigates two main topics in senior high school chemistry subject: electrochemistry and acid-base indicator. This study has shown that it is feasible to integrate the principles of green chemistry into senior high school chemistry practicum through SSC experiments. The experiments demonstrated in this study enable us to integrate Principles of Green Chemistry in terms of prevention waste, using less hazardous chemicals and conducting safer experiments which can be implemented in senior high school chemistry practicum.

Keywords: small scale chemistry (SSC), high school chemistry practicum, green chemistry
Textbook Development on Character-Based Active Learning Strategy Using Tournament Type for Elementary Students

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ABSTRACT

It was indicated from the results of a preliminary study in Elementary School that textbooks used have not been compiled in the form of themes that are in accordance with the subject matter. The textbooks have also not referred to one of the learning models. They have not involved students' active learning and have not been able to develop students' character. This research aimed to develop a textbook using active learning strategy of the learning tournament type with character building for elementary school students. The research used 4D model of Thiagarajan with the steps; define, design, develop, and disseminate. The data were collected using observation sheets, interview guides, questionnaires, character assessment sheet, and test. The data were analyzed using descriptive statistics. The result of the validity test showed that the textbook developed was valid. The result of the practicality test also showed that the textbook was practical to be used in learning. The result of effectiveness test showed that the textbook was effectively helped to improve students' competence in the knowledge and character domain. The effectiveness of the textbook was based on the results of the effect size of the competency of students' knowledge which was included in a large category and most of the students' characters were in a good category.

Keywords: Active learning, tournament, character
Implementation of Guided Inquiry Learning Model on The Topic of Invertebrate to Enhance Student Curiosity at Grade X MIA

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Abstract

The research aimed to enhance student’s curiosity at grade X MIA by implementation of guided inquiry learning model on the topic of invertebrate. This research was a Classroom Action Research based on the model developed by Lewin (1992). This research was performed within 3 cycles with implementation of guided inquiry learning model based on Kuhlthau (2010). The subject is grade X MIA consist of 17 men students and 22 women students.

Data were obtained by questionnaire, interviews, documentation, and observation sheets of four aspects of curiosity developed by Daniel Berlyne (1960) consisted of epistemic curiosity, perceptual curiosity, specific curiosity, diversive curiosity. The data were validated by triangulation method. The data were analyzed by qualitative descriptive technique. The result showed that the student’s curiosity in precycle: epistemic curiosity at 21% with very low category, perceptual curiosity at 8% with very low category, specific curiosity at 12% with very low category, diversive curiosity at 23% with very low category. The student’s curiosity in cycle I: epistemic curiosity at 22% with very low category, perceptual curiosity at 21% with very low category, specific curiosity at 28% with very low category, diversive curiosity at 28% with very low category. The student’s curiosity in cycle II: epistemic curiosity at 32% with low category, perceptual curiosity at 24% with very low category, specific curiosity at 35% with low category, diversive curiosity at 39% with low category. The student’s curiosity in cycle III: epistemic curiosity at 46% with medium category, perceptual curiosity at 42% with low category, specific curiosity at 42% with low category, diversive curiosity at 44% with medium category. The student’s curiosity increased from very low category (16%) in precycle becomes low category (43,5%) in cycle III and meet the target research.

Keywords: guided inquiry learning, curiosity, classroom action research, invertebrate
Examining the Relationship between Student’s Motivation and Critical Thinking Skills in learning Torque and Static Equilibrium.

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Absract. This study designed to determine the motivation components that most motivated students in learning torque and static equilibrium and the relationship of the motivation with student’s critical thinking skills on Torque and Static Equilibrium subject. The research was conduct in Senior High Scholl Laboratory State University of Malang. This study used correlational research design and using the Physics Motivation Questionnaire II (PMQ II) and Torque and Static Equilibrium Critical Thinking test as Instrument. The analysis showed that students have a weak motivation level in learning torque and statistic equilibrium. Grade motivation found to be the most motivating for students. The least motivated for students is Career Motivation. Researcher found that there were a significant correlation between intrinsic motivation, self-efficacy, grade motivation with student’s critical thinking skills, but there were no significant relationship between self-determination and career motivation with student’s critical thinking skills. However, the overall motivation has a significant correlation with student’s critical thinking skills.

Keywords: motivation, critical thinking skills, senior high school.
Kauniyah Verse Based Science Learning: Reconstruction of the 21st Century Science Learning Program

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Abstract. This study aims to determine the effectiveness of the Kauniyah Verse Based Science Learning (KVBSL) program in optimizing student scientific communication skills. The KVBSL program is the result of the reconstruction of science learning in accordance with 21st century learning and it integrates the Islamic values stated in the Al-Qur’an. It employed developmental research. The population of this research was 436 students at three colleges and it assigned 112 students by using cluster random sampling. The data was obtained through observation and test. It, then analysed by using t-test formula. The results showed that the KVBSL program significantly improved students' scientific communication skill. It was characterized by: 1) the scientific communication skills is increased significantly (α=0,05); 2) there is consistent improvement of scientific communication skills in each college; 3) among the aspects of scientific communication skills, the highest average score is on the ability of representation and scientific writing.
Ecopesantren-based hidden curriculum model in metropolis buffer areas (case study: pondok pesantren hidayatullah depok)

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Abstract. This study aims to determine the eco pesantren-based hidden curriculum model in the metropolis buffer area with the Pesantren Hidayatullah in Depok as a case study. This research uses the theory of hidden curriculum by Murray Print and the eco pesantren theory especially in the aspect of policy development in an environment-based curriculum and the aspect of development policy of environment-based extra-curricular activity. The method used is qualitative research method with data collection through field observation, documentation, literature study, and interview. This study concludes that firstly, Pesantren Hidayatullah Depok has used this model and it turns out to influence increasing values, persuasion and behavior that can shape the character of ecologically pious santri. Secondly, this eco pesantren-based hidden curriculum model focuses on the activities, policies, rules, and interactions of santri and all pesantren residents. Third, the application of this eco pesantren-based hidden curriculum model is able to solve environmental problems of Pesantren located in metropolis buffer areas such as air pollution, toxic gas pollution, and factory waste and is able to increase the awareness of pesantren residents and surrounding communities on the importance of environmental conservation. The Hidden Curriculum component includes the First, Competencies, namely the ecological character of the santri. Second, policies, namely regulations that encourage santri to care for the environment. Third, the material, namely disaster mitigation in the buffer areas of the city.
Recitation Program to Improve Students’ Conceptual Understanding on Thermodynamics

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The purpose of this research is to analyze students’ improvement in thermodynamics concepts after using three sets of developed recitation program. Recitation program consists of the equation of ideal gas, The First Law of Thermodynamic and The Second Law of Thermodynamic. The subjects consisted of 21 undergraduate students who enrolling fundamental physics course. The results showed that the recitation program improved the mastery of the thermodynamic concepts with $t(20) = 9.4$, $p = 0.000$, $d = 2.51$ and $N$-gain $0.365$. This program made students effectively constructing $P$-$V$ diagrams and understanding the relationship of the average kinetic energy of each particle with temperature. However, this recitation program needs to be improved in the concept of determining work total and heat total in cyclic processes.

Keywords: conceptual understanding, program recitation, thermodynamics
Implementation of the Outdoor Learning Model in Developing Elementary Students' Creative Thinking Capabilities

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**Abstract.** The arms of this study is to describe outdoor learning model in developing the creative thinking skills of elementary school students. The ability to think creatively is very important in supporting the success of the learning process for elementary school students. The application of innovative learning models strongly supports the development of the ability to think creatively. The fact that there are still many teachers who do not understand how to develop creative thinking skills makes this very important. Outdoor learning invites students to interact directly with learning objects so that the learning process becomes clearer, more real, and enjoyable. Creative thinking requires a learning space that provides opportunities for students to act freely outside the classroom by producing great work and producing new findings in the original field. Outdoor learning stimulates students' creative thinking skills in learning. This study uses a qualitative descriptive research method. The subjects of this study were 28 students in grade 4 of elementary school, consisting of 16 male students and 12 female students. This study uses observation, interviews, and documentation to collect data, and interactive analysis methods to analyze data. The results of this study are that the application of the outdoor learning model can improve students’ creative thinking skills in learning.
THE CRITICAL THINKING SKILL PROFILE OF
CLASS X SMA N 2 KUDUS

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Abstract. This study aims to describe the critical thinking skills of class X students of SMAN 2 Kudus on physics subjects. The design of this study uses quantitative descriptive methods. The research was conducted at SMAN 2 Kudus with a sample of class X research taken by cluster random sampling. The instrument used was a test of critical thinking skills. Data analysis was carried out in a quantitative percentage. The results showed that critical thinking skills of class X students of SMAN 2 Kudus were in the low ability category with an average percentage of 13.75%.
Measuring Critical Thinking In Physics: Identification Of The Student Critical Thinking Skill Through The Work Report On Momentum Conservation?

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Abstract. This study aims to identify students' critical thinking skills based on their ability to produce work reports. The method used is quantitative data in the form of critical thinking skills through assessment of student work reports and questionnaire data. Rubric Hoyo is used to measure students' critical thinking skills with 10 indicators: clarity, accuracy, precision, consistency, relevance, strength, reason, depth, breadth and fairness.

The study sample was 34 students. The results showed that students' critical thinking skills through work reports were still 17.6% of students already had very high critical thinking skills, 58.82% had moderate critical thinking skills and as many as 23.53% students have weak critical thinking skills. Students have a high category in the breadth. Then clarity, accuracy, precision, consistency, and evidence have a moderate. And evidence has a weak. The results of the student and teacher questionnaires about the application of practicum also stated that before practicum students were still sometimes given time to conduct preliminary studies.
STUDY OF USING VILLAGE FUNDS FOR ENVIRONMENTAL CONSERVATION ACCORDING TO THE MINISTRY OF NUMBER 16 OF 2018

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Abstract. The central government provides the freedom to use the budget autonomously to the village government through the village funding policy. The use of village funds specifically refers to the Regulation of the Minister of Village, Development of Disadvantaged Regions, and Transmigration of the Republic of Indonesia number 16 in 2018. The environmental sector is one of the important parts written in Permendesa number 16 of 2018. Policy on the utilization of village budget expenditure in the environmental field life aims to improve the quality of life of the community which is directly related to the environment of residence. Improving the quality of life of the community can be achieved through environmental conservation activities to improve the quality of decent housing. Analysis of village material number 16 of 2018 has several parts that have become a concentration in the successful use of the budget for environmental conservation. The specific part of the utilization of village funds for environmental conservation is stated in article 5 paragraph 2 point d number 3 concerning the procurement, construction, development, and maintenance of environmental facilities to fulfill environmental conservation needs. Referring to Permendesa article 12, the concept of environmental conservation has a distinctive difference between villages based on the characteristics of the geographical conditions of the environment, so that appropriate interpretation analysis is needed so that the use of village funds for environmental conservation can run well and achieve maximum results.
VALIDITY AND RELIABILITY CBSL MODEL TO IMPROVE CRITICAL THINKING SKILLS AND STUDENTS RESPONSIBILITY

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Abstract

The Collaborative Based Science Learning (CBSL) model was a collaborative science-based learning that is used in science learning to improve the critical thinking skill and responsibility of junior high school students. The syntax of CBSL model includes: 1) Motivation and problem orientation, 2) Collaborative-based critical thinking activity, 3) Communicating the results of collaborative critical thinking activity, 4) Advance practice of critical thinking and responsibility, and 5) Reflection. The purpose of this study was to analyze the validity and reliability of CBSL model that had been developed to improve the critical thinking skill and responsibility of junior high school students. The validity and reliability data of CBSL model was obtained through Focus Group Discussion (FGD) activities. The single measures inter rater coefficient correlation (ICC) and Cronbach's coefficient alpha was used to analyze the validity and reliability of the CBSL model. The results showed that CBSL model has fulfilled the validity requirements ($r_\alpha = 0.860$) and reliability ($\alpha = 0.980$), so the CBSL model qualified the validity and reliability. The implication of this research is that the valid and reliable CBSL models can be used to improve students’ critical thinking skill and student responsibility theoretically.

Keywords: CBSL model, validity, reliability, critical thinking skills, responsibility.
The Influence of Mobile Learning with NOS Oriented to Students Learning Outcomes

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Abstract
The aim of this research was to evaluate the influence of Mobile Learning with NOS Oriented to Students Learning Outcomes that consist of science process skill, scientific attitude, and conceptual understanding of elementary chemistry student. In form quasy experimental, this was carried out by posttest only control group design. There were 142 students as subject separated on to 3 groups. Eksperiment 1 group was treated by Mobile Learning with NOS Oriented, eksperimen 2 group by Learning with NOS Oriented, and control group without NOS Oriented. Data collected by process science skill observation sheet and portofolio, scientific attitude observation sheet, and conceptual understanding test. Data was analyzed by inferensial statistic method through SPSS 15 for windows. Research result showed that: Use of Mobile Learning with NOS Oriented with Android Based Learning Application Media influences science process skills. This is evidenced by the significant value of the t test results which is 0.00 smaller than the value (α = 0.05). There is the influence of the application of Mobile Learning with NOS Oriented to the scientific attitude of students in each learning activity. This is evidenced by the significant value of the t test results which is 0.00 smaller than the value (α = 0.05). There is no influence on the application of Mobile Learning with NOS Oriented to student concepts understanding. This is evidenced by the significant value of the t test results which is 0.249 greater than the value (α = 0.05).

Keywords: Mobile Learning with NOS Oriented, science process skill, scientific attitude, and conceptual understanding
The Development of Scientific Literacy through Inquiry Process Using Empirical Evidence of Ethnic Minority Students

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Abstract. The objectives of this research were to: 1) study the outcomes of learning management through the inquiry process using empirical evidence affecting scientific literacy and 2) investigate the attitude toward science when passing through the learning management process by the inquiry process using empirical evidence on work, basic electrical circuits, and electrical circuits in the house of ethnic minority students. They were 9th grade students at Ban Mai Saraphi School, Chiang Mai province in the 2nd semester, academic year of 2018. There were twenty-six students were randomly selected by stratified sampling technique. The research instruments consisted of 3 learning management plans based on inquiry process (5E); this learning management had the procedures for students to become knowledgeable through the inquiry process by using empirical evidence to support the knowledge gained, and (2) scientific literacy test which is evaluated by experts had the consistency index between the question and the purpose of the test at 0.92.0. According to the data analysis by finding the mean, percentage and standard deviation, it showed that the outcomes of scientific literacy as the aspect of knowledge, competency, context and attitude of students after having learnt management through the inquiry process by using empirical evidence was higher than before with the statistical significance.

Keywords: Inquiry process, empirical evidence, scientific literacy, ethnic minority students
ICT Literacy among High School Students Based on E-Learning Effectivity in Surakarta

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Abstract Skills for living in the world are 21st century skills based on information, information, and communicate literacy. ICT literacy supports education successfully due to the fact that ICT literacy on education is lower than general ICT usage. E-learning engages ICT tools to increase transfer of knowledge, then e-learning usage is expected to improve ICT literacy especially on education. The purpose of this study is to determine ICT literacy through the assessment of school e-learning effectiveness. The questionnaire consisted of students' ICT literacy tests based on PISA (2012) and the assessment of e-learning effectiveness according to The European Association of Distance Teaching Universities. The results showed students' ICT literacy of high level school is 34.95%, middle level school is 34.95%, and lower level school is 34.95% while the assessment of school e-learning effectiveness is around 43.07%. We determined the impression of the students' ICT literacy with the assessment of school e-learning effectiveness.
The Effectiveness of Experiential Learning Model by using Mind Map to the Understanding of Concepts on Fungi Materials at the Tenth-Grade Students of Senior High School

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Abstract. This study aimed to find out what experiential learning model by using mind map could increase the understanding of concepts of fungi materials at the tenth-grade students of senior high school. This study was quasi-experiment research that used pre-test and post-test control group design. The population of the research was all of the tenth-grade students at SMAN 1 Kalasan. The technique of getting sample used cluster random sampling technique where X MIPA 4 class became an experiment class, and X MIPA 5 class became a control class. The used instruments in this research contained the observation sheet about the implementation of learning by using experiment learning model and evaluation sheet about the students’ understanding of concepts. The data of the research were analyzed by using t-test (independent sample t-test). The results showed that the significant value (2-tailed) was 0.000 (< 0.05). It concluded that there was a difference of understanding concept between class experiment and control class. It was proved that the learning process through experiential learning model by using mind map could increase the students’ understanding of concepts.

Keywords: Experiential Learning Model, Mind Map, Understanding of Concepts
Analysis critical thinking skill profile on the concept of simple harmonic motion using two tier instrument test

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Abstract. This study aimed to analysis critical thinking skill profile of senior high school student, especially in eleventh grade student. This study used qualitative descriptive study to analysis critical thinking skill. The subject of this study were eleventh grade student of sciences class in Surakarta 4 State Senior High School with 87 students whose registered as student in the 2018/2019 school year. Sampling in this study used random sampling technique. The instrument used is two tier test of critical thinking skill which 5 indicator and 7 sub indicator expressed by Ennis. Instrument consists two level, first level is multiple choice questions and the second level is open ended free respons question which is the reason of student’s answer to the first level questions. The result of this study show that critical thinking skill are still low. In every indicator critical thinking skill were 42% for basic clarification, 29% basic for decision or basic support, 27% for inference, 25% advanced clarification, 24% stategy and tactic.

Keywords: Two tier test, critical thinking skill
Profile of the Integration of Earthquake Precursor Animal Knowledge in Animal Ecology Course

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Earthquake experts have stated that the western coastal region of Sumatra Island is one of the most earthquake-prone areas in Indonesia. In response to this fact, disaster mitigation education programs must involve preparedness and preparedness before an earthquake occurs. This preliminary study aims to describe the profile of integration of biological studies, especially earthquake precursors in animal ecology lectures at the Biology Department of the Faculty of Natural Sciences (FMIPA) Padang State University (UNP). Data collection is done through analysis of lecture documents, surveys and interviews, and data analysis is done descriptively by referring to Hsieh and Shannon (2015) in Malekipour et al., (2017). The instruments used were a checklist of lecture content, semi-structured questionnaires, and interview guidelines. The results of the study show that the lectures on animal ecology in the Department of Biology FMIPA UNP have included the application of basic ecological concepts in everyday life. However, the area of application of these competencies is limited to conservation goals and how to treat animals in the student environment. The study of animal behavior as a marker of earthquakes has never been integrated and applied in lectures on theory and practicum. Students’ knowledge of animal behavior in an earthquake event is mostly obtained independently from books and articles. From the results of the study, it can be concluded that the lecture on animal ecology is a potential lecture to examine the relationship between animal behavior and earthquake disasters. Furthermore, it can be recommended integration of the behavior of earthquake-related animals in animal ecology lectures for prospective biology teacher students, especially in practical learning. It aims to improve the ability and contribution of prospective teacher students involved in anticipating the impact of the earthquake on students living in disaster-prone areas, especially on the west coast of Sumatra.

Keyword: Animal behavior, earthquake precursor, ecology learning, mitigation education
Computational Thinking and Problem Solving Skills with the STEM Concept in Environmental and Disaster Management by Utilizing Microcontroller Arduino Board of Technology Enriched- Classroom

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Abstract. The objectives aimed to: 1) promote computational thinking and problem solving skills, and 2) to study the attitude towards using the instructional activity package according to STEM concept. The sample group employed with twenty-two students of 12\textsuperscript{th} grade from Technology Enriched- Classroom at Assumption College Lampang, Muang District, Lampang Province, studying in the 2\textsuperscript{nd} semester, academic year 2018, which were randomly selected from a population of 2 classrooms (fifty students). The research instruments used were: 1) a set of activities to create a water quality measurement that affects living things, a set of activities to create Anemometer to analyze wind speed and a set of activities to create Seismic instrument, 2) computational thinking test, 3) problem solving skills Test and 4) attitude test for using activity based on STEM concept. The data analysis was carried by analyzing mean, standard deviation, and percentage. The computational thinking and promotion of problem solving skills by using STEM concept after using the activity set, it was found that the students had the computational thinking and problem solving skills at a high level. They can identify problems and guidelines for solving problems, according to the research objectives. Moreover, the students had a good attitude towards using a set of teaching and learning activities in accordance with the STEM concept.

Keywords: computational thinking, problem solving skills, STEM concept, Technology Enriched- Classroom
Measuring Early Students’ Chemical Literacy in Understanding Industrial Process

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Abstract

21st-century learning addressed scientific literacy as a decisive skill which students need to be possessed. Some major in vocational high school prepare students to work in certain fields which demand higher thinking knowledge and science process skills. Proposing science through context-based or constructive learning may promote scientific literacy, including chemical literacy. This study aimed to describe the early students' chemical literacy in understanding the melting and boiling point topic through science article. The study was conducted by 32 students of grade 10 Analytical Chemistry in public vocational high school in the region of Yogyakarta. The learning process adapted guided-inquiry, which conducts learning through students' investigation and constructive activities. A scientific article about metallurgical mining was developed to measure students' understanding. It consisted of 4 questions (essay) which order students to relate their conceptual understanding of the melting and boiling point to the content of the article. Students' worksheet adapted guided-inquiry was also developed to support students' learning. The result showed that 25% of students were at the average level of chemical literacy scale and 55% are under the average level.

Keywords:

Scientific literacy, Chemical literacy, Guided-inquiry learning, Vocational high school
Abstract. Interactive Multimedia learning is a learning media that combines sound, visual and text elements and can interact with users. This study aims to obtain information about the development needs of interactive multimedia learning material building space and learning media formulations that need to be developed in mathematics learning material building space. The study was conducted in the form of teachers needs assessment instruments which were analyzed using qualitative descriptive. The results showed that the use of learning media as a learning resource in the mathematics learning process had been carried out in the field, but the implementation was not optimal, that are: 1) there were obstacles in the delivery of material, especially material that could not be directly observed, 2) building material including material that difficult in delivery, the teacher needs media that can visualize the building of space for fifth grade elementary school and explain in detail and correct the types of building space so that there is no misunderstanding of students in mathematics building material, 3) the format favored by children are games and tutorials.
The Implementation of Science, Technology and Society Environment (STSE) for Creating the Nature of Science Understandings in Accordance with Empirical Evidence Among Intern General Science Pre-Service Teachers

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Abstract. The objective of this research was to study the outcomes of teaching style based on Science, Technology, Society and Environment (STSE) in creating the nature of science understandings, emphasizing the empirical evidence among 23 intern pre-service teachers in General Science at one of Rajabhat Universities in the upper northern region. They were selected by the purposive sampling techniques from bachelor’s students of Education program in 4 subject areas, with a total of 120 students. The research instruments used in the research consisted of 10 learning management plans based on the concept of Science, Technology and Society Environment (STSE) with the emphasis of empirical evidence covering 10 environmental issues in the upper northern region; such learning management has steps for students to utilize the empirical evidence to create the nature of science understandings, questionnaire for the nature of science understandings as well as interview form for the nature of science understandings. Mean, and Standard deviation were applied to data analysis and then the results were presented in the descriptive form. The research found that intern pre-service teachers had a better the nature of science understandings after studying with the statistical significance and were satisfied with the implementation of teaching style at the highest level.

Keywords: Nature of Science, Nature of Science understandings, Scientific evidence, Science, Technology and Society Environment (STSE)
Identification of potential hydrocarbon traps in Area “X” pre-tertiary sediment North Sumatra Basin using gravity and seismic data

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ABSTRACT

The discovery of oil and gas in Indonesian basins, generally comes from tertiary layer, where the production has descended. Therefore, hydrocarbon exploration continues by diversification of both new fields and new reservoir concepts. The research in Area “X”, North Sumatra Basin, aims to find a new hydrocarbon reservoir in a new concept of pre-tertiary layer. Therefore, it is necessary to identify the presence of pre-tertiary basement as the boundary of the potentially reservoir layers. The method used in this study is 2D forward gravity modelling which is supported by seismic section secondary data. The models were performing in two lines, line 4 and line 6. In addition, the FHD and SVD methods were carried out to characterize the fault structure. The results of gravity 2D forward modeling on lines 4 and 6 indicate the presence of a pre-tertiary basement at a depth of about 6000 m. It also shows some formations above the basement which consists of pre-tertiary and tertiary formation. The structures shown in FHD and SVD analysis are mostly reverse fault. The gravity results are confirmed by both seismic section and geological data. There are two formations in the inner layer just above pre-tertiary basement which has potential as a good reservoir, the Tampur Formation with limestone dominated and Parapat Formation.

Keywords: Pre-tertiary Basement, Gravity Method, Forward Modelling, North Sumatra Basin, Tampur Formation
The implementation of SSCS (search-solve-create-share) model with worksheet to build students’ creativity on making simple water purifier in chemistry classroom

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Abstract. The aims of this research is to describe the implementation of SSCS (search-solve-create-share) model with worksheet to build students’ creativity on making simple water purifier in chemistry classroom. The implementation of this model including activities of chemistry teacher and the students of VIIth grade junior high school in Bandung. The research method is used in this study is design research according to Plomp. The subjects of this are 1 chemistry teacher and 24 students to implementation and 3 observers. The instruments of this research are activity observation sheet of teachers and learners. Data processing result of this research use scoring process based on Likert scale then interpretation of percentage according to Riduwan. The results of this research describing that activity of teacher and the students showed very good.

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Abstract: The aim of the study was to identify the scientific concept in the batik manufacturing processes as learning resources for developing science teaching learning grounded in STEM-approaches and ethnoscience. The research method was one of qualitative ethnographic studies. Data were collected by observation, interviews, and documentation studies at Pekalongan Municipality and Regency. The results showed that in the process of batik-manufacturing by indigenous people in Pekalongan, the concept of science was successfully identified and related to science teaching learning for junior high schools. Furthermore, these scientific concepts were integrated into science learning using the Science, Technology, Engineering and Mathematics (STEM) approach.

Keywords: Ethnoscience; STEM; Science Learning; Batik.
ASSESSING USING TECHNOLOGY: IS ELECTRONIC PORTFOLIO EFFECTIVE TO ASSESS THE SCIENTIFIC LITERACY OF EVOLUTION THEORY

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ABSTRACT

This study used a sequential exploratory mixed method to examine the effectiveness of using electronic portfolio to assess the scientific literacy of evolution theory. 135 university students majoring biology education were involved as the research participants. They were asked to create the electronic portfolio by using any learning artefacts produced during the classroom activities including direct and virtual practicums, reading activities, direct and online discussions, quizzes, and formative examinations. Results depicted that electronic portfolio was effective for assessing the scientific literacy of evolution theory that consisted of some skills namely scientific communication, observation and experiment, scientific and creative thinking, professionalism, and electronic portfolio organization and content. Another finding disclosed that students showed a positive response on the electronic portfolio creation. This study suggests that electronic portfolio can be used as an assessment tool of the scientific literacy of evolution theory relevantly to industrial revolution 4.0.

Keywords: assessment, electronic portfolio, evolution theory, scientific literacy.
The study of shale reservoir characterization has been done on field “TAF”, in North Sumatra Basin. The Lower Baong Formation is the target of study. The parameters of P-impedance and S-impedance that generated by the simultaneous inversion method is used to identify fluids existence and the lithology of the target zone, respectively. The partial angle stack analysis consists of near angle stack (1-19°), mid angle stack (19-36°) and far angle stack (36-53°). The simultaneous inversion result is a shale dominated layer obtained with the values range of P-impedance is 4000-8000 (m/s)*(gr/cc), the S-impedance is 1500-3000 (m/s)*(gr/cc) and the density is 2.2-2.5 g/cc. Whereas the value of P-impedance ranging from 8000-12000 (m/s)*(gr/cc), the S-impedance ranging from 3000-5700 (m/s)*(gr/cc) and the density value ranging from 2.5-2.75 g/cc are situated on the bottom of the Lower Baong Formation and correlate with the rock layer dominated by sandstone and carbonate. However, the P-Impedance and the Lambda-Rho inversion results, as well as the crossplot analysis of AI vs SI and LMR curves, has no indicate the hydrocarbon fluids.

**Keywords:**

Reservoir Characterization, Simultaneous Inversion, Shale Hydrocarbon, North Sumatra Basin
UNDERSTANDING OF CHEMICAL CONTENT IN HIGH SCHOOL:
DIFFICULTIES FROM THE TEACHER'S PERSPECTIVE

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Abstract
This research is trying to uncover the difficulties encountered by high school chemistry teachers in teaching chemical content. A total of 30 chemistry teachers who were attending a regional teacher professional development program at the Institutes of Educational Development in Central Java were included in this study. The methods of collecting data by using questionnaires and interviews to respondents. The results showed that the difficulty of teaching chemical content experienced by 30 chemistry teachers from all over Indonesia was mainly due to the lack of knowledge of chemistry mastered both in the macroscopic, microscopic and symbolic aspects, the many concepts that must be mastered that were not interconnected, the low mathematical abilities of the teachers. The difficulties experienced by teachers are exacerbated by the difficulty of teachers to access various information and opportunities to participate in continuous professional development activities.

Keywords: Chemical teaching, high school, teacher's difficulties, chemical content
"EVALUATION OF CRAFT AND ENTREPRENEURSHIP LEARNING PROGRAMS IN CLASS XI OF SENIOR HIGH SCHOOLS (SMAN) IN SLEMAN DISTRICT, SLEMAN REGENCY, YOGYAKARTA SPECIAL REGION "

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Abstract: This study is an evaluation of the implementation of craft learning and entrepreneurship which aims to 1) to find out the Context of the RPP Relevance with permendikbud no 22 of 2016 concerning the standards for primary and secondary education processes in Craft and Entrepreneurship learning at SMAN Sub district Sleman. 2) To find out the Inputs from Teacher Qualifications and facilities in Craft and Entrepreneurship learning at SMAN Sub district Sleman. 3) To find out the process of implementing learning in Craft and Entrepreneurship learning at SMAN Sub district Sleman. 4) To find out the Products of the achievement of learning outcomes in Craft and Entrepreneurship learning at SMAN Sub district Sleman. This research method is a study of processing evaluation using the CIPP model (Context, Input, Process and Product. Subjects in this evaluation are students, craft subject teachers and entrepreneurship. This research was conducted at SMAN Sub district Sleman. Data collection was done using questionnaires, observation, and documentation. The data analysis technique used is quantitative. The results of the study show that: a) The context aspect of the crafting and entrepreneurship learning implementation program with the relevance component of RPP with Permendikbud No. 22 of 2016 concerning the qualifications of primary and secondary school processes very good, (b) input aspects of the implementation of craft learning and entrepreneurship programs in public high schools with teacher qualification components in good qualifications, and infrastructure components are in good qualification; (c) Aspects of the process of implementing craft and entrepreneurship learning programs at SMAN with the components of implementing learning are in good qualification; (d) Product aspects with the components of learning outcomes of students in the implementation of craft learning and entrepreneurship programs at the SMAN are well qualified.

Keywords: CIPP, evaluation, Craft and Entrepreneurship
Developing of Physics Teaching Materials Based on authentic learning to train problem-solving skills

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Abstract

Authentic learning as a means that allows students to develop knowledge transferred to real-world practice. This research aimed at determining the validity, the practicality and the effectiveness of the use of physics teaching materials based on authentic learning. This research type is a research and development using the ADDIE model. The subjects of the trial were 33 students of class X MIA 3 of SMA Negeri 2 Banjarmasin. The research instruments were validation sheets, observation sheets for lesson plan implementation, student achievement results and problem-solving skills assessment sheets. The results showed that: (1) the validity of the Physics teaching materials based on authentic learning was very high with an average value of 3.68, (2) practicality with an average of 3.68 criteria very high, (3) effective in improving aspects of knowledge of students who are classified as moderate with a gain score of 0.6 and problem-solving skills is adequately trained. It was concluded that the physics teaching materials based on authentic learning were declared valid, practical and effective to train problem-solving skills. This problem-solving skills is also useful for students to get success in real life.

Keywords, physics teaching materials, authentic learning, problem-solving
PROFILE OF SENIOR HIGH SCHOOL STUDENTS’ MISCONCEPTION IN PHYSICS USING NEED-BASED ANALYSIS

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Abstract

This study obtained the current situation of physics teaching, learning, and assessment at the senior high school in Surakarta, Indonesia based on various skills in 21st century. A need-based analysis was conducted to explore students’ current situation that lead to misconception in understanding concept of physics as learning objectives. Through random sampling, students questionnaires and teachers questionnaires to over 120 students and 12 teachers were held respectively. The implications showed that generic science skill and interpersonal skills had influenced students’ understanding of physics as the two affecting factors could be the reasons for misconception. From the questionnaires result, it showed that teachers and students of senior high school in Surakarta need a proper diagnostic test to investigate and map students’ misconception in physics classroom especially in difficult learning object such as kinetic gas theory. The four-tier diagnostic test with five possible answers was developed based on the result of need-based analysis and factors affecting students’ misconception which were students’ generic science and interpersonal skills.

Keywords: Four-tier test, diagnostic test, misconception, need-based analysis, kinetic gas theory
LOCAL WISDOM VALUE OF THE REJANG TRIBE IN GROWING THE CHARACTER OF ENVIRONMENTAL CARE

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Abstract. The increasing influence of modernization and globalization at this time causes the younger generation, especially in adolescence, to tend to be more proud of foreign cultures than their own national culture. Culture has a very important role in developing the character of adolescents. This local wisdom should be arranged in a cultural unity to realize a nation, namely the Indonesian nation. The level of damage to natural resources increases the risk of natural disasters due to factors such as natural and human-caused events. The formation of character caring for the environment is an attitude and action that always seeks to prevent damage to the natural environment and its surroundings, and develop efforts to repair the damage to the natural environment that has occurred. Damage to the environment is largely caused by humans, human dependence on the environment is a major factor in environmental damage. Character education in the current era is very relevant to overcome the moral crisis that hit the young people of the Republic of Indonesia. The development of moral character has several important aspects such as problem solving, decision making, and conflict resolution. The local wisdom of the Rejang Tribe is a product of the past culture which is continuously being taken into account by the people of the Rejang Tribe. Local wisdom of the Rejang Tribe is local but the values contained in it are very universal. Examples of local wisdom that can shape character care about the indigenous environment ca’o muko imbo, adat beto’ok, aliak bilai, adat kedurai bumai, adat mundang biniak and adat meket poi. And this is a proof of their belief and obedience to the customs that have been valid since long ago, this is clearly seen from having a strong and strong value of resilience, and having diverse aesthetic values.

Keywords: local wisdom, character education, Rejang Tribe, environment
In the digital era, access to information was opened as widely as possible, including information about education. Access like this provides benefits, namely to improve education on a global scale. The hope is that the competency of the information accessors can develop, one of which is the ability to write scientific papers which are specialized in scientific research. Therefore, this study aims to determine the ability to write scientific papers of students in the Community Technology Environmental Science (Salingtemas) course using E-learning.

E-learning is a solution in offering various possibilities for social networks so that in this way the lecturer can keep a variety of student interaction records in lectures. The form of lectures using E-learning as a tool to understand material is a good thing. The form of video in E-learning is a form of video in the form of facts related to material phenomena that have to do with science, environment, technology and its use for society so that it can have an effect in the process of thinking of writing scientific papers. The research method used in this research is descriptive qualitative research. The instruments used in this study were observation sheets writing scientific papers and scientific writing papers. The aspects assessed from the writing ability of scientific papers, namely constructing the title, making abstracts, composing an introduction, designing a research methodology from observations in areas that have a lot of waste wasted. As a result, students can write research proposals well. In fact, some of them passed the Unesa LPPM research desk-evaluation stage, and one title obtained funding from the scheme with the theme of the relationship between waste and health. Of the overall proposals examined, the most common weaknesses lie in research templates and procedures that have not been systematic and detailed; while the writing process and sentence / paragraph connection to describe the idea is good. Based on the results that have been achieved it can be concluded that writing skills scientific papers students can be trained through lectures using E-learning.

Keywords: e-learning, scientific papers.
IDENTIFY STUDENTS’ SCIENTIFIC LITERACY THROUGH TESTS ON KINETICS OF CHEMISTRY CONCEPT

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Abstract

The purpose of this study was to determine students’ scientific literacy through multiple choice test on the kinetics of chemistry concept. Scientific literacy is one of the abilities students must have to know how much they can implement their knowledge to be applied in life. This test was established randomly selecting 65 students of eleventh grade from senior high school in Sukoharjo. In each item of 25 questions contain aspects in the dimensions of scientific literacy including dimensions of content, context, and competence. The results of this study, 35 students can’t answer half of questions correctly. Furthermore students’ scientific literacy of almost 80% are low. This shows that students don’t understand yet how to use of science in life.

Keywords: kinetics of chemistry, multiple choice test, scientific literacy
Students’ scientific reasoning skills in fluid and its correlation with project activity

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ABSTRACT

Scientific reasoning skills are necessary to be achieved high school students to encounter competition in the 21st century. This study aims to explore the students' scientific reasoning skills in fluid and its relation to project activities. This research is a qualitative study with a case study design that focuses on students' scientific reasoning skills on fluid. The subjects in this study were high school class XI students who attended project activities. Data were collected by analyzing the results of students' written tests, observation, and interviews. The results of the study show the relationship between students' scientific reasoning skills and project activities in a fluid. These show common mistakes made by students in scientific reasoning, such as testing all variables (including variables that not related to the questions), testing incorrect variables, focusing on one variable and depending on prior knowledge, could not determine the relationship between dependent and independent variable. Scientific reasoning skills are essential to be trained in learning through project activities. This study recommends teachers to apply project-based learning to explore students' scientific reasoning skills in large and heterogeneous groups.

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Keywords: Scientific reasoning, project activities, common mistake, fluid
Improving Concept Understanding and Motivation of Learners through PhET Simulation

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ABSTRACT

This study was aimed at determining the improvement of concept understanding and motivation of learners through Physics Education Technology (PhET) simulation. Quantitative approach and quasi experimental technic were employed in this research. The populations in the study were four classes of 8th grade students of MTs Insan Qur’ani, while two samples were class VIIIc and class VIIId. The sample was determined by simple random sampling technic where VIIIc was treated as experimental group and taught using PhET while class VIIId was simulated as control group and was taught using a simple lecture method. 15 valid and reliable multiple choice questions were used as instrument to evaluate the concept understanding and motivation. While learners motivation was measured using 7 questions and was quantitatively analyzed. The test results of concept understanding undergo normality test, homogeneity test and hypothesis evaluation. The data show that the average result for the class of experiment was found to be 9.75% while for the control class was found to be 8.81%. Motivation questionnaire analysis results showed the significant increase in each item of statement, for the experimental class was found to be 85.6 while control class was 64.6, the score indicated that the students in the experimental class were more motivated in learning physics compared to the students of the control class. Based on the research findings, we conclude that PhET implementation in the classroom would enhance both concept understanding and motivations of students.

Keywords: concept understanding, motivation, PhET
The Effects of Family Ecology Learning on Student University Environmental Awareness

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Abstract. Family Ecology is one of the learning materials in the Cosmetology Study Program, Jakarta State University. The aspects studied include; education about environmental care, and the balance between the environment and family units. This study aims to look at the influence of learning experience, and the absorption of material obtained by students in family ecology material, on environmental awareness. The sampling method uses a purposive technique. This study involved 75 respondents by taking research locations at Jakarta State University in the Cosmetology study program. Respondents were involved, overall female sex. The method used in this study is a regression analysis approach with Partial Least Square. Data collection was conducted using a Learning Experience questionnaire, Level of Understanding of Materials in Family Ecology Learning, and Environmental Awareness. The results showed that there was a positive influence between students’ knowledge gained, after studying family ecology material with students’ awareness of the environment. Thus, it can be concluded that the science concept, as well as the application of family ecology learning can be used as one of the factors that fosters students’ love for their environment.

Keywords Education of family ecology, Learning Experience, Environmental awareness, Partial least square
SCT MODEL: IMPROVING CRITICAL THINKING SKILLS AND SELF EFFICACY OF STUDENTS

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Abstract

The purpose of this study to analyze the effectiveness of model Scientific Critical Thinking (SCT) for improve critical thinking skills and self-efficacy chemistry student teachers, Subject trials limited to the implementation of SCT in first class models as many as 31 students at the University of Chemical Education Studies Program Lambung Mangkurat University. Subject extensive trials on the implementation of SCT models on 2nd grade 70 students in Chemistry Education Program. Trial design uses a one-group pretest-posttest design. Collecting data used critical thinking skills test instruments and self-efficacy questionnaire. The results showed: 1) Critical Thinking Skills of students increased in the high criteria and significant (α = 0.05) limited testing and trials spacious, 2) self-efficacy of students increased in the high criteria and significant (α = 0.05) limited trial and extensive testing. Based on the results of the study it was concluded that the SCT model was effective for training critical thinking skills and self-efficacy of prospective chemistry teachers.

Keywords SCT model, critical thinking skills, self-efficacy
DEVELOPMENT OF LOCAL WISDOM BASED BOOKLETS AND LABORATORY EXPERIMENTS FOR THE WADI MAKING COMMUNITIES WITH ELEMENTARY AND DROPOUTS EDUCATION IN CENTRAL KALIMANTAN

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ABSTRACT

Wadi is a traditional type of fermented preserved food, using basic ingredients of fish, salt, and lumu. As a nutritious traditional food, the wadi needs to be improved in quality and preserved through community education. The innovation of the wadi making process has not been done by the community of wadi makers because of the limited information about how to make wadi with better quality. As an effort to conserve local wisdom, non-formal education for the community of wadi makers with a low level of education, using simple media is very necessary. The development of this laboratory experiment and local wisdom booklet aims to add insight and skills to make wadi for the wadi-making community in the interior of Central Kalimantan. The development of this booklet refers to the development model of Hannafin and Peck (1979). Booklet containing enrichment material for non-formal community education, product oriented for wadi makers. The booklet has been validated by community education expert validators, biotechnology experts, instructional media experts, and has been tested to the community of wadi makers. The results of validation and booklet trials show that the compiled booklets can be well received by the user community and have readability values with very good criteria.

Keywords: research development, booklet, community education.
Most junior high school students considered chemistry as a complicated science subject with abstract symbols and terms that must be memorized. The difficulty of learning chemistry can make students have low positive perceptions of chemistry. The purpose of our multiple case study was to explore how an integrated learning media can help teachers and students understand the difficulty of chemistry and create a good impression in junior high school. The integrated learning media has been developed based on multiple representations in chemistry. The study was conducted in three classes in grade 7. Several techniques were used to collect the data: a classroom observation, a test, the questionnaires, and an interview. We documented that the appearance of integrated learning media could make the students attracted and curious about chemistry. They were interested in various bright colors used in integrated learning media, which captured their attention to focus on learning. The integrated learning media made it easier for the teacher to introduce chemistry through podcast, molymod, and simulation.

Keywords: integrated learning media; chemistry; good impression
The Use of Electronic Comic to Increase Elementary Students’ Knowledge of Marine Conservation

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Abstract. The purpose of this study was to determine the effectiveness of using electronic comics to increase elementary students' knowledge of marine conservation. This study used an experimental design model with paired t-test statistical analysis. The participants in this study involved three classes of elementary schools in Banten Province, Indonesia. There was a total of 113 children, that comprised of two classes acted as experimental classes using electronic comics (laptops, computers, tablets, and mobile phones) and one control class using printed books (P). This experiment was conducted in the second semester of the school year in 2017-2018. The results of this study showed a significant increase in marine conservation knowledge of elementary school students in the electronic comics class (EC). In the control class with printed books (P), there is only a slight increase in the knowledge of elementary students of marine conservation.

Keywords: Electronic Comics; Knowledge of Marine Conservation; Elementary School
The Profile of Critical Thinking and Learning Outcomes of Biology Teacher Candidates Viewed from Gender Differences

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Abstract

This research is intended to determine the profile of students' critical thinking viewed from gender differences and whether there is a correlation between critical thinking and learning outcomes of basic mathematic. This research is a descriptive quantitative design in which 40 Biology teacher candidates as samples. Data collection is conducted through tests. The results showed that: 1) The average level of male student’s critical thinking (53.78) is higher than female’s (52.61), 2) At the high critical thinking level, it was found that (male = 63.25, female = 61.22), in the moderate level: (male = 53, female = 52.15) and in the low level (male = 42.5, female = 42, 3) The highest aspect of critical thinking is assessing credibility (4.28), and the lowest one is producing arguments (3.74), 4) The average level of male student’s learning outcome (70) is higher than female’s (60,68), 5) There is a significant correlation between students’ critical thinking and their learning outcomes. It can be concluded that male students are more critical than female’s and there is a correlation between critical thinking and learning outcomes. Therefore, students are suggested to practice their critical thinking ability.
Effectiveness of in-service professional teacher education online system (PPG) on non-productive teachers towards productive teachers of Kemenristekdikti in cosmetology education at the State University of Jakarta

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Abstract. Educational evaluation is one of the supporting factors for quality in education itself. The digital age places education to continue to make updates, especially on online programs. In addition to educational equipment, the education system also increases the competence and qualifications of educator resources, one of which is through PPG Ristekdikti. The successful implementation of online system programs in education can include participants' understanding of online learning media, ease of access, and observation during implementation. This research is a qualitative research that describes the facts and phenomena of online programs from Teacher Professional Education (PPG). This study involved 29 teachers who participated in the PPG Cosmetology program. Based on the results of observations, interviews, and the value data obtained by participants, the online system of the PPG program is quite good because it is considered flexible. Other factors that inhibit the PPG program online system include: (a) management scheduling each assignment, (b) the age of participants who are no longer young, it is quite difficult for participants to understand learning technology online, and (c) in connection with the transfer of programs, not all teachers are able to master cosmetology material.
COGENERATIVE DIALOGUE OF CROSS-GENERATION EDUCATORS TO IMPROVE CHEMISTRY TEACHING QUALITY THROUGH TECHNOLOGY

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Abstract

This research showed the efforts of educators in improving the quality of the chemistry classroom atmosphere through technology. Cogenerative dialogue involves dialogue between a small number of students, teachers, and researchers who all speak, listen, and learn from each other across boundaries such as age, gender, ethnicity, and rank. This discussion featured an ethnographic case study from coteaching and cogenerative dialogue involving junior lecturers, certified chemistry teachers, pre-service chemistry teachers, and students in the chemistry learning about chemical bonding, chemical elements, and laboratory introduction. This dialogue is guided by a list of questions related to Technological Pedagogical Content Knowledge (TPACK). The SWOT analysis was used to provide an overview experienced by educators as well as TPACKing process. The use of a smartphone simple application that is a music player, video and camera can be easily used to make the class more enjoyable. Students enjoy a more comfortable classroom atmosphere with song rhythms, funny videos, and selfie activities. Constraints in mastering concepts macroscopically, submicroscopically, and symbolically are completed by utilizing virtual reality/augmented reality (VR/AR) and virtual laboratory. Cogenerative dialogue on technology implementation can inspire among educators to try and learn the technology for teaching chemistry.

Keywords: Cogenerative dialogue; Technological Pedagogical Content Knowledge; Cross-generation educators; Chemistry educators, Chemistry teaching.
Augmented reality: technology for net generation in 21st century learning

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Abstract: Net generation is a young generation aged 10-15 years old. Nowadays, the population reaches more than 90 million people but many of them do not use the certain applications such as augmented reality in learning because it is rarely operated in the classroom by the teacher in Indonesia. The presence of this paper is to explore more about how AR helps net generation to understand the subject matter. This study uses method interview, observations, document analysis retrieved from Scopus, Science of Direct, Web of Science in obtaining actual data then selected studies were analysis. The findings showed: (1) net generation cannot be separated from laptops, smartphones, tablets, and internet every day to do their activities because this is one of the net generation’s special characteristics; (2) AR is a technology application that is an alternative and a choice in the future learning because the role of AR can be integrated with smartphones, gadgets, and tablets that make it more interesting and suitable for the Net-Generation in learning both inside and outside the classroom. AR can be used both personally and collectively to explore subject matters such as science and social subjects.
Science Process Skills Analysis on Environmental Issues of Junior High School Students

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Abstract. The purpose of this paper is to analyse the students’ science process skills based on students’ responses on science process skills test in environmental issues adapted from PISA test. The change of Indonesian National Curriculum was caused by the development of international life in the globalization era. The existence of International study from OECD named PISA (Program of International Students Assessments) provides data about the fact of Indonesian students’ science process skills is still low. In order to analyse students’ science process skills, researcher used qualitative analysis and for the students’ response the researcher used descriptive analysis. This study conducted on 124 junior high school students in Indonesia. The result showed that the highest skill achieved by students is communication skills (80.24%) meanwhile the lowest skill is identify variable skills (40.32%).
Effect of Guided Discovery and Basic Knowledge of Science on Biology Learning Achievement

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ABSTRACT

This research was conducted to examine the effect of guided discovery models and basic science knowledge on biology learning achievement. This study uses a quantitative quasi-experimental method with a constellation of treatment by level 2 x 2 design research, the selection of research samples is done through random side techniques. Two classes of XI IPA from the same school were selected. 2 classes apply different learning models. The first class (Experimental Class) uses a guided learning model, and the second class (Control Class) uses the direct instruction model. Overall, the number of selected samples is 36 students. The results showed that there were significant differences in biological learning achievement between guided discovery models and direct instruction models. There is a significant difference in biology learning achievement between students who have a high basic knowledge of science with students who have low basic knowledge of science. Therefore, it was concluded that there was a significant influence between basic science knowledge.

Keywords: guided discovery, science, achievement biology.
The Effectiveness of Inquiry-Based Basic Science Learning Materials on Problem Solving and Critical Thinking Skills

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Abstract

This research and development study was aimed to improve problem solving and critical thinking skills for science prospective teachers. The study was carried by implementing a Basic Science learning tools based on inquiry model for the first semester students of Department of Science Education in teacher training institution at Bali. The research was employed one group pretest posttest design. The results of the study showed that (1) the program was effective to improve the science prospective teachers’ problem solving ability (t = 15.596 > 2.029) with N-gain = 60.9 (mediocre category); and (2) the program was effective to improve the science prospective teachers’ critical thinking skills (t= 4.004 > 2.029) with N-gain = 14.1 (low category).

Keyword: basic science, inquiry, problem solving, critical thinking
This research is motivated by learning that is still done in the classroom only, students feel bored in the classroom for the sake of achieving learning goals, besides that there is still an assumption that interpersonal intelligence of students of biology education is still low, as evidenced by students’ inability to interact or socialize quickly with others, lack of social care for others (individualists). The purpose of this study was to analyze the Interpersonal Intelligence of Biology Education Study Program students through Outdoor Activities. The population were all students in semester 2 of Biology Education Study Program FKIP UNIKU in the 2017/2018 academic year as many as 104 students. Samples taken by purposive sampling were 1 experimental class totaling 24 students. The research method used is weak experiment with research design using The One-Group Pretest-Posttest Design. The data obtained were analyzed using the t test. In addition, the N-gain value was also analyzed, in the experimental class N-gain value was in the medium category. Thus H₁ is accepted, meaning that there is a significant effect of outdoor activities on student interpersonal intelligence in plant morphology courses.

Keywords:
Interpersonal Intelligence, Outdoor Activities, Plant Morphology.
The development of module based on scientific literacy: geometric optics

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Abstract. The purpose of this research is to develop geometry optics module based on scientific literacy in terms of theoretical and empirical. The module was developed by using four-D model. Subject of this study was the geometry optics module which was tried out on first semester students of natural science education by using the one-group pre-test post-test design. The two techniques of collecting data were validation sheets and test. The obtained data then were analyzed with quantitative descriptive. The results showed that the module of Geometric Optic was judged valid in terms of content, performance, language and scientific literacy aspect with average score respectively 3.35, 3.38, 3.44, and 3.50. In addition, the Geometric Optics module-based scientific literacy was categorized easy to understand by cloze test. Based on the results of N-gain analysis, it was obtained an average score of 0.63 which means that the geometry optics module based on scientific literacy was able to improve students' scientific literacy skills.

Keywords: Module, Scientific Literacy
Teams assisted individualization to improve students’ self-regulated learning in mathematics

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Abstract. The 21st century today requires not only students who have competences in mathematical fields, but also life skills. One of the life skills that must be mastered by students is self-regulated learning. Self-regulated learning is an important personal skill so students are able to develop their ability to solve problems. Therefore, we need a learning method that is able to improve the students’ self-regulated learning, namely the cooperative learning method Teams Assisted Individualization (TAI) type. This study aims to improve self-regulated learning with cooperative learning methods Teams Assisted Individualization type. The research design used was classroom action research. The research subjects were 30 X grade students of UII Yogyakarta Senior High School. This research was conducted in two cycles. The first cycle was obtained results of the self-regulated of students learning in the medium category with an average of 97.57 and learning outcomes obtained 63.33% of students who completed. The second cycle obtained the results of the self-regulated of students learning already in the high category with an average of 118 and learning outcomes obtained 80% of students who complete. Thus it can be concluded that the TAI type of cooperative learning method can improve student independence and learning outcomes. Keywords: teams assisted individualization, self-regulated learning
Case Study: Future Home Design Projects to Grow Pro-Environmental Attitudes

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Abstract. Based on the results of the learning evaluation, the data shows that many students who do not apply pro-environmental attitudes which include consumption patterns, conservation, and waste recycling. This study aims to foster a pro-environmental attitude towards students by making future home designs. It is done because they wish to own a house in the next 4-5 years later. The study was attended by 35 students conducted in November 2018 to January 2019 at the University of Muhammadiyah Semarang. The problem discussion method and the implementation of pro-environmental future home design projects are used in this study and was conducted in two stages. First, students discussed the topics of discussion: plants, water, electricity, and garbage in each of their homes. The results of the discussion were formulated to be environmentally friendly homes. Second, students designed future homes with pro-environmental based. Students implement their ideas into a good 2-dimensional (2D) future home design, as much as 86%. During the learning process, students enthusiastically made pro-environmental home designs with performance indicators: 100% of future homes have plants, 11% of future homes use Light Emitting Diode (LED) lights, 6% of future homes use solar lighting, 71% of future homes use good water sanitation, 54% of future homes apply waste management and 81% of future homes have biopores. It shows that students understand the pro-environmental concept on the aspects of plants, water, garbage and biopores. It can be concluded that future home design projects have a potency to foster a pro-environment attitude.
The Effect of Integrated Science Learning Model based of Local Wisdom on Outcomes Learning and Scientific Literacy

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ABSTRACT

This study was a quasi experiment with pretest-posttest control group design. This study aims to analyze differences in learning outcomes and scientific literacy (both together or separately) between students who study with integrated science learning models based on local wisdom and students who study with conventional learning models. The study population was all 7th grade students of Singataja 1 Junior High School in the 2017/2018 academic year. Determination of samples using random sampling technique. The research data was analyzed by Mancova with a significance level of 5%. The results showed that there were significant differences from learning outcomes and scientific literacy (both together or separately) between students who study with integrated science learning models based on local wisdom and students who study with conventional learning models.

Keywords: integrated-science learning, local wisdom, outcomes learning, scientific literacy
SCAFFOLDING STRATEGY IN COOPERATIVE LEARNING GI TYPE TO IMPROVE INTEGRATED SCIENCE PROCESS SKILLS STUDENTS

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Abstract

Students need to be given opportunity to design their own investigative activities based on their curiosity after observing the phenomenon that the lecturer delivered at the beginning of learning so that they can design investigations and communicate the results. This study aims to improve the integrated science process skills of prospective madrasah ibtidaiyah teacher students using scaffolding strategies in cooperative learning models group investigation type. The study was conducted on prospective student teachers at UIN Sunan Ampel. The students involved numbered 12 people. Techniques for collecting data with tests. Material used by the respiratory system. This study uses the design of the one group pretest posttest. The study began with cooperative learning type group investigation without scaffolding. At the end of the lesson, an integrated science process skill test is given. Next, the researcher uses the learning model the same with scaffolding and the end of the test is done with the same question. Data were analyzed by t test. The results showed that differences in integrated science process skills with a significance of 1% on indicators observing, formulating problems, designing investigations, and communicating ideas. Scaffolding strategy is not able to improve data analysis skills.

Keywords: IMWR scaffolding, cooperative learning group investigation type, science process skills
The profile of students problem solving skill using analytical problem solving test (apst) on the topic of thermodynamic

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Abstract. This study aims to analyze students problem solving skill in solving analytical problem solving test on the topic of thermodynamics. The research approach used is quantitative with descriptive method. The research subjects were 100 students of senior high school in Ngawi. Instrument test research used analytical problem solving test was modified of national examination test. Instrument test in the form of essay test which measure of 4 indicator problem solving skill by G Polya : (1) Understanding the Problem, (2) Devising plan, (3) Carrying out the plan, (4) Looking Back. The results show that percentage achievement of understanding the problem (58.40%), Devising plan (70.92%), Carrying out the plan (65.52%), looking back (42.88%). It shows that the student problem solving skill of senior high school in Ngawi is still moderate category so it’s necessary to do improvement effort.
Developing Project Based Learning Model Using Local Potential of Biology Materials at Senior High School

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Abstract. The research purposed to develop and examine the feasibility of the Project Based Learning model by utilizing local potential of biology materials in Senior High School. The Steps to develop Project-Based Learning Models by utilizing Local potential were developed through a modified research and development procedures as follows: 1) needs analysis, 2) development of prototypes and devices, 3) validation of model designs by experts and practitioners, 4). The concept of a revised model. The feasibility of the learning model was tested through expert judgment. The results of expert validation indicated that the average percentage of the learning model was 78%. The results of experts on syllabus showed that the average score was 78%. The results of the experts’ assessment on the Learning Implementation Plan indicated that the average percentage was 79.16%. and the assessment of expert on Biology learning material showed that the average percentage was 78.83%. it can be concluded that the project based learning model using local potential of biotechnology was feasible or appropriate to be implemented at senior high schools.
The correlation between input voltage with hydrogen production rate by electrolysis using CO₂ as catalyst

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Abstract. In this research to reduce energy consumption of the electrolytic hydrogen production process, on the other hand still increase the efficiency, durability, and safety, we propose a catalyst from CO₂ that decrease the use of energy and still produce the same amount of hydrogen. Wherein hydrogen and oxygen is produced from splitting carbonic acid (H₂CO₃) which comes from mixing CO₂ and water (H₂O). Based on the research conducted, hydrogen production rate when using CO₂ as catalyst in lower voltage variation compensated the higher voltage. The best result regarding CO₂ as catalyst after 300 minutes of electrolysis process, the lower voltage generate higher hydrogen volume.
Development of Mobile Application upon Mechanical Engineering Students’ Learning Styles

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Abstract. The use of technology in this era of globalisation is growing from day to seconds. Mobile learning or also known as m-learning is commonly heard lately as we are in the 21st century of education. Mobile applications developed are to enhance m-learning among students. Henceforth, making students engaged to m-learning is only possible when we had identified their learning styles. Current paper presents the development of mobile application for Polytechnic Mechanical Engineering Students (PolyMES) based on the previous analysis of learning styles among premier polytechnic mechanical engineering students in Malaysia. The aim of this study is achieved whereby the design for PolyMES is developed according to these mechanical engineering students’ learning style. The mobile application developed requires the understanding of students’ learning style to enhance m-learning. PolyMES is designed to be user friendly application that enables students to study the subject at their own space. They can read the simple notes with related video and images. In addition, students are able to test themselves with the quiz and exercises given and also view the list of formulas and symbols with sample calculation as a practice. The features available in PolyMES designed to suit students’ different types of learning styles. As known every individual has their own learning styles of retaining new information and skills. Hereby, PolyMES design is developed to cater students using smart phones at various learning style and might be useful for further implementations of m-learning.
The Profile Analysis of Science Process Skill in High School Students

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Abstract. Science Process Skills (SPS) are all scientific skills used to acquire, develop, and apply scientific concepts and theories. Mastery of Science Process Skills is not only useful in science learning but also for the daily life of students. This study aims to obtain a profile analysis of students' science process skills. The research method used is a survey method with research subjects, namely at 4 Madiun state Senior High School. Data collection technique used is the test technique. The data obtained were then analyzed by simple statistical analysis. Based on the results of the research that has been done, it can be seen that the ability of Science Process Skills in 4 Madiun state Senior High School students as a for each aspect of Science Process Skills is still low with a percentage of 47%.
The scheme construction to solve the adding fractions problems using images conducted by elementary students

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Abstract. Mathematics consists of various learning segments and one of which is a fraction. Completing the adding fractions can be done through several methods, one of which is by using images. This is a less-known method of learning, especially for elementary school students which may be due to incomplete student scheme construction. This study aims to describe how elementary school students construct the scheme by using images in the adding fraction. The subject was the sixth grader who has high mathematical skills. Data were collected through interviews as well as mathematical abilities and adding fraction tests as supporting instruments. Mathematical ability tests were used to determine the students’ mathematical abilities category; while adding fraction tests were used to explore the student schemes construction. Data were analyzed qualitatively based on the APOS theory framework (Action, Process, Oject, Scheme). The results showed that the subject made an incomplete sketch of adding fractions through images proved by how to complete the design scheme in adding fractions through images, subject tended to change procedural solutions by using sketches. Keywords: scheme, constructions, APOS, triad.
The Effectiveness of Guided Inquiry Model with Starter Experiment Approach towards Critical Thinking Skill in Understanding Fungi Material: An Experimental Study on the First Students of Senior High School

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ABSTRACT

Competency result is a major problem encountered in school level education. This research aims to investigate the effectiveness of guided inquiry model with starter experiment approach towards the students’ critical thinking skill. Using quasi-experimental design, this research took the sample of 64 students of X MIPA\textsubscript{1} and X MIPA\textsubscript{2}. Technique in selecting the sample was cluster random sampling. To collect the data, the test was utilized. The data analysis was performed using the normality test, homogeneity test, and manova test with the significance level of 0.05. The mean of posttest result was 84.14\%. The improvement of critical thinking skill was 42.89\%, compared to the result of the pretest. This research shows that the guided inquiry model with starter experiment approach had a significant effect on the students' critical thinking skill in understanding Fungi material.
Estimation of 3D Carbonate Reservoir Permeability and Interparticle Porosity Based on Rock Types Distribution Model: A Case Study in “R” Oil Field

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ABSTRACT

Carbonate reservoir in “R” Oil Field is a reef limestone which has a very complex porosity and permeability characteristics caused by its diverse pore types (interparticle, stiff, and crack). This study aims to characterize the carbonate reservoir by estimating its interparticle porosity and permeability based on rock types distribution model. Modified Rock-Fabric Classification is used to determine the distribution of rock types in three reference wells (R2, R9, R20). Rock Types distribution model is generated by integrating acoustic impedance (AI) and shear impedance (SI) attributes from seismic simultaneous inversion with rock types distribution in reference wells using Naïve Bayes Classifier. Three-dimensional (3D) interparticle porosity and permeability is then estimated from rock types distribution model. The result shows RT3 which is characterized by crack pores as the most dominant rock type in the reservoir followed by RT5, RT4, and RT6 which are characterized by interparticle pores. Relatively high interparticle porosity values ranges from 0.18 to 0.22 can be associated with RT4. Meanwhile, relatively high permeability values range from 70 to 80 milidarcy (mD) can be associated with RT6.

Keywords: carbonate reservoir, rock type, modified rock-fabric classification, interparticle porosity, permeability.
The Impact of Non-formal Education in Developing a Community: A case study in Pati Regency Indonesia

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Abstract. Community development through education is a pioneer of the success of national development of a country. Non-formal education that serves as a compliment, alternative and enrichment has a very decisive role in developing a community to be a better one. Development through community empowerment or training programs aims to empower human and natural resources or local potential. This research is intended to describe the role of non-formal education in Pati Regency along with the supporting and inhibiting factors in its implementation. This research made use of descriptive qualitative approach along with FGD (Forum Group Development). The subject of the research was the Division Head of Non-Formal Education (PAUD/PendidikanAnakUsiaDini/Early Childhood Education, Kesetaraan (equality education, and Community Education), KepalaDisdikbudKecamatan/ Head of Sub-District Education and Culture Office, and LKP (LembagaKursusdanPelatihan/Course and Training Institution). Data collection was done by (1) observation, (2) documentation, (3) interview. Data analyses method was done by (1) data collection, (2) data reduction, (3) data presentation, and (4) conclusion or verification. The result of this research reveal that: (1) Favorite Education program is available in every sub-district, (2) non-formal education is capable of helping to serve early childhood education sector (PAUD) and equality program to raise up entrepreneurship spirit in developing economy of the community, (3) the supporting factors including public interest and financial aid from the government, and (4) the inhibiting factors including many incompetence human resources, complicated administration, and budget allocation from the government.
The Developing of Students Worksheets through STEM Approach to Train Critical Thinking Skills

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Abstrak. Telah dilakukan penelitian dengan tujuan menghasilkan Lembar Kerja Peserta Didik (LKPD) dengan pendekatan Science, Technology, Engineering, and Mathematics (STEM) untuk melatih keterampilan berpikir kritis peserta didik yang layak digunakan dalam proses pembelajaran. Tujuan khusus penelitian ini yaitu untuk mendeskripsikan: 1) validitas LKPD, 2) kepraktisan LKPD, 3) efektivitas LKPD, dan 4) pencapaian keterampilan berpikir kritis peserta didik. Jenis penelitian ini merupakan Penelitian dan Pengembangan dengan model analyze, design, development, implementation, evaluation (ADDIE). Subjek uji coba penelitian ini adalah 36 peserta didik kelas XI sekolah negeri di kota Banjarmasin. Instrumen penelitian ini adalah lembar validasi LKPD, lembar keterlaksanaan rencana proses pembelajaran (RPP), Tes Hasil Belajar (THB), dan LKPD. Hasil penelitian menunjukkan: 1) LKPD yang dikembangkan berkategori valid, 2) kepraktisan LKPD dengan berkategori sangat praktis, 3) efektivitas peserta didik berkategori sedang, dan 4) pencapaian keterampilan berpikir kritis peserta didik berkategori cukup. Berdasarkan hasil penelitian dan pengembangan, LKPD dengan pendekatan STEM untuk melatih keterampilan berpikir kritis peserta didik layak digunakan dalam pembelajaran fisika.

Kata kunci: LKPD, STEM, keterampilan berpikir kritis.
Pre-Service Science Teachers’ Enhancement of Environmental Care Behavior through Conservation-based Green Learning Methods (GeLeM)

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Abstract. Science learnings provide opportunities to grasp knowledge by constructing and examining explanations of a particular phenomenon. This information is obtained from a scientific process which gives learning experience to students. Green Learning Method (GeLeM) employs natural phenomena as learning sources; therefore, it is suitably applied in science learnings. Green Learning Method (GeLeM) lets students involve in nature learning directly, identifies as well as offers a solution to surrounded environmental problems. Hence, this method is closely related to environmental care behaviour emerged during learning activities. This research intended to reveal pre-service science teachers’ enhancement of environmental care behaviour through Conservation-based Green Learning Method. Data collection process was carried out in the Department of Integrated Sciences, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang on Living Organism Systematics course, odd semester, academic year of 2018/2019. The obtained results showed that ‘GeLeM’-based learnings could enhance the students’ environmental care behaviour. Other than that, the observation results indicated that the students’ environmental care behaviour was seen during nature learnings. Pre-service science teachers must have favourable environmental care behaviour to inherit it to their future students.
Morphology Characterization of Bioactivator Microorganisms in Product of Septick Tank Phosphate Degradator

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Abstract. Septic Tank is a shelter for solid materials of human waste (faeces) which will quickly fill up when there is no decomposition process by bacteria decomposers. The amount of bacterial decomposers in a septic tank is generally less compared to the accumulation rate, so it is necessary to supply bacteria decomposers. The addition of these microorganisms is very cheap when compared to the cost of desludging or drying beside being practical, healthy and environmentally friendly. The decomposing bacteria (microorganisms) will decompose the solid materials in the septic tank into water (H₂O) and some gas (CO₂). Microorganisms that can decompose or degrade human faeces are PAOs (polyphosphate accumulating organisms) by degrading the polyphosphate into phosphate. Microorganisms that play a role in the decrease of phosphates are bacteria and fungi. Aerobic bacteria such as Pseudomonas sp. is one of the phosphate-degrading microorganisms. This research used the Pour Plate and gram staining method for microscopic observation to find the morphology of Pseudomonas sp.
Relationship between Ecosystem Knowledge and Locus of Control with Intention to Act on Students

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Abstract. Intention to act of students is an interpretation of knowledge of ecosystems and locus of control. This study aims to look at the relevance of students’ intention to act which is analysed through ecosystem knowledge and locus of control. Research on the intention to act to date has been developed because of the problem of deterioration in people’s behavior in interacting in the ecosystem. The method used in this research is descriptive quantitative, with a sample of 203 respondents. The technique used is multistage random sampling. The instrument used is a questionnaire for locus of control and intention to act data collection. Multiple choice instrument in retrieving data on ecosystem knowledge of students. This study concluded that there was a relationship between ecosystem knowledge and locus of control with the intention to act.

Keywords: Ecosystem Knowledge, Intention to act, locus of control
Utilization of Multiple Representations in Science Learning

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Abstract. This study aims to develop a science teaching model by utilizing multiple representations in each syntax to be implemented by science teachers in order to improve understanding of science concepts, science process skills, and critical thinking skills of students. This study is a research and development (R & D), adapting R & D model of Borg and Gall which consists of 10 developing stages, specifically: 1) research and information collection; 2) planning; 3) develop preliminary form of product; 4) preliminary field testing; 5) main product revision; 6) main field testing; 7) operational product revision; 8) operational field testing; 9) final product revision; 10) dissemination and implementation. This research was carried out until the main product revision stage (5th stage). Revisions were conducted after the experts' judgments obtained. The result of this study is the framework of science teaching models by utilizing multiple representations called, Discovery Learning using Multiple Representations (DLMRs). Based on experts judgments, this model is suitable to be implemented in science learning to improve science process skills, critical thinking skills, and students' curiosity.

Keywords: DLMRs Model; Multiple Representations; Science Process Skills; Critical Thinking Skills; Curiosity.
Development and Validation Learning Materials of Waves Contains Holy Alquran Values

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**Abstrak.** The research aims to develop learning materials. In addition, the research also tested the validation of physics materials learning using holy Alquran. The preparation of learning materials contains holy Quran values become very important to use when learning school. Learning materials that have been fitted Alquran values can help improve the insights of science as well as add value to the spiritual attitude of learners. Learning materials are also expected to invite learners to more easily understand a material through contemplation. For example, by incorporating the results of the interpretation of some verses of the Qur'an to wave material class 11. Research on learning materials contains holy Alquran values using the approach to research and development. Further learning materials contains holy Alquran values using the approach to research and development. Further learning materials are validated by experts in their field to be used as guidelines revision of materials. Expert lecturers and practitioners considered viable materials used as learning materials categorized very well with the value > 3.00. In addition, the materials also received excellent response 87.5% of the learners.

**Key words:** Alquran values, learning materials, validation
DEVELOPMENT OF LESSON PLAN DEVICE BASED ON INQUIRY BASED LEARNING TO IMPROVE LEARNING OUTCOME AND CRITICAL THINKING SKILL

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ABSTRACT

This research is a development research that aims to evaluate the validity, practicality, and effectivity of lesson plan device based on inquiry based learning which has been developed on interaction of living things and its environment topic in junior high school. This research adapt Tessmer model to developed the lesson plan device include syllabi, lesson plan, worksheet, learning material, and media. The instruments used in this research were validation sheet, response questionnaire, learning outcome test, and critical thinking skills observation sheet. The results showed that: 1) the validity of lesson plan device based on expert assessment was in a valid category, b) the practically of the lesson plan device categorized as very good and c) the effectiveness based on learning outcome and critical thinking skills. The subjects for the field test were 29 grade VII students at SMPN 13 Banjarmasin, South Kalimantan. The learning outcome result showed that has exceeded the passing grade and the critical thinking skill was in a very good category. This result concluded that the lesson plan device based on inquiry based learning developed have been proved worthy for biology learning, especially on on interaction of living things and its environment topic.

Keywords: inquiry based learning, lesson plan device, biology learning, development research.
CHARACTERISTICS AND VALIDITY OF SETS-BASED DISASTER LEARNING MODELS

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Abstract. This study aims to: (1) describe the characteristics of the SETS-based disaster learning model, (2) test the validity of the SETS-based disaster learning model. This type of research is research and development following the ten steps of developing Borg & Gall. In this study five steps from the ten steps were carried out to produce a valid product according to expert judgment. The research findings are: (1) producing a product in the form of a SETS-based disaster learning model with characteristics having the main elements consisting of: syntax, social system, reaction principle, support system, instructional impact, and companion impact. The learning model produced has met the specifications of the learning model which is complementary to existing products by focusing on the integration of thematic disasters, having a wider level of integration, having a high applicable level, and having in-depth studies and providing detailed and complete information. The SETS-based disaster learning model consists of six stages of activity. The first stage is organization and orientation, the second stage is concept formation, the third stage is Application and conceptualization, the fourth stage is adapting the concept, the fifth stage is Planning and making decisions, the sixth stage is SETS-based Evaluation. (2) SETS-based disaster learning model is feasible to use based on expert judgment. The average value of the model validation score is 102.5 or 85% (very valid).
Environmental literacy of high school students

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ABSTRACT

The goal of this research is to find out the environmental literacy of the tenth grade of Senior High School students. The aspects of environmental literacy presented include knowledge, skills, and attitudes towards the environment. Research applies descriptive methods. The results of the study showed that the average score of students’ knowledge was 11.5 which was in the medium category, students’ attitude towards environment was 28.5 which was considered as low category and cognitive skills which included issue identification was 5.4 and it was in the medium category, issues analysis with an average of 30.35 was in the low category and the student action plans with the highest percentage of 64.4% was in the form of reporting to the government and asking for a ban on land sales and there was 17.9% of students who did not have an action plan.

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Keywords Environmental literacy, Knowledge, Cognitive Skill, Attitude.
Developing inquiry-based learning materials by using ADDIE approach

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Abstract. This study aimed at developing English for midwifery purposes on inquiry-based learning materials. The development of the learning materials used the ADDIE (analyze, design, develop, implement, evaluate). It was developed through the stages of ADDIE to produce learning material prototypes. The feasibility of the prototypes was tested by some experts consisting of material experts, media experts, linguists, and experts in learning design. The feasibility of the materials was consisted of aspects of content, presentation and aspects of the inquiry. The results showed that the aspect of content obtained the average score of 86.7%, the feasibility aspect of the presentation got an average score of 90.8%. Inquiry feasibility aspects gained an average score of 92.9%. The feasibility of the material, based on the scores of the three aspects, obtained an average score of 90.1%. The average scores of media experts were 93.3%. Language feasibility got an average score of 81.25%. The feasibility of learning design based on expert judgment got an average score of 92.6%. Based on the results of the above research it can be concluded that English for midwifery purposes based on inquiry learning materials had very high category, it was feasible for teaching and learning.
The impact of mathematics learning materials based on contextual teaching and learning towards students' arithmetic skill

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Abstract. The purpose of this study was to analyze the impact of mathematics learning material based on Contextual Teaching and Learning towards students' Arithmetic Skill. The study was the comparative study with pre-test post-test only design. Mathematics learning materials based on Contextual Teaching and Learning Materials was the mathematics learning materials that Consist of the component of contextual teaching and learning. It was designed and developed to be implemented to the students of Junior High School at SMPN 2 Gondang, SMPN 1 Sekar, SMPN 1 TambakRejo, Bojonegoro, East Java, Indonesia. The respondents were 178 students. Students' arithmetic skills were collected through written test that was validated and reliable. Data analysed by using paired t test. Result of statistical test showed the significance level was 0.000 > 0.05. It can be concluded the learning materials had a positive impact towards students' competency on arithmetic.
Scientific Reasoning-based Dual Situation in Facilitating Conceptual Change of Natural Selection Concepts

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Abstract. Natural selection is one of the biology topics that is quite complicated to be understood by pre-service teachers on biology subjects. The concept of natural selection as the cause of evolution often leads to student misconceptions. This study was conducted to determine the role of the Scientific Reasoning-based Dual Situated Learning Model program in facilitating changes in student conceptions on the concept of Natural Selection. The design of this study uses mixed method embedded design experimental models. Research data obtained from students majoring in biology using data pre and post-test essays. Data collection is done at the time, before, and after the process takes place in the part of student misconception. The results are presented in qualitative form as primary and quantitative data as supporters. The research data shows that the conceptual change level consists of construction, revision, disorientation, static, and complementation. While the answer category at the beginning and end of the test has several indicators, namely no response, incorrect, incomplete, and complete. This study produces a learning model that can be used to facilitate the occurrence of changes in conception and also explain in detail the variation of understanding experienced by each student. The results of the study indicate that this model can facilitate the change in student conceptions in natural selection learning material.

Keywords: Scientific reasoning, Dual Situated, Change of conception
The development of project-based learning and students’ learning style-based chemistry teaching-learning instruments in the reaction rate materials to improve students’ outcome

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Abstract. Each student has their own learning styles which teachers should facilitate in their teaching. However, the reality in the field found that the lack of accommodating students’ learning style and of emphasizing authentic problem solving skills in learning process has been the cause for students’ low learning outcomes. One of the alternative ways to overcome this problem is by implementing problem-based learning (PBL) combined with several activities which can facilitate students’ diverse learning styles. Unfortunately, the existence of such teaching-learning instruments seems to be very scarce; therefore, this study focused on the development of teaching-learning instruments which combines PBL and students’ learning styles. This study aimed at developing valid, practical, and effective teaching-learning instruments consisting of lesson plans, workbook, and tier multiple choices questions approach to 4-D (define, design, develop, and disseminate) model. The developed products were tried out in the eleventh grade of SMA Trensains Tebuireng. The result showed that the teaching-learning instruments developed in this study are highly valid both in content and construct. They were also found to be very practical seen from the implementation of learning and students’ activities. Also, teaching-learning instruments developed were proven to be effective considering the students’ learning outcomes and their response toward the materials.
ANALYZING THE TPACK OF SCIENCE TEACHER BASED EXPERIENCE FOR TEACHING GLOBAL WARMING IN SECONDARY LEVEL

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ABSTRACT

Technological pedagogical and content knowledge (TPACK) has been one of the steering frameworks that widely employed by researchers in order to examine and develop teachers' knowledge of integrating technology into instruction. This thing also viewed as a modern signature pedagogy within science teachers education integration of technology with science area content and effective pedagogy. In this article the author purposes to describe TPACK of science teachers using a new contextualized TPACK model with global warming. The participants were science teachers from three districts in Indonesia and have different ages from 24 until 34 years old. They were completed questionnaire to measure their ability to sync content, pedagogy, and technology in global warming material. Content Representation was applied to support quantitative data. Our results reveal that the teachers have different knowledge of TPACK. The implications of this study are that experienced teachers perceived higher barriers in integrating technology in classrooms than less experienced teachers

Keywords: Descriptive method, Global warming, Teacher competencies, Technology
Analysis of Students’ Critical Thinking Ability of Junior High School in Ngawi

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Abstract. This study aims to determine the critical thinking ability in material classification and its changes 7th grade of junior high school in Ngawi. The method used in this research is quantitative descriptive. The sample of this research is taken by stratified random sampling technique. The initial profile of critical thinking ability is analyzed from 51 state junior high schools in Ngawi with sampling proportion 10% in each strata. The sample which were used were 93 students from 3 schools which is include high categorized (SMPN 2 Ngawi), medium categorized (SMPN 2 Karangjati, SMPN 3 Karangjati, SMPN 1 Pangkur) and low categorized (SMPN 3 Ngawi). Technique of data collecting was written test in form of essay. The result of this research from aspect critical thinking ability (Facione, 2015) was: interpretation was equal to 26,68%, inference was equal to 21,79%, analysis was equal to 20,31%, explanation was equal to 28,10%, evaluation was equal to 36,39% and self-regulation was equal to 36,79%. From those data, can be concluded that all of the aspect critical thinking ability of students in 7th grade junior high school in Ngawi needs to be improved.
Implementation of Problem Based Learning Model in Providing Critical Thinking Skills for Elementary School Students

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Abstract. The use of models in the learning process greatly influences students critical thinking skills. The teacher has tried to improve critical thinking skills by applying various learning models, but the application has not been maximized so that students critical thinking skills have also not developed and increased. Alternative learning models that can improve critical thinking skills are problem based learning models. The model of problem based learning is a learning model that presents a real problem as a context for learning students to have the ability to think critically. So that in improving critical thinking skills can use the application of problem based learning models. The purpose of this study was to find out how the application of problem based learning models in improving critical thinking skills in students of grade V elementary School in Purwodadi. This research uses a descriptive qualitative method. Data collection techniques using observation, interviews, and documentation with the source of teachers and students of grade V elementary school in Purwodadi. The conclusion is that one of the efforts to improve students critical thinking skills to use problem based learning models.

Keywords: PBL, critical thinking skills.
Learning device support higher order thinking skills (hots) for elementary schools

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Abstract. Learning in the curriculum 2013, students are expected to have higher order thinking skills (HOTS). The concept of HOTS learning in students can improve critical thinking skills, be creative and be able to solve problems. HOTS is well implemented if the teacher is able to arrange learning devices well. Learning devices can support HOTS by implementing problem based learning device, because learning that presents real problems can stimulate students to solve problems. The purpose of this study was to find out the learning devices that supported HOTS on students of SDN 3 Nambuhan, Purwodadi District, Grobogan Regency. The method of this research is qualitative descriptive. Data collection techniques in the form of interviews and observations. The results of this study indicate that learning devices support HOTS in the form of Syllabus, RPP, LKPD and Assessment. Learning device that support HOTS focus on operational verbs (KKO) on C4 (analysis), C5 (evaluation) and C6 (create) domains.
TRAINING OF STUDENTS’ THINKING SKILL BASED ON SOLO TAXONOMY THROUGH INQUIRY-BASED LEARNING IMPLEMENTATION

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Abstract: Thinking skills based on the structure of observed learning outcomes (SOLO) taxonomy is one of the thinking skills that can be training through the use of inquiry-based learning (IBL). The aimed of the research was analyzed the effectiveness of inquiry-based learning device for training thinking skills of students based on SOLO taxonomy. The research was a part of research and development with the application of used one group pretest-posttest design. Research participant included 88 grade X student taken from senior high school in Manokwari. Collected of data used an achievement test to measure thinking skills was used a rubric SOLO taxonomy with five levels. Wilcoxon test was used for data analysis. It is revealed that sig. 0.000 < 0.05, 64 students experienced an increased level of thinking, 24 students were ties, and no students decrease in the level of thinking. Based on findings data, inquiry-based learning is effective in training students' thinking skills.

Keywords: Effective learning, inquiry-based learning, level of thinking, learning device, SOLO taxonomy,
Assessing Mathematics Higher-Order Thinking Skills in Junior High School

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Abstract. To cope with the demands of the modern era, students should be able to deal with various challenges that they might face in the future. This ability is highly related to the so-called the 21st century skills that cover creativity, critical thinking, and collaboration skills. The 21st century skills are categorized as higher order thinking skills (HOTS); therefore, to develop students’ 21st century skills teachers need to teach and assess HOTS regularly. Despite the importance of HOTS, many teachers still face various challenges, such as lack of understanding of assessing HOTS that include difficulties in developing the HOTS-based problems. Considering this issue, this paper is aimed to provide contemporary research related to assessing junior high school students’ higher order thinking skills on mathematics. A document analysis technique was used to analyze selected literatures on assessing HOTS. This document analysis focused on: (a) the purpose of assessing HOTS, (b) the types of technique to assess higher order thinking skills in mathematics, and (c) the instruments for assessing higher order thinking skills.

Keywords: assessment, high order thinking, junior high school
Comparison of Pheromone Extraction Methods for *Callosobruchus maculatus* (F.) Warehouse Pest Control

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**Abstract.** *Callosbruchus maculatus* is a warehouse pest that attack many various of nuts. One of the food preservation techniques from the threat of pests in Indonesia is the use of chemical pesticides and fumigants. However, it can interfere the human health, contaminate the environment and non-target organisms. The aims of this study is to compare the extraction method of dimethyloctane dioic acid and analyze the effectiveness of dimethyloctane dioic acid nanoparticles in controlling *C.maculatus*. The research method consisted of sample preparation, dimethyloctane dioic acid extract, like-dislike test and GC-MS analysis. The results showed that compounds extracted using the sampling headspace aeration method were more effective and right on target than body extract method. The compound of dimethyloctane dioic acid from body is very high evaporation rate than headspace aeration. The *Independent Sample T Test* gave significant results between *C.maculatus* response to headspace aeration and body extract method.
The Implementation of Collaborative Learning Models using Worksheet to Increase Student Learning Outcomes at Senior High School the Subject of Light Waves

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Abstract. This action research aims to increase the learning outcomes of students by implementing of collaborative learning models using worksheet on the subject of light waves in SMAN 2 Indramayu XI-1 Mathematics and Natural Sciences. The research models used in this study is action research models proposed by Kemmis and Taggart, actions applied in action research with the following stages: the first stage of planning; the second stage of implementation; third stage of observation; fourth stage of reflection. This study consisted of three cycles implemented in January 2019. The instruments of this study are worksheet, observation sheets of teacher and student activities and learning outcomes assessment sheets which consist of cognitive, psychomotor and affective assessments. Based on the results of research and discussion of students learning outcomes gradually in each cycle, the conclusions obtained in this study that by implementing of collaborative learning models using worksheet to increase students learning outcomes at senior high school on the subject of light waves.

Keywords: collaborative learning, worksheet, learning outcomes.
The Effect of SETS Learning Model And Scientific Attitude Toward Student’s Physics Achievement

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ABSTRACT
The purpose of this study is determine the effect of science, environment, technology, and society (SETS) learning model and scientific attitude toward student’s physics achievement in X1 grade student. This study was conducted at SMAN 2 Indramayu. This study used quasi experiment method with Two Way Anova design. There are 64 students as the sample and it was selected by purposive sampling. Students in experimental group learned through Science, Environment, Technology, and Society. Meanwhile, in control group, students learned through Inquiry Learning. The result of this study are: the student’s achievement given by Science, Environment, Technology and Society is higher than Inquiry; there is influence of interaction between learning models and scientific attitude toward student’s achievement; student’s achievement given by Science, Environment, Technology, and Society is higher than Inquiry in group of student’s with high scientific attitude; and student’s achievement given by Science, Environment, Technology, and Society is lower than Inquiry in group of student’s who have low scientific attitude.

Keywords: Science Environment Technology Society, Inquiry, Scientific Attitude, Student’s Achievement
Validation of learning instrument based on science, technology, and society (STS) approach on chemical equilibrium to train creative thinking skills

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Abstract. The aim of this research is to describe validity of chemical learning instrument consists of Syllabus and Lesson Plan (RPP), Students’ Worksheet, and Assessment Sheets of Concept and Creative Thinking Skills based on Science, Technology, and Society (STS). The subject is Chemical Equilibrium. The learning instruments aimed to train creative thinking skills. The development of learning instrument used 4D’s model. The validity data from the results of validation by expert using a validity test sheet in the form of a questionnaire. Validated by two lecturers and one teacher. The data obtained were analyzed using a Likert scale. Average validity test results for (1) the syllabus and lesson plan is 3.33 - 4 with valid and very valid categories, (2) the students’ worksheet is 3 - 4 with valid and very valid categories, and (3) the assessment sheet of concepts and creative thinking skills is 3.33 - 4 with valid and very valid categories.
Students’ Higher-Order Thinking Skills and Characters on Problem-Based Learning with Character Emphasis

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ABSTRACT

This study aimed at investigating the effect of Problem-Based Learning with Character Emphasis on the students’ higher-order thinking skills and characters on biology subjects at Madrasah Aliyah. This experimental research was conducted at two Madrasah Aliyah in Mataram using Single Factor Independent Group Design. The treatment in this study was given to three independent randomly selected groups at each Madrasah, namely Problem-Based Learning with Character Emphasis, Problem Based-Learning, and Regular Learning. The data of the students’ higher-order thinking skills were collected through essay tests and the data of the students’ characters were collected through self-assessment sheets. The results of analysis using MANOVA showed that the average highest score for the students’ higher-order thinking skills was found on the Problem-Based Learning with Character Emphasis group, it was significantly different with the Regular Learning group, yet it was not significantly different with the Problem-Based Learning group. Meanwhile, for the average score of the students’ characters, the Problem-Based Learning with Character Emphasis group obtained higher and it was significantly different with the other two groups. The conclusion is that the Problem-Based Learning with Character Emphasis affected the students’ higher-order thinking skills and characters on biology subjects at Madrasah Aliyah.

Keywords: Problem-Based Learning with Character Emphasis (PBL-CE), Problem-Based Learning (PBL), Regular Learning (RL) Higher-Order Thinking Skills (HOTS), Character
THE ANALYSIS OF BIOLOGY TEACHER'S TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE DEVELOPMENT IN LESSON STUDY

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ABSTRACT

The study aims to analyze the development of biology teachers’ Technological Pedagogical Content Knowledge (TPACK) in lesson study and to describe the role of observer in developing teacher’s TPACK during the activity. The lesson study was carried out in two forms, school based lesson study and biology teacher association based lesson study. Method used in the study was descriptive involved teachers in one school located in Bandung and member of biology teacher association in West Bandung District. The development of TPACK was focused on five components, they are: learning objective, concept, pedagogy, evaluation and technology. The information of teachers’ TPACK was gained from CoRe + technology and the result was categorized in pre, growing and maturing TPACK. The study reveal that the teachers’ TPACK in school based lesson study was more in the aspect of pedagogical knowledge meanwhile teacher TPACK in biology association lesson study improved their TPACK in pedagogycal knowledge, content knowledge and technological knowledge. The development of teachers’ TPACK were varied for each indicator from pra to maturing and from growing to maturing. The overall result, the development of two type Lesson study was more to the pedagogical knowledge. The study suggests that teacher association based lesson study is more effective to develop teacher TPACK than school based lesson study, and the role of observer is important in developing teacher TPACK.

Key word: TPACK, Lesson Study
DEVELOPING ASSESSMENT AS LEARNING TO IMPROVE THE STUDENTS' COMPETENCIES IN SCIENCE COMPETENCY

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ABSTRACT

The objective of this research is to develop assessment as learning (model-AaL) model for improving competency of senior high school students in science subject. The study belongs to the research and development (R & D), consist of two phases by namely research and development. The former included preliminary research, study of the research results, analysis of the model components, and the arrangement of model prototype. Latter, validation model was comprised by experts and practitioners, teacher training for using the model, limited and extended model experimentations accompanied with evaluation. The subjects of the research were science teachers and Grade XI senior High Schools students of competencies in Science Competency. Data was obtained by through in-depth interview, questionnaire, observation, and test. Data was analyzed by using the qualitative approach descriptive analysis technique and quantitative approach with analysis techniques of repeating measurement analysis and sample test paired. The results shown that: (1) the model-AaL consisted of six components, namely: objective, structured task, self-assessment, peer assessment, observation on student’s activities, and feedback; and (2) the model-AaL can effectively improve the students’ of competencies in Science Competency senior High Schools, with a value of p (Sig) < α (0.05).

Keywords: model-AaL, students’ competencies, Science Competency, model of assessment
SCAFFOLDING DESIGN TO IMPROVE PEDAGOGICAL COMPETENCE OF NATURAL SCIENCES FOR PRE-SERVICE BIOLOGY TEACHERS

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ABSTRACT

This research aimed to develop the curriculum and module of natural science curriculum development for junior highschool – (NSCD for JHS) subject. This work is a research and development study. The development model used in this research was ADDIE (analyze, design, development, implementation and evaluations). The results of validator assessment for the suitability of teacher’s qualification standard for the content knowledge = 3.8 (extremely valid). The suitability of teacher’s qualification standard for the content of pedagogical = 3.9 (extremely valid). Then the curriculum is developed into a module. The design of module is according to the principle of scaffolding. The most basic level contains the most complete example of cross-disciplinary integration. The second level is about the integration between subdisciplines in science, the completeness of the example is reduced. Scaffolding at the highest level, fewer examples. The third level concerns aspects of pedagogical skills. Examples are given in two forms namely Curriculum 2013 and Curriculum 2013 revised edition (Curriculum 2016). Module 2 and 5 gaining 100% responses liked by the students are categorized practical. The hardest one to be understood is module 4. Module 2 is the most effective one in which the students achieved the highest score of 96. Module 3 is the most difficult one to be completed; the students’ mean was 47.

Keywords: Scaffolding, integrated science teachers preparation for junior high school
The development of integrated science textbook use research-based learning for Junior High School

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ABSTRACT

According to the 2013 curriculum, science subjects in Junior High School were developed as integrated science. Integrated science learning used themes to link subject material to the everyday life of students, so they can gain meaningful experiences. The results of the survey showed that the science textbooks material has not been integrated and has not involved student activities. This has an impact on the low competency of students. One effort to improve student competency is to develop integrated science textbook use research-based learning. The aim of the research was to develop integrated science textbook use research-based learning. The research used the Plomp model which consisted of three phase namely preliminary research, prototyping phase, and assessment phase. The research instruments were observation sheets, questionnaires, interview guide, validation sheets, tests, attitudes and skills assessment sheets. The results showed that integrated science textbooks use research-based learning were categorized as valid, practical, and effective. Validity of textbooks based on expert judgment. Practicality of textbooks based on teacher and student responses. The effectiveness of textbooks in improving student competency based on the competency of most students was included the good category and the increase in student competency was included the high category.

Keywords: textbook, integrated science, research-based learning.
Development of Learning Materials Using Problem-solving Models To Train Critical Thinking Skills

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Abstract. Critical thinking skills is one of the high-level thinking skills that encourage students to question what they hear and examine the wrong thoughts. This research aims to determine the feasibility of chemical learning materials that have been developed with a problem-solving model to train critical thinking skills. This research uses the Dick and Carey development model. The first step is validated learning materials to the 3 experts and the second step is trial with one group pre-test post-test design. Learning materials have been developed include lesson plan, worksheet, and assessment instruments. The results of the research are obtained as follows: (1) The developed learning materials is valid, (2) The implementation of the problem-solving model gets good categories, (3) Score for each component critical thinking skills are skilled and highly skilled, and the average N-gain is at high criteria. Chemical learning materials with problem-solving models have been valid, practical, and effective to train critical thinking skills. The novelty of this study is problem solving models according to Polya can be applied in the chemistry learning of the reaction rate using learning materials have been developed, so that it becomes a solution to train critical thinking skills needed in understanding chemical comprehensively.
LOCAL CONTENT ADIWIYATA CURRICULUM AND RESPONSIVE WEB-BASED MITIGATION

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ABSTRACT

This research is conducted to fill the absence of guidance on Adiwyata curriculum based on local wisdom and mitigation through the integration of material into the syllabus and lesson plans implementation in elementary schools. It aims to produce an elementary curriculum that can be accessed through responsive web as an effort to realize schools that responsible for environmental management and protection and also know how to mitigate disasters. Type of this research is model development using ADDIE model. Sample of respondents are first and second grade teachers, while subjects of trial are 30 students of SD Negeri 5 Palu City. Data are taken from observations, interviews, and questionnaires with the instruments of validation sheets, response questionnaires, and environmental care instruments. The research results show that: 1) curriculum validation in the form of content and product appearance of good category, 2) it is very practical and effective to use, 3) it is useful for realizing environmental care and introducing regional culture and art, including dances, special foods, and regional games. Based on that, it can be concluded that the development of this curriculum is feasible and can increase the environmental awareness by utilizing natural materials and waste as learning media and reference to implement local content Adiwyata school programs and disaster mitigation.

Keywords: Environmental care and awareness, ADDIE, disaster mitigation
Problem Based Learning with Argumentation as A Hypothetical Model to Improve Critical Thinking Skills of Junior High School Students

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Abstract: Problem Based Learning with Argumentation (PBLA) model is designed to improve the thinking skills of junior high school students. This study aims to formulate a hypothetical PBLA model through stages, namely: preliminary studies, theoretical studies, relevant research results, and frame of mind. The hypothetical PBLA model is based on the problem-based learning model (PBL) which is supported by argumentation preparation according to the Toulmin Argumentation Pattern (TAP). The results of the PBLA hypothetical model formulation have 5 phases, namely: (1) identification of problem and motivation, (2) organization and investigation, (3) build argumentation, (4) sessions argumentation, and (5) evaluation-reflection.

Keywords: PBLA model, critical thinking skills, junior high school.
Dimethyldecanal Analysis on Body Extract and Head Space Sampling Method

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Abstract. Tribolium castaneum is warehouse pest for flour commodity. The usage of chemical pesticide to control Tribolium castaneum is harmful to humans and environment. One of effective and eco-friendly method is utilization of dimethyldecanal specific pheromone which act as attractant that affect both sex. The purpose of this research is to analyze the influence of dimethyldecanal towards flour beetle behaviour respons. This research conducted by sample preparation, dimethyldecanal extraction, like dislike assay, and GC-MS analysis. Dimethyldecanal extract was obtained using body extract and head space sampling methods was then tested for its effectiveness in influencing the behavior of Tribolium castaneum using like dislike test and analyzed using GC-MS. Like dislike test based on One Way Anava analysis showed that there was significant difference between dimethyldecanal extract from body extract and head space sampling in influencing the behavior of Tribolium castaneum ($P = 0.001; P < 0.05$). Based on GC-MS analysis, dimethyldecanal compounds can only be detected in head space sampling extract. Like dislikes test result and GC-MS analysis showed that dimethyldecanal can be extracted using head space sampling method but cannot be extracted using body extract method.
Evaluation of Field Training Program Solus Par Aqua (SPA) in Mataram

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ABSTRACT

This study aims to: 1) evaluate the components of preparation (antecedents), 2) evaluate the components of the transaction (transaction), 3) evaluate the components of learning outcomes (outcomes). This research is an evaluation research using a qualitative approach supported by a quantitative approach. The data of this study were collected using documentation, observations and interviews, analyzed by the Stake Model analysis technique, which compares the results obtained with predetermined standards. The results of the study show: 1) Compensation for the identification of needs analysis, vision mission and program implementation objectives is appropriate, the curriculum used is a competency-based curriculum with SKKNI standards, the educational qualifications requirements of instructors have not fulfilled the requirements as Level II Spa educators, infrastructure facilities are well met, the financing requirements are well fulfilled, 2) the transaction component of mastery of facilitators and instructors in preparing learning materials is not good enough, 3) components of learning outcomes (outcomes) in Spa training on good cognitive aspects, on psychomotor aspects are very good, and test results all Spa training program participants are good. This research contributes in the form of development of competency test assessment instruments that have not previously been available at the BP-PAUD and Dikmas NTB Labsite

Keywords: Program Evaluation, Stake model, Training Spa (Solus Paper Aqua)
Abstract. Creativity is one of some competencies needed in the 21st Century, therefore creativity is something that people should have to face challenges in the 21st Century. The aim of this research was to 1) find the creativity’s level which measured based on aspects Fluency, Flexibility, Elaboration, Originality, and Problem Solving; 2) find the percentage of each creativity’s indicators. This research was held in SMP Negeri 1 Kawedanan Magetan on second semester 2017/2018. This research’s subject were 55 7th grade students, determined with the random sampling technique. This research was descriptive quantitative research. Data were collected using observation technique. Analysis technique of observation sheet with quantitative analysis. The outcomes showed that: 1) student’s creativity in the high level was 31, in the medium level were 17, in the low level were 7; 2) the percentage of each creativity’s indicators in Fluency 74.55%, Flexibility 78.64%, Elaboration 77.42%, Originality 87.73%, and Problem Solving 88.41%. The conclusion was the level of student’s creativity on Science learning was at high level seen on each aspect which gets the result over 50%. Creativity analysis in this research can be used as a reference for further research about measuring deeper creativity.
Gamified Experimental Data on Physics Experiment to Measuring The Acceleration Due to Gravity

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This research is a first step in the model design of gamification on physics experiment that engage pre-service physics teachers (PPTs) to an experiment system designed like gameplay. The implementation of gamification on physics experiment to measuring acceleration due to gravity (g) using the application of physical phone experiments (phyphox). It was involved 25 PPTs at one of the University in Bandung. This quasi-experimental research used one-group-pretest-posttest design. Data were collected through tests and questionnaire. The physics experiment activities were monitored through WhatsApp. The result of data analysis shows that the implementation of gamification on physics experiment can improve PPTs’ concept mastery related to the free-fall motion concept that can be categorized as medium (<g> = 0,30 and d = 0,32). The model of gamification on physics experiment that was designed create the atmosphere of physics experiment more fun and competitive, promoting motivation to engage in physics experiment activities such as observing, collecting data, analyzing data, inferring and communicating. Further development, this model of gamification needs to be supported by a system that can integrate the assessment automatically. It will be facilitate lecturers in conducting product and process assessments.

Keywords: gamification, physics experiment, acceleration due to gravity, phyphox.
Profile of student’s conception in implementation of predict-observe-explain (POE) strategy on thermochemistry concept

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Abstract. Every student has different understanding of a concept. To achieve expected cognitive abilities, so it needs a good understanding of concept. Based on preliminary research understanding of thermochemistry concept is low. This low ability caused of majority of student still have misconception. This misconception should be removed, one of the way to remove is using predict-observe-explain (POE) strategy. The aim of this research is to find out profile of student conception after implementation of POE strategy. The subject was 36 student of science class at 11th grade of SMA Kemala Bhayangkari 3 Porong. This research was using three tier diagnostic test to know student’s conception. Generally the result was student’s conception changed. It indicated with the result of pre-test, initially 72.80% student have misconception, 15.14% didn’t know the concept and 12.78% knew the concept, while the result of post-test changed become 92.78% knew the concept, 3.06% didn’t know the concept and left 4.17% with misconception. So it can be concluded that student’s conception profile after implementation POE strategy generally changes become knew the concept and student conception who didn’t know the concept and misconceptions showed low percentage.
The Effect of Snowball Throwing Method Towards The Science Students Learning Result at SD Inpress 5 Doom.

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ABSTRACT

This study aims to determine the effect of the snowball throwing learning model on student learning outcomes in IV students of SD Inpres 5 Doom Classes 2018-2019 Academic Year. The type of research used is quantitative experimental research with pre-experimental specifications with the design of one group pre test - post test design. The sample performance was done by purposive sampling technique, with 26 students for the experimental class. The instrument used was a multiple-choice pre-test and post-test test in 20 questions. The results of the analysis of the frequency distribution data in the pre-test and post-test given showed a significant difference because for the students' pre-test the score was more than 59 with a percentage of 69.23% while for the post-test students got more 70-79 with a percentage of 34.61% . Validity test The researcher involved 1 (one) expert validator, namely 1 (one) lecturer. Reliability test shows reliability analysis above 0.60 that is 0.721 so it is said to be very reliable on Alpha Cronbach's. The results of the data normality test with Kolmogrov-Smirnov show that the variable data is normally distributed because of the Asymp value. Sig (2-tailed) 0.060 greater than 0.05. The results of the t-test obtained t=7.936 and t table at the value level Sig. (2-tailed) 0.05, which is 1.70 (t count <t table). This shows that the scientific learning approach influences the mathematics learning outcomes of the fourth grade students, so that the hypothesis is validated.

Keywords: Learning model, Snowball throwing, Learning Outcomes, Natural Science.
The Appropriateness of Developing the Media: Experts’ Validation and Students’ Response of Learning Media Based on Augmented Reality Technology for Natural Science Lesson

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Abstract. The development in science are so rapid in this era. Many experts exploited medias with new technologies in science learning based on the development of 21st century education. Technology is used as innovative learning media, that can follow the times. Technology which is integrated in learning is strategies for achieving learning purposes. This research is conducted to develop and find out appropriateness of learning media based on augmented reality technology for natural science lesson. The media was validated by the experts and science teachers. The samples were 30 of 8th grade students. The method was descriptive quantitative and the instruments were validation sheets and student questionnaires. Based on the results, it shows validation of media is 83%, subject 82%, language 87%, and from teachers are 88%. While the results of evaluation stage are 91%. It can be concluded that is suitable to used as learning. Then, this media can be used for science learning process in classroom and can be used for teachers as a reference for developing other learning media.
Various population issues become challenges in sustainable development in Indonesia. For this reason, synergy from various parties is needed to overcome and anticipate the problems caused by this population impact. One of them is by increasing the strategic role of teachers in instilling knowledge, attitudes, behaviors that are responsive and adaptive in dealing with population situations for headmaster, educators, education staff, and students. The effort that can be done is to integrate population material into the teaching and learning process according to the curriculum and local culture. The purpose of the study was to find out the implementation of the population material integration curriculum at High School. The results of this study are that the school curriculum can integrate population material with science subjects, but must be supported by teachers, students, headmaster. In conclusion, the school curriculum at the high school level can be integrated with population material with support from various parties.

Keywords: curriculum, high school, population.
PROMOTING CHILDREN’S CONSERVATION AWARENESS OF *Macaca fascicularis* THROUGH NARRATIVE VIDEO.

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**ABSTRACT**

This research and development (R&D) aimed to develop a narrated video of monkey’s daily behavior *Macaca fascicularis* for conservation education. This R&D were conducted by the following steps as identification of potentials and problems of creating the video, data collection, video design, validation by media and content experts, revisions, and the limited field-testing of final products. To collect data some research instruments were developed such as validation sheets, feasibility test, and attitude scales. The data were analysed descriptively and quantitatively. The results showed that scores of validation video were classified as ‘valid’ (94.23% and 87.5%). Video media was also rated ‘feasible’ (95.24%) by the local forest tourism manager. Level of children conservation awareness is ‘high’ (88.42%). In sum, the videos are valid, feasible, and effective in instilling conservation awareness as well ready for use in promoting children’s awareness of long-tail monkey *Macaca fascicularis* protection.

**Keywords:** Conservation, *Macaca fascicularis*, Narrative video.
Development of learning media pairing card to improve the early math learning outcomes

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Abstract. Instructional media is a tool for delivering material to students. The aim of this research is to develop a “pairing card” media that aims to improve the learning outcomes of early mathematics of a child. The research subjects were 75 grade 1 elementary school students in DKI Jakarta. The research method is research and development (R & D) with data analysis techniques through qualitative and quantitative. Pairing card developed through 4 main steps, namely introduction (objective needs and conditions analysis), media development, media validation and revision, and media implementation. The pairing card media was tested with one on one, small scale trials, and large scale trials. The results showed that media pairing card significantly improved the early mathematical results of the child with basic competencies, namely count many objects, sort many objects, use the properties of exchange operations and grouping, solve problems involving addition and subtraction of numbers. Pairing card is media card that contains the content of mathematics with how to play find the pairs, the results of interviews with teachers that pairing card are easy to use and easy to understand.
Computational thinking and literacy science are competencies that must be possessed by pre-service primary teachers in the 21st century. This study aims to improve the competence of teaching concepts in science concepts that have been developed in improving computational thinking skills of PGSD students at Muria Kudus University. This research is part of the Research & Development (R & D) procedure which includes 3 stages, namely preliminary studies, development studies and validation studies. In this validation phase, the concept of science teaching literacy has been developed in large-scale trials with quasi-experimental control groups only for the second semester PGSD students in the 2017/2018 school year, where class 2A as the control group and 2C class as experimental group were taken randomly. After being given intervention, the two classes were given posttest to determine its effectiveness. Based on hypothesis testing using the right t-test, it has $t_{\text{count}} = 2.215$ and $t_{\text{table}} = 1.99$. Thus, it could be concluded that the teaching materials of developed science literacy concepts were effective in improving students' computational thinking skills.
Causal relationships among economic growth, poverty, and environmental quality using path analysis

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Abstract. Sustainable Development is a development that must be able to accommodate a balance between economic, social and environmental development. Economic development is expected to improve people's welfare. However, the development of the economy in Indonesia is not yet in line with the development of the social and environmental sectors which means there are gaps in the achievement of the three. This study aims to find out the causal relationships of economic growth, the number of poor people (poverty), the Environmental Quality Index and the linkages between them using The Path Analysis Method. The results of this study indicate that economic growth does not have a direct effect on poverty which allegedly has intervention variables between the two, such as unemployment, employment, salary, and income inequality. Poverty has a direct negative effect on the quality of the environment, it shows that with all of its circumspection and in order to fulfill their living needs, the poor people can directly reduce the quality of the environment. On other hand, the economic growth does not significantly affect the environmental quality, both direct and indirect effect. With a positive direction, there are indications that economic growth is beginning to show an improvement effort in environmental quality.

Keywords—economic growth, poverty, environment, path analysis, causal relationships
Development carried out by the government in various sectors not only has a positive impact but also has a negative impact. The negative thing that arises from development and related to the environment is of course pollution. Whether it's water, soil, air pollution, including sound pollution, all of which are referred to as environmental pollution. Water pollution as one of the environmental pollution that gets serious attention. Water is the source of life, all human life depends on the presence of water, especially clean water. Nearly 90% (ninety percent) of human needs need water, the need for water is a primary need for humanity. However, in reality, the Ministry of Environment and Forestry mentions 75 (seventy five percent) of river water in Indonesia has been heavily polluted especially by domestic waste. The water pollution that occurs comes from the contribution of domestic waste in river water above 60 percent. Which of course this condition must be responded to and dealt with seriously and currently 73.24% of the rivers in Indonesia are in a heavily polluted status, while 2.01% meets the class II water quality standards. Nearly 60-80% of the settlements are close to water sources, so caring for rivers is very important, and as one solution to very broad environmental problems.

Based on this description, in this paper we will discuss and analyze that water pollution which is part of the overall environmental pollution is very necessary for us to know how water management should be, and how it should be managed by water if pollution has occurred.

**Keywords:** Pollution, Water, Environment.
Self-Adjustment of Candidate Counselor Student who is Forced in Taking a Guidance and Counseling Department

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ABSTRACT

This study aims to determine the process and self-adjustment factors of guidance and counseling students to be able to maintain their status as students of guidance and counseling. This study uses a qualitative approach to the type of case study research and data collection techniques using observation and interviews. The results showed that students A, B, C, and D claimed to be forced to take the direction of guidance and counseling. Until the third semester of students A and B were able to adjust themselves, students A and B considered this a fate that must be lived and reacted with grace and even now they felt solid with the direction of guidance and counseling. While students C and D have not been able to adjust because they are unable to live it. Students C and D look for alternative roads by moving majors as desired.

Keywords: Self-Adjustment, Candidates Counselor Student, Guidance and Counseling
STUDENTS’ BEHAVIOUR TOWARDS ETNOSTEMS: INSTRUMENTS FOR STUDENTS OF ETNO-STEMBASED SCIENCE EDUCATION

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ABSTRAK

The learning process that is synergistic with the development of the current era is very necessary. Local wisdom that is aligned with technology is a challenge. Therefore, the objective of this study is to develop a tool for measuring students’ readiness towards developing instruments related to etno-STEMbased Science Education courses. The selected items were given to the expert team for validation. The initial trial of the initial instrument was done using the main component analysis and Cronbach alpha coefficient. The results of a strong coefficient on each instrument can be used as a reference for implementing etno-STEMbased Science Education

The wisdom of the Indonesian people towards the wealth of natural resources and their use is influenced by the lifestyle of the Indonesian people who still tend to be weary. Human resources that are aware of local wisdom and technology and its impact on the environment are needed. Students are as agents of change; developing or not a culture of maintainingetno-STEMbased technology friendly local wisdom.

Keywords: Etno-STEM, Science Education
Restructuring of STSE-Teaching Material on Buffer Solution Developed by 4S TMD to Improve Science Process Skills

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ABSTRAK

Penelitian ini bertujuan untuk menghasilkan bahan ajar larutan penyanga berbasis Science, technology, society and environment (STSE) untuk mengembangkan keterampilan proses sains siswa. Kebutuhan restrukturisasi melalui pengembangan bahan ajar dilatarbelakangi oleh indikasi beberapa konsep pada buku pelajaran yang beredar sekarang masih belum benar sesuai keilmuan, masih belum sesuai dengan kurikulum, dan kurang mengembangkan nilai dan keterampilan. Metode penelitian yang digunakan adalah Developmental Research, meliputi tiga tahap yaitu design, development, dan evaluation. Pada tahap development digunakan model 4S TMD yang terdiri dari tahap seleksi, strukturisasi, karakterisasi dan reduksi didaktik. Hasil tahap seleksi adalah pengembangan indikator pembelajaran larutan penyanga dari standar isi dari kurikulum, mengembangkan konsep saindara yang bersumber dari buku teks, dan pengembangan basis STSE untuk mengembangkan materi larutan penyanga. Selanjutnya dilakukan strukturisasi dengan membuat peta konsep, struktur makro sebagai pedoman urutan penyajian materi larutan penyanga, dan multipel representasi. Hasil dari strukturisasi adalah draf bahan ajar larutan penyanga yang kemudian dilakukan penghalusan, penyesuaian dan penyesuapi. Setelah melalui karakterisasi ditemukan empat teks sulit yang kemudian dilakukan reduksi didaktik melalui tiga cara, yaitu penggunaan gambar, penggunaan simbol, dan partikularisasi. Hasil evaluasi terhadap bahan ajar yang dikembangkan menunjukkan bahwa bahan ajar bersifat self instructional dilihat dari keterpahaman termasuk mudah dipahami (80,2%), selanjutnya dilihat dari kelayakan bahan ajar termasuk dalam kategori sangat layak (96,3%), pengembangan keterampilan proses sains mampu dikembangkan melalui lembar kerja siswa berupa tugas dan pertanyaan yang diajukan pada bahan ajar tersebut.

Kata Kunci : Bahan Ajar, STSE, Larutan Penyanga, Model 4S TMD, Keterampilan Proses Sains
The Strategy to Enhance Teaching Skill of Teacher Candidates through Web-based Learning

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Abstract. Basic teaching skills are essential, absolute and must be mastered by teacher candidates in carrying out their teaching task. Therefore, teacher candidates are required to study independently both in groups and individuals in order to develop their teaching skills in terms of deepen theories through continuous practices. Besides that, the effort that needs to be done is to design a learning strategy and approach that allows teachers candidates to flexibly develop their teaching skills. This paper was developed from initial research that provides an overview of strategies to improve teacher teaching skills through web-based learning. The strategy for implementing web-based learning uses approaches: first, introduction and review, relating to the overview and delivery of learning objectives; the second, developing understanding, emphasizes the understanding of the concept of teaching skills; third, presentation, presents concrete examples and video modelling; fourth, drill and practice, providing opportunities for independent practice, discussion and feedback; and fifth, is the final practice, is the last practice carried out in front of the class in order to measure the improvement of teacher candidates' teaching skills.
Abstract. The purpose of this study is to evaluate the effectiveness of TSP courses by EDI UNJ. The TSP Program Evaluation by the EDI Center UNJ focused on four aspects including: (1) context, (2) input, (3) process, and (4) product between the 2011/2012 academic year and the 2015/2016 academic year. Viewed from the context, this research is classified as research using qualitative and quantitative approaches. The evaluation model used is the CIPP evaluation model. This evaluation model was developed by Daniel Stufflebeam. Result of research (1) Evaluate the Context component. The evaluation of the context component carried out was the legal basis / UNJ Rector’s Decree and the objectives of the educational development institution. It can be concluded that context evaluation is in the high category; (2) Evaluate the Input component. Evaluation of Input components includes supervisors, student competencies, requirements to take part in TSP, information about TSP, and development, Guidebooks, training and assignments of Faculty TSP coordinators. Of the eight components the input of information from the development team relating to partner schools is in the unfavorable criteria (43.8%); (3) Evaluate Process components. Evaluation of Process components includes aspects of readiness of supervisors, ability of supervisors, introduction of partner schools, guidance to students, socialization of TSP programs and monitoring. Of the six aspects all are in very precise and very good criteria; (4) Evaluation of product components. Product evaluation is an evaluation conducted to determine the success and achievement of program objectives in the three aspects evaluated, namely the TSP assessment, the ability of the lecturer to assess and the results of the TSP. Of the three aspects evaluated all were in the very good, very precise and very high category.

Keywords: Evaluation Program, TSP Course, CIPP Evaluation Model
Viability microcapsules *Lactobacillus plantarum* Mar 8 and KMar C2 in chocolate candy (*Theobroma cacao* L) for probiotic purposes

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**Abstract.** *Lactobacillus plantarum* Mar 8 and KMar C2 is a lactic acid bacteria can be used as probiotic. Chocolate have served as antioxidant and beneficial for health, it contains : flavonoids, theobromine, epicatechin, and catechin. Combination between chocolate and bacteria can increased chocolate benefit as probiotic chocolate. Probiotic used to decrease uric acid level in blood if contains $10^9$ – $10^9$ cfu/g living bacteria. The research purpose study of viability probiotic in chocolate candy with addition of *Lactobacillus plantarum* Mar 8 and KMar C2. The assay used in viability research is Total Plate Count. The process encapsulation of Mar 8 dan KMar C2 use 10% milk skim and 3% chocolate fat to maintain viability of *Lactobactillus plantarum* Mar 8 dan KMar C2 mixed in chocolate candy. The result revealed microcapsules *Lactobacillus plantarum* Mar 8 and KMar C2 viability before mix with chocolate candy $1.325 \times 10^{10}$ cfu/g, after mixing in chocolate candy decreased to $1.7 \times 10^9$ cfu/g and probiotic content for the addition of 20 g of microcapsules at 1000 g chocolate candy was $3.4 \times 10^7$ cfu/g chocolate candy. The probiotic chocolate candy will be use to decrease the level of uric acid in blood.

Keywords : Chocolate candy, Encapsulation, Lactic Acid Bacteria, Probiotic, Viability
ENVIRONMENTAL EDUCATION TRANSFORMATION IN EARLY CHILDHOOD THROUGH HORSE RACING AT DOMPU TRIBE

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ABSTRACT

This study aims to examine the role of traditional horse racing games in the tribes of the Dompu tribe, Indonesia. This study uses a qualitative approach with ethnographic methods. The subjects of the study were five young jockeys aged 5-11 years and seven horse owners. Data were collected through observation, interviews, documentation and focus group discussion (FGD). The results show that the transformation of environmental education for early childhood through horse racing can build children's physical, psychological and social health. This game is an environmental education facility for children to care and preserve nature. This game is also one form of sustainable tourism. Another important finding is that the traditional horse racing game in the Dompu tribe has become a media for transforming environmental education for children. This study informs that the transformation of environmental education can be done for children starting from 5 years old through a traditional horse racing game. This research can also be a reference for early childhood education practitioners to create a special school for children who have a hobby of riding horses.

Keywords: early childhood, environmental education, horse racing
ENABLING INDONESIAN PRE-SERVICE TEACHERS TO DESIGN BIOLOGY LEARNING TOOLS USING METACOGNITIVE STRATEGY

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ABSTRACT

Biology pre-service teachers are required to be able to design innovative learning tools, which include lesson plan, student’s worksheet, and assessment. Metacognitive strategy along with the assistance of Self Understanding Evaluation Sheet (SUES) can be considered to enable them construct the learning tools. This study aimed at training pre-service teachers able to design biology learning tools. This study used one-shot case study design with 36 biology pre-service teachers at Universitas Negeri Surabaya, Indonesia, involved as the research participants. The implementation of metacognitive strategy included revealing pre-service teachers’ prior knowledge, determining their confidence, writing their new knowledge, contrasting their prior knowledge with the new knowledge, and evaluating their understanding using SUES. Results showed that all pre-service teachers were skilful in designing biology learning tools, of which the scores given by the lecturer and themselves showed insignificant difference. Another finding portrayed that the pre-service teachers provided positive feedbacks as a response to the implementation of metacognitive strategy during the learning process in designing biology learning tools.

Keyword: metacognitive strategy, SUES, learning tools, Biology.
Building scientific creativity of high school students through biological practicum activities based on creative research projects

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Abstract. Developing creativity in biology learning is a necessity that must be built so that students are able to solve their biological problems. Research has been conducted which aims to investigate the effect of Biology practicum activities models based on creative research projects on the scientific creativity of high school students. The research subjects were 34 high school students in class X MIPA as an experimental class and 34 students as a control class. The data of the research results were collected using a disposition questionnaire creative thinking, tests of creative biology thinking skills and the assessment of creative products. The results of the study showed that the creative dispositions of the experimental class students and the control class were classified as average categories, improve creative thinking skills at a medium category and produce a creative product including good categories. Thus the Biology practicum model based on creative research projects needs to be developed in high school because it contributes to fostering students' scientific creativity.
Use of the Science Technology and Society (STS) model with the help of Facebook in science learning for junior high school students

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Abstract. Research has been conducted to investigate the influence of the Science Technology Society (STS) learning model which is assisted by social media Facebook (FB) in science learning. This research was conducted in a group of junior high school students in Tondano, North Sulawesi, Indonesia. The research method is a Quasi-Experiment Posttest-Only Control Group Design. The experimental group was treated with the STS learning model assisted by FB, and the control group with lectures, discussions, question, and answer. The number of samples in the experimental group consisted of 25 students and the number of samples in the control group was 25 students. The results of the statistical analysis concluded that there was an influence of the STS learning model with the help of Facebook social media on improving student learning outcomes in science learning in junior high school students. The research data showed that the average post-test score of student learning outcomes in the experimental group was 88.5 higher than in the control group score was only 68.9. The implication of the research results is that the use of Facebook social media in the learning process will make teachers and students interact not only in the classroom. In addition, the STS learning model arouses students' interest in science learning, especially related to strengthening scientific literacy.
IMPROVING THE EFFECTIVENESS OF SCIENCE EXPERIMENTS THROUGH MULTIMEDIA TEACHING MATERIALS FOR COLLEGE STUDENTS

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ABSTRACT

The purpose of this study aims to explore the effects of three different forms of multimedia teaching on the achievements and attitudes of junior high school students in the context of the science laboratory. That three forms of multimedia teaching materials, static images, videos, and animations, are used to teach chemical trial for 120 students of Samudra University Elementary School teacher education, Langsa. The method in this study is a quasi-experiment with pretest-posttest control group design. The pretest was given to college student to determine learning achievement before the application multimedia to experiment science during learning process for the experimental group and the implementation multimedia and learning feedback a list of questions. Descriptive statistics and ANCOVA were given to analyze collected data. His findings This study shows that videos and animations have more significant effects in promoting student learning achievement in the context of science laboratories rather than static images in terms of operating equipment, technical surgery, experimental procedures, and observation performance. In addition, students show videos The presentation can help them understand the experiment. Finally, these findings and suggestions the study can be a useful reference for multimedia designers and science teacher candidates.

Keywords: College Students; Effectiveness; Multimedia; Teaching Materials; Science Experiments

DOI:
IMPROVING COASTAL CHILDREN ECO-LITERACY THROUGH MANGROVES STORYTELLING

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ABSTRACT

The objective of this research was to determine the level of coastal children eco-literacy by using storytelling about the role of mangroves for coastal communities in Serang Regency - Banten. The research methodology was classroom action research (CAR). The implementation of classroom action research was conducted of two cycles. There were cycle I and cycle II, each cycle consisted of two meetings. This research involved third grade students which consisted of 30 students in SDN Cerocoh, Serang Regency - Banten. The instrument of the research was data collecting technique, the data were observation, tests (pre-test and post-tests), and documentation. The result of this research showed that there was a significant difference of the students’ eco-literacy in pre-test and post-test after learning environmental education with mangrove storytelling. The average score of pre-test was 48.52%, while, after giving treatment in cycle I, the students average score in post-test I was 68.94%. Then, after giving treatment in cycle II, the students’ average score in post-test II was 87.17%. Based on the data the researcher concluded that: 1) there was the improvement coastal student eco-literacy by using mangrove storytelling in teaching environmental education at our environmental thematic subject 2) the students became interested and motivated in learning about mangroves.

Keywords: Coastal Children; Eco-literacy; Environmental Education; Mangroves Storytelling
Insecticidal activity of essential oils compared with chemical insecticide against stored-grain pest *Sitophilus oryzae*

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**Abstract.** Stored-grain pest *Sitophilus oryzae* causes loss of rice in quantitative and qualitative. Until recently, the most frequent ways used to control insect pest is synthetic chemicals that harmful to human health, causing resistance to the pest, and pollute the environment. An alternative solution is offered by natural insecticide. The aim of the research is to analyze the effect of toxicity of three essential oils compared with a chemical insecticide toward *S. oryzae*. Bioassay was carried out by fumigation. The essential oil of *Myristica fragrans* 40 μL g⁻¹ was the most insecticidal than essential oil of *Cymbopogon citratus* and *Eucalyptus* sp. with 100% mortality after 48 h exposure. Chlorpyriphos 2 μL g⁻¹ as chemical insecticide generally used had 100% mortality after 24 h exposure. In spite of natural insecticide had longer time and higher concentration to kill insect pest, but it can be used for integrated management of stored-grain pest *S. oryzae* that more safety for human and environment.
Ethno-science Studies in Chemistry Learning to Develop Science Literacy

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ABSTRACT

The low scientific literacy index of Indonesian students due to lack of attention to the socio-cultural environment as a source of learning and local culture and unique local wisdom has not been widely studied and expressed and even used as a learning resource in instilling soft skills content and contexts in science learning. This study aims to develop science literacy through ethno-science studies in chemistry learning. The method of this study was qualitative descriptive with retrieval of data through direct observation, questionnaires, and interviews. The results of the study showed that is needs to: (1) emphasis on the curriculum which involves the importance of developing chemical literacy for students, (2) the skills of chemistry lecturers in designing learning programs by using local potential in their respective regions, and (3) material coverage of concepts basic chemistry must be discussed, (4) the emphasis must be not only on chemical content but also on context, processes, and attitudes. Thus it can be concluded that the development of scientific literacy needs to be done by focusing on the preparation of future generations of science literacy with curriculum content that pays attention to culture and daily life so that it is more contextual.

Keywords: Chemistry Learning, Ethno-science, Science Literacy
**Framework**

TPACK Using Quick Response (QR) Code to Promote ICT Literacy and Scientific Communication Skills Students in Learning Physics

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**Abstract.** Teachers are an important instrument in finding a new role that is more contextual and relevant to 21st century learning concepts of 21st Century learning concept offered a demanding professionalism of teachers in integrating technology, pedagogy and content knowledge in learning. Framework TPACK (Technological Pedagogic Content Knowledge) into current issues relevant to 21st century learning concepts This research aims to design a learning device in accordance with the framework using technology TPACK Quick Response (QR) Code to promote ICT literacy skills and scientific communication students. The type of this research is a research development with 4D development model covering Define, Design, Develop, and Disseminate. The subjects were 95 students senior high school class X at SMAN 6 Yogyakarta. These results indicate that the developed learning tools such as ICT literacy test instrument and instrument of scientific communication each have a reliability 0.84 and 0.82. Criteria for each item has a value of 0.98 and 1:01 infit meansquare with grain criteria fit with the model of Rasch (meansquare infit ≤ 0.77 ≤ 1.33) with both criteria.

**Keywords:** Technological Pedagogic Content Knowledge (TPACK), Scientific Communication, 21st century skills, Quick Response (QR) Code, Guided inquiry
THE EFFECT OF PROBLEM BASED LEARNING SUPPORTED WITH COMPUTER SIMULATION STUDENT'S CREATIVE THINKING SKILLS

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ABSTRACT

Generally, student's have low creative thingking skills. The students who have a low creative thingking skills will be difficult, in solve the problem. Creative thingking skills will increase learning process. This research aims to determine the effect of PBL with computer simulation towards student's creative thingking skills. The research method use a pretest-posttest design. The subject of this research are three classes, with experiment1 class simulation supported with computer simulations used PBL, PBL use the experiment2 class, and the contol class use conventional learning. The instrument use essay tests that measure creative thingking skills based on problem. The average of pretest and posttest in experiment1 class are 20.28 and 76.62 with N-gain of 71\%, in experiment2 class 20.84 and 68.06 with N-gain of 60\%, and in the control class 20.35 and 44.05 with N-gain of 30\% and all of that classes in the medium category. Based on the results of testing that there is significant difference obtained on PBL applied supported with computer simulations towards student's creative thingking skills.

\textbf{Keywords:} problem based learning, creative thingking
THE APPLICATION OF PROBLEM BASED LEARNING ON MULTIPLE REPRESENTATION TOWARDS CRITICAL THINKING SKILLS IN PROBLEM SOLVING

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ABSTRACT

Learning science, including physics has long been regarded as one of the most abstract and difficult subjects to learn. It is because the human’s mind can’t respond the abstract representations properly. This research aims to describe the applications of PBL based on multiple representations in an effort to develop critical thinking in problem solving of General Physics. Research method use pretest-posttest design. Subject of this research involved two classes with one of experiment class one of control class. Instrument use descriptive test that measure the critical thinking skills based problem. Data will be analyzed by t-test. Average of pretest and posttest in experiment class is 22.3 and 67.57 which percentage increase (N-gain) 58%, in control class, the average of posttest and pretest is 23.03 and 53.97 with N-gain 40% and it is in medium category. Based on the results of hypotheses obtained, there are significant differences between applied PBL assisted multiple representation toward critical thinking skills in physics problem solving.

keywords: problem based learning (PBL), multiple representation, critical thinking
ABSTRACT

The efforts to empower and foster communities in the Indonesia border region must be integrated with efforts to foster soft security. The community in border region, such as Timor Leste seems to be easily affected of nationalisms eroding due to massive interaction with neighboring countries. It urges to be anticipated quickly through better actions and professional procedure. The most strategic way to anticipate this problem is optimizing local educational institutions among the border region. Dealing with this condition, science education can play a crucial with the use of biodiversity as a learning resource which is contextual and has economic values. This model is also able to develop a love for national biodiversity, which is followed by fostering soft security. This research used the research design of development type “Prototypical Studies” as put forward by Akker (1999) and Plomp (2001). The important thing to consider in development research is the quality of the produced learning model (product). Plomp (2001) also provides criteria for product quality, namely: validity (reflecting state-of-the-art knowledge and internal consistency), added value, practicality, and effectiveness. The research results in the first year were (1) Subject Specific Pedagogic (SSP) for science subjects with a contextual approach which is valid and practical as well as has economic value added of biodiversity in order to foster soft security among junior high school students in Indonesia border region -Timor Leste, (2) based on the effectiveness testing on SSP of science learning in junior high schools, this model was proven effective to improve the understanding of concepts, process skills, and soft security among the students.

Keywords: biodiversity, soft security, subject specific pedagogic, local education institution
STSE BEST PRACTICE MODEL: GROWTH OPTIMIZATION AND PRODUCTIVITY OF ORGANIC FOOD PLANTS THROUGH IASMUSPEC APPLICATION

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Abstract

The application of STSE (Science, Technology, Society, and Environment) approach through the Biophysics course has been proved as an effective solution to develop new literacy among the students of Natural Sciences Study Program, Faculty of Mathematics and Natural Sciences, Universitas Negeri Yogyakarta. The application of this approach can solve the students’ learning difficulties in connecting STSE elements within learning by providing integrated technology that is in accordance with basic competencies and learning indicators. The relational model of Integrated Audio Stimulator - Multi Sensor - Pest Control (IASMUSPEC) engineering to optimize growth and productivity of organic food plants directly involves students in realistic science learning by applying technology to assist farmers. The research method to produce STSE best practice model is the combination of Research & Development of spiral model referring to Cennamo and Kalk concept (2005: 6) and Experimental Research for implementing IASMUSPEC to increasee organic food plants productivity. The preliminary study of this research results in two aspect. They are the skills improvement aspect for both students and farmers in applying IASMUSPEC, and the increase of productivity aspect in organic rice plants into 209.81% (yield total for land samples of 8.3 x 29.8 meters) in the treatment plants was 237.3 kg, while for control plants was 113.1 kg. The effects of IASMUSPEC on plant growth rates were also examined. The output of this study is the subject specific pedagogic (SSP) of Biophysics with STSE approach and IASMUSPEC appropriate technology.

Keywords: STSE, IASMUSPEC, organic food plants
READINESS FOR SELF-DIRECTED LEARNING OF AUTOMOTIVE STUDENTS AT YOGYAKARTA TO FACE 4.0 LEARNING SYSTEM

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Abstract

This study aims to study readiness self-directed learning of vocational school student in the automotive engineering department in Yogyakarta to face 4.0 learning system. Readiness self-directed learning is one of the supporting factors in the 4.0 learning system. The research method used in this study was a descriptive survey involving 140 vocational school students majoring in automotive engineering in Yogyakarta. The instruments used were SDLRS instruments developed by Gugliemino. This instrument is designed to measure attitudes, skills, and characteristics that make up the level of readiness of individual learning. Data were analyzed using SPSS 20 and then compared with the reference level of SDLRS developed by Gugliemino. The results of this study were obtained from the results of independent student learning readiness at a score of 59.19 and according to the range of 19-66 SDLR values. In accordance with the readiness of students' learning included in the category below average.

Keywords:

self-directed learning, automotive, 4.0 learning system
Establishing an android-based physics glossary for junior high school students

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Abstract. Understanding Physics term accurately is exceedingly essential in supporting the achievement of Physics learning objectives. Android-based software has many advantages starting from a large number of users, practicality, to the ease in the spread of the application as a means of pinning learning media. The purpose of this study was to develop an Android-based physics glossary. The research steps referred to the Four-D (Define, Design, Develop and Disseminate). The finished product has been declared valid and practical by material experts, media experts, and teachers. The product’s validity value was 4.25 and categorised as “excellent” while the practicality score was 4.53 and categorised as “excellent”. The product testing was carried out through three stages, namely One-to-One Trial involving 3 students, Small-Scale Trial including 12 students, and Field Trial involving 28 students. The developed product, “Physics Glossary”, is in an Application Package File (.apk) format and has been published so that it can be downloaded for free through the Google Play Store. The glossary was designed interactively, making it easier for users to search for physical terms and explanations. Another plus is that the application includes explanations in two languages, Indonesian and English.
Every individual, basically have multiple intelligence. Therefore, in the learning process must facilitate students to be able to develop their intelligence. Through the development of LKS based on multiple intelligences on the material systems of human motion, students' intelligence is enhanced, includes: verbal-linguistic (smart words), visual-spatial (smart images), musical-rhythmic (intelligent music), intrapersonal (smart self), and physical-kinesthetic (smart body). The purpose of this study is to develop LKS based on multiple intelligences that fulfill validity, practicality, and effectiveness. LKS development uses the 4D model (Define, Design, Develop, and Disseminate). The worksheets developed include the subject: bones, joints, muscles, and motion systems in humans. The results of the LKS validation were obtained very feasibly with a percentage of 95.5% in the aspect of content suitability; 92.5% in the aspect of conformity of presentation; and 90.0% on language aspects. Practical analysis was seen through implementation of learning in three meetings with an average of 72.5%; 87.2%; and 85.7% (very good), and student activities when working on LKS. The results of observations related to student activities showed average scores of multiple intelligences ≥ 61 (good category). Effectiveness seen from learning outcomes increases from the average score of 38.5 (pretest) to 85.2 (posttest). The completeness of multiple intelligences also increased, from 23.3% to 90.6% for verbal linguistics; 9.4% to 71.9% for visual spatial; 25% to 84.4% for intrapersonal; 0% to 46.9% for kinesthetic bodies; and 0% to 43.8% for rhythmic music. The conclusion of this study is LKS based on multiple intelligences that have fulfilled validity, practicality, and effectiveness.

**Keywords**: development of student worksheets, multiple intelligences
The Effects of Using Learning Resources and and Learning Motivation on Science Learning Outcomes

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Abstract. This study aims to determine the effect of independent variables of learning resources and learning motivation on science learning outcome by controlling the prior knowledge. In addition, we want to know interaction between the two independent variables that affect students learning outcomes in science. The method used to carry out this research is experiment. The results of the study were: 1) Science learning outcomes between students using modules were higher than those using textbooks after controlling the prior knowledge. 2) There is an interaction between learning resources and the learning motivation on science learning outcome controlling knowledge. 3) For groups of students with high learning motivation, science learning outcomes between groups of students taught with modules are higher than those taught by textbooks after controlling prior knowledge, and. 4) For groups of students low learning motivation, there is no difference in science learning outcomes between groups of students who are taught using modules or those taught using textbooks after controlling the prior knowledge.

Keywords: Learning Resources, Learning Motivation, Prior Knowledge
Minangkabau Values and Culture in Responding to the Enhancement of Character Education Competitiveness of the Indonesian Community in the 21st Century

By Haiyyu Darman Moenir, S.IP, M.Si and Abdul Halim, S.IP, MA

Abstract

Character education is a pattern of education with the aim of forming individual characters in order to train one's abilities towards a better life. The 21st century requires people to have a strong character through character education. Of the many aspects that support character education, there are at least two important aspects that will be studied in this paper. These two aspects include communication and negotiation patterns. Minangkabau is a community entity in Indonesia that has a strong character in the field of communication and negotiation. This can be seen from the many reliable Indonesian diplomats born from Minang and these diplomats have excellent communication and negotiation skills to help Indonesia achieve national interests in the international order. Among these figures is H. Agus Salim, Moh. Hatta and Sultan Sjahrir. The paper focuses on seeing the relevance between Minangkabau values and culture which is the background of these Indonesian national leaders and the character education patterns that shape these figures. This paper uses qualitative methods with a type of descriptive-analysis research to see the relevance of Minangkabau values and culture towards character education which results in individuals with very strong characters to face competition in the 21st Century. The data used in this paper will further explain the forms of Minangkabau values and culture which are then represented in character education that forms communication and negotiation patterns.

Keywords: Value, Culture, Minangkabau, Education, Character, Communication, Negotiation
Indigenous Science: What We Can Learn?
(The Exploration of Balinese Local Wisdom for Science Learning)

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Abstract

Indigenous science is the original knowledge of local communities in studying natural phenomena based on observations that produce products, attitudes, and scientific processes in accordance with the culture and location of the community. The purpose of this study is to explore indigenous science based on the local wisdom of Balinese people that can be used in science learning at school. This research is an exploratory study. Data collection techniques in this study use: observation, interview and literature study. Descriptive data analysis was also carried out for data on indigenous people's knowledge and local wisdom. Based on the results of data analysis, there are three (3) dimensions of science in the Balinese local wisdom that can be used in science learning: First, local wisdom contains elements of scientific attitude; Second, local wisdom is a scientific product; and The Third finding in this study is local wisdom as a scientific process.

Key words: Indigenous Science, Local Wisdom and Science Learning
HOW ARE STUDENT'S COGNITIVE PATTERNS VIEWED FROM HIGHER-ORDER THINKING SKILLS IN KINEMATICS?

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Abstract. Higher-Order Thinking Skills (HOTS) is an ability that must be achieved by students today because this ability is the core of assessment in K13 and also as demand for 21st-century skills. Giving HOTS-based tests is an attempt to explore further the extent to which HOTS is mastered by students in kinematics and also describe cognitive patterns based on student's HOTS. The method used in this study is descriptive, with in-depth analysis of student answers. The research subjects were 51 students. The test instrument used consisted of five HOTS questions which were divided into two analyzing questions, 1 evaluating question and 2 creating questions, has a reliability coefficient of 0.85 with considered high. The results of the study show that the cognitive patterns of students with high HOTS tend to be stable increasing following cognitive levels, for cognitive patterns of students with medium HOTS are having an up and down pattern, while the cognitive patterns of students with low HOTS tend to decline at higher cognitive levels. The whole HOTS in this study is relatively low because only 3.92% of students can reach high HOTS. Thus, it is necessary to apply of learning model such as Problem Based Learning to train students for higher-order thinking in solving physics problems.

Keywords: Higher-order Thinking Skills, Cognitive Patterns, Kinematics
The effectiveness of conceptual change module (CCM) based on mental model to reduce students’ misconception in orbital concept

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Abstract. The main reason that makes researchers interested in doing this research is because the concept of orbitals is still understood misconception, especially because it is caused by aspects of the mental model of students. The aim of the study is to know the effectiveness of conceptual change module (CCM) based on mental model to reduce students’ misconception in orbital concept. Misconception reduction is gained through CRI test method. The results were analyzed by quantitative descriptive. The research design use is one group pretest posttest design. The participants of the study were thirteen students who have misconception status and a low level of perception. The results show that CCM was successfully reduce a number of MC up to 74%. The reductions of MC were shifted to KCC of 71% and into LC for about 16%. There were 13% students with MC status, so it can be said that CCM was not successfully yet to reduce all students’ misconception. The result of wilcoxon sign ranked test show that CCM influenced on the reduction of MC. The novelty of this research is in the CCM that has been developed. CCM has been developed according to the needs of individuals with a misconception status and has a low mental model on perceptual aspects so that it can be used as an alternative way to correct these misconceptions.
Validity of *Guided Discovery* Based Learning Instruments to Increase Students’ Learning Outcomes

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**Abstract.** This research aimed to describe the validity of learning instruments guided discovery oriented which has developed. Research model used is Research and Development (R & D). The learning instruments were developed based on guided discovery phases. It included Lesson Plan, Worksheet, and students’ learning outcomes assessment sheets. Research data collected using validation sheets. Resources of this research were from chemistry lecturer and teacher. The collected data were analysed descriptively. The result of validation showed that the developed learning instruments were on valid category. Based on that category then the learning instruments can be used on learning activity.
Establishing an android-based integrated sciences glossary for junior high school students

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Abstract. Preliminary field research revealed the requirement of an interactive and supportive learning media for the Integrated Science course. Therefore, this research aimed at producing a valid and practical glossary of Integrated Science. The Four-D (Define, Design, Develop and Disseminate) method was applied in this research. Materials expert, media expert, and teacher have validated the product; also, tested in One-to-One Trial, Small-Scale Trial, and Field Trial which included respectively three, twelve, and thirty VII grade students. The product validity scored 4.21 and categorised as “excellent” while the product practicality value was 4.45 and categorised as “excellent”. The research product named “Integrated Sciences Glossary” is in the Application Package File (.apk) format and could be downloaded freely on the Google Play Store. This glossary consists of scientific terms equipped with explanations in both English and Indonesian. The students showed their enthusiasm in using the application for its ease. Other than that, this Android-based glossary is convenient to be used outside classroom learnings.
The development of android-based learning media on vibrations and waves topic for junior high school students

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Abstract. Instilling abstract concept of vibrations and waves into students requires proper learning media and this research intended to develop such learning media. The Android-based learning media on Vibrations and Waves topic for VIII grade junior high school students have been successfully created through the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model. The interactive research product entitled “Vibrations and Waves” packed in Application Package File (.apk) is downloadable on Google Play Store. The application contains texts, figures, and animations that can be accessed on the Objective, Materials, Simulation, Exercise, and Evaluation menu. This product has been through a validation test and product trial. The validation was performed by materials expert, media expert, and teachers while the trial was done to VIII grade junior high school students. There were three students in the One-to-One Trial, twelve students in the Small-Scale Trial, and twenty-eight students in the Field Trial. The validity and practicality of the product were respectively 4.24 (excellent); and 4.43 (excellent). Also, the students stated that this learning media could be used as an independent learning source while the teachers convinced that this product is a supportive school learning source.
Developing an android-based learning media on human auditory system for junior high school students

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Abstract. The purpose of this research was to produce an Android-based learning media on Human Auditory System for VIII graders of Junior High School. The product is packed in the Application Package File (.apk) format and was triumphantly developed using the Research and Development model consisting of several stages: Analysis, Design, Development, Implementation, and Evaluation. The application contains Objectives, Materials, Simulation, and Interactive Evaluation. The product entitled “Human Auditory System” could be accessed on the Google Play Store. The application was assessed by materials experts, media experts, and teachers. Moreover, the product has gone through three stages of evaluation in VIII Grade of Junior High School students involving six students in One-to-One Trial, 12 students in Small-Scale Trial, and 30 students in Field Trial. The results showed that this product was conveniently used as the learning media for Human Auditory Systems in VIII Grade of Junior High School with a validity value of 4.22 (excellent), and a practicality score of 4.31 (excellent). This product can be used as an independent learning media and is not limited to space and time.
Kinetics and efficiency of inhibition of *Tetraselmis* biomass on carbon steel corrosion in the environment according to the conditions of petroleum wells

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Abstract

Corrosion control on the surface of internal pipe in oil production well can only be done through the addition of corrosion inhibitors. In this study, the corrosion inhibitors studied were marine aquatic microorganisms, namely microalgae of the type *Tetraselmis*. The purpose of this study was to determine the kinetics and efficiency of inhibition of the extraction of *Tetraselmis* biomass on the corrosion of carbon steel in media that is in accordance with the conditions of petroleum wells. To achieve these objectives, a potentiodynamic polarization (Tafel extrapolation) and Electrochemistry Impedance Spectroscopy (EIS) methods were applied using a galvanostat-potentiostat instrument (Voltalab 40, PGZ 301). The results obtained showed that carbon steel API 5L X65 in the test medium corroded significantly, due to the acidic media sourced from acetic acid and dissolved CO$_2$. The inhibition ability of *Tetraselmic* biomass extraction was in line with the increase in extract concentration and reached optimum at a concentration of 250 ppm with inhibition efficiency of 70%. The mechanism of inhibition takes place through the formation of a protective layer adsorbed on the surface of carbon steel.
THE EFFECT OF SCIENCE LEARNING BASES-STEM ASISTED BY AUGMENTED REALITY TOWARD SCIENTIFIC ATTITUDES AND SCIENCE OUTCOMES OF STUDENTS AT PGSD STKIP SANTU PAULUS RUTENG

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Abstract:

STEM-based science learning assisted by augmented reality can answer 21st century education challenges by characterizing the interdisciplinary approach of the four fields of study. 21st century learning requires students to be literate in science, technology literacy, creativity, and have a good scientific attitude. STEM-based science learning aided by augmented reality is a learning approach that can develop scientific attitudes and improve the learning outcomes of the basic concepts of student science. The purpose of this study was to determine the effect of STEM-based science learning models assisted by augmented reality on scientific attitudes and science of PGSD students’ learning outcomes of STKIP Santu Paulus Ruteng. The research design used was quasi experimental in the form of nonequivalent pre-post control group design. Based on the results of the effectiveness test, it is known that the experimental class n-gain value is greater than the control class. It can be concluded that STEM-based science learning can develop scientific attitudes and improve students’ science learning outcomes.

Keywords: Science Learning, Learning Outcomes, STEM, Augmented Reality, and Scientific Attitudes
THE EFFECTIVENESS OF ANDROID APPLICATION AS STUDENT AID TOOLS IN UNDERSTANDING TASK OF PHYSICS

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ABSTRACT

Gadget addiction and the low level of learning interest of students in carrying out tasks are the new problems in education so that efforts need to be made to overcome them. The aim of this study is to determine the effectiveness of android application as student aid tools in understanding the task of Physics. Subjects in this research are all students of class VIII SMP Islam Terpadu Arrozaq Rantauprapat. The type of research is qualitative research that is directing students to utilize his gadgets in completing the task of physics. The instruments used in this research are the video checking rubric and the effectiveness questionnaire. This research was carried out for 3 months and video checks were carried out at the end of each month after project assignments were collected. The results of data analysis in this study indicate that the utilization of android application as a tool of students is considered effective. The students become enthusiastic in working on assignments and students access the internet through gadgets on positive things.

Keywords: Effectiveness, Android application, task, physics
A problem of chemistry book: The need to improve students science literacy with STSE approach

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Abstract. In this article, we explain the need for chemistry book developed by 4S TMD models on the level of science and literacy with STSE approach. Teaching materials are one of the determinants in the chemistry learning process, one of them is the concept of rate reaction. Rate reaction concept there are many applications in daily life. One suitable approach to use is the STSE approach. Teaching materials with the STSE approach help students reflect on the scientific, environmental, technological and social aspects of learning. Science literacy as an output of knowledge, and scientific processes. The instruments for data collection used in this study were structured questions and interviews. This research was conducted in 2 senior high schools, 2 vocational high schools with 12 chemistry teachers. The teacher structure question responses was analyzed descriptively for each item. Teaching materials currently available have not been able to increase students' interest in reading because their appearance is less attractive, material content is difficult for students to understand. Most teachers want teaching materials that are easily understood by students, full colour, contain many examples in daily life. So that it can improve students' scientific literacy. STSE-based teaching materials are expected to improve students' scientific literacy because contain content in life. STSE-based teaching materials are still rarely used because of the lack of availability of STSE-based teaching materials that can be used by teachers in learning. The results of this study are the basis for us in developing chemistry book by 4S TMD models on rate reaction to improve student’s science literacy with STSE approach that can be used in chemistry learning and teaching in upper high schools.
The use of quartet card game on hydrocarbon to improve learning outcomes ten-Grade students

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Abstract. This study has the results of applying for a quartet media game card in student learning outcomes about Hydrocarbons in the Class X MA DarelPekanbaru. The teacher must understand the types of media available at the school because learning with media can make it easier for students to understand subjects that are often difficult to manifest in traditional learning. One of the media created for hydrocarbon lesson material is quartet card game media because hydrocarbons are one of the chemical learning materials. Chemistry is the science of nature and the nature of things that shape our environment and various changes. With the media quartet card game can help students' motivation in learning so that it can improve student learning outcomes. This type of research is an experimental study with a randomized pretest-posttest control group design. The population of this study is all classes of PekanbaruDarel X Learning which consist of 7 classes. The sample in this study was obtained after the normality and homogeneity tests, were classes X₅ and X₇. The experimental class was applied with quartet classes and traditional learning media and control card games. Data were analyzed using a significance level (α = 0.05) and dk = 44, based on data analysis and processing, obtained tcount > ttable ie 2.82 > 1.68, this means that media applications can improve student learning outcomes quartet learning card game results with the subject of Hydrocarbon in class X DarelHikmahPekanbaru. The influence of the media quartet applies card games for learning outcomes on hydrocarbons in class X MA DarelHikmahPekanbaru 15.3%. This study also shows that the use of quartet game cards can improve student learning outcomes.
The Use of TGT Cooperative Learning for Chemistry Learning on Tenth-Grade Students

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Abstract

This study aims to improve student learning outcomes on chemistry subjects by applying the Teams Games Tournament (TGT) learning model for tenth-grade students. The method used is classroom action research that is carried out in three cycles, each cycle consisting of two meetings. Techniques of data collecting use the observation sheet and final testing cycle. Observation sheet was used to determine the activity of students and the test to determine student learning outcomes. Based on research, gained mastery learning outcomes of students increased from 45% before treatment (T0) to 55% in the first cycle (T1), 72.5% in the second cycle (T2) and 87.5% in the third cycle. Average student activity within the group at the first cycle of 53.43%, 57.18% for the second cycle and the third cycle of 64.47%. Average student learning outcomes at the first cycle of 70, 55, 72, and 125 for the second cycle and the third cycle of 74, 6. Cooperative learning strategies are effective when the curricular knowledge taught in the school is drawn from all groups by playing. Based on these results, the researchers suggest to teachers who have the same problem in learning can apply learning model Teams Games Tournament (TGT).

Keywords: classroom action research, cooperative learning, teams games tournament (TGT)
Analysis of high school students’ science process skills on elasticity material

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Abstract. This research aims to describe the Science Process Skills of high school students on elasticity material. This research used descriptive methods. The respondents involved in this research were 25 students from XI IPA 2 SMA N 4 Madiun. The instruments used were 10 multiple choice tests and questionnaires for Science Process Skills. Science Process Skills in this research are basic Science Process Skills consisting of 5 aspects of indicators. The indicator aspects of the Science Process Skills in question are observing, concluding, identifying and manipulating variables, predicting and interpreting data. Science Process Skills in the indicator aspect conclude that has the lowest percentage of 30%, while the highest skill is the Science Process Skills in the aspect of indicators identifying and manipulating variables, and interpreting aspects of data where each indicator has an equal percentage of 50%, for observing indicators have a percentage of 40% and indicators predict by 34%. The results of this research show the Science Process Skills of students SMA N 4 Madiun on elasticity material included in the low category with an average value of 40.8%.
The Use of Quantum Teaching Models on Equilibrium Chemistry for Eleven-Grade Students in Senior High Schools of 14 Palembang

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Abstract

The purpose of this research is to determine the use of quantum teaching models on equilibrium chemistry to improve chemistry learning process in senior high schools 14 of Palembang. The quantum teaching model is one of the guidelines in planning and implementing learning that can improve the teaching and learning process in a class consisted of six phase i.e. Grow, Natural, Name, Demonstrate, Repeat and Celebrate. The subject of this research was 40 eleven-grade students. This research was conducted for 3 cycles. The averages of students learning outcomes before treatment (T₀) was 51.82 with percentage of learning completeness was 10%. The average of students’ learning outcomes in first cycle (T₁) was 68.4 with percentage of learning completeness was 47.37%. The average of students learning outcomes in the second cycle (T₂) was 78.9 with the percentage of learning completeness was 78.9%. The average of the students’ learning outcomes in the third cycle (T₃) was 84.4 with the percentage of learning completeness was 86.84%. Based on observe to students activity, quantum teaching can improve students activity, that is in the first cycle was 50.64%, the second cycle was 63.03% and 73.76% was for the third cycle.

Keywords:

Classroom Action Research, Quantum Teaching Model, Chemistry Learning Outcomes
Need of chemistry book developed by 4S TMD models on hydrocarbon to increase knowledge building environment eleven-grade students

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Abstract. In this article, we explain the needs of chemistry book developed by 4S TMD models on hydrocarbon to increase knowledge building environment eleven-grade students. Teaching materials are supporting learning that have an important role for students. The Knowledge Building Environment has built students' knowledge so that when implemented in teaching materials it can support the development of ideas for students but there are still no teaching materials based on the knowledge building environment. The concepts in teaching materials currently still lead to misunderstanding for student so that it has the potential to cause misconceptions so that a knowledge building environment based textbook on hydrocarbon often needed in chemistry learning process. We use a qualitative descriptive research. The instruments of data collection used in this study were structured questions and interview. This study was conducted 4 senior high schools and 5 vocational high schools with 22 chemistry teachers. The teachers structure question responses was analyzed descriptively for each item. Based on the results of interviews with chemistry teachers teaching materials in the form of textbook are still a top priority as a learning resources. School facilities have not supported the use of electronic-based teaching materials due to the unavailability of sufficient projectors for each class, there are no internet facilities, textbook are the perfect solution. The results of this study are the basis for us in developing chemistry book by 4S TMD models on hydrocarbon to increase knowledge building environment eleven-grade students that can be used in chemistry learning and teaching in upper high schools.
A chemistry book developed by 4S TMD models based science process skills on colligative properties of solution for student’s need analysis

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Abstract. In this article, we explain the needs of chemistry book developed by 4S TMD models on colligative properties of solution with science process skills (SPS) approach. Teaching materials as a source of knowledge, because they contain various representations that are able to communicate scientific ideas effectively. Science process skills is intellectual knowledge that can be practiced, which allows students to ask questions of phenomena, and help understanding scientific knowledge. The instruments of data collection used in this study were structured questions and interview. This study was conducted in 2 Senior High Schools and 2 vocational high schools with 8 chemistry teachers. The teachers structure question responses was analyzed descriptively for each item. Most of the teachers responded that the teaching material of the colligative properties of solution had not led students to learn from phenomena, and had not been equipped with multiple representations. This teacher’s response shows the need to develop teaching materials with a science process skills approach to complement the shortcomings of interesting teaching materials in chemistry learning. The results of this study are the basis for us in developing chemistry book by 4S TMD models on colligative properties of solution with SPS approach.
The development of SPS worksheet on colligative properties of solution for chemistry learning in upper high schools

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Abstract. This research aims to generate science process skills (SPS) worksheet on colligative properties of solution for chemistry learning. SPS allows students to discuss science problems, and can activate students in the learning process. The study which used research and development method the study by Borg and Gall models. Instruments of data collection used is validation sheet and practicality questionnaire. The purpose of this research not only develop, but also to describe its characteristic and teacher-student responses about the developed student’s worksheets. The developed experiment worksheets based on SPS was validated by three expert and practicality tests by 65 students. The results of expert validation about developed student worksheets were declared valid with very high category. Teachers responses to suitability of content, construction, readability, and attractiveness aspect of developed student worksheet were categorized in very high. Student also gave responses in very high category to readability and attractiveness aspect of developed student worksheets. This finding of research suggest that developed SPS worksheet on colligative properties of solution can increase student’s science process skills.
STES – Chemistry book: The need for learning and teaching on acid and base 11th grade students

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Abstract. The aims of this study explain the need of chemistry book on acid and base developed by 4S TMD models with STES approach. Problems of education in the last 100 years are often related to students understanding of the concepts taught, one of which is acid-base (Cetin-dindar and Geban, 2016). In acid-base, there are many applications in daily life. So to overcome these problems, we need a teaching material with the STES approach (Más et al, 2012; Nahum et al, 2014). The STES approach is used to improve positive attitude towards science and conceptual knowledge as well as improving teacher quality and student learning outcomes (Abualrob et al, 2015; Vries et al, 2015). This study uses qualitative descriptive research. The instruments of data collection used in this study were structured questions and interview. The study involves 3 senior high schools and 3 vocational high schools with 12 chemistry teachers. The teachers structure question responses was analyzed descriptively for each item. The teacher needs teaching materials that explain the material simply and involve examples in daily life. The teaching material available lack a concept that contains knowledge is associated with technological developments, especially in acid-base material. The research findings indicate the need to develop chemistry book on acid-base to meet the shortcomings of interesting teaching materials. The results of this study are the basis for us in developing a chemistry book on acid and base by 4S TMD models with STES approach that can be used chemistry learning and teaching in upper high schools.
THE DEVELOPMENT AND VALIDATION OF CRITICAL AND CREATIVE THINKING SKILLS TEST IN ENZYME FOR UNDERGRADUATE CHEMISTRY STUDENTS

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ABSTRACT

The aim of this study was to develop and validate a test of students’ critical and creative thinking skills on enzyme. This study was conducted using development and validation methods through six steps, i.e. (1) defining the construct and formulating objectives, (2) formatting items, (3) constructing items, (4) creating a scoring guide, (5) Judging items by experts, and (6) calculating validity, reliability, level of difficulty and discrimination by empirical study. This test was constructed two-tier test, which consists of the first tier as a multiple choice and the second tier as the reason from the first tier option. The participants were 61 undergraduate chemistry students who studied enzyme in a chemistry department. The results showed that item CVI value was 0.86 and item Cronbach’s Alpha value was 0.843 (very high category). Item difficulty index (P) was 0.501, and Item discrimination index (D) was 0.328 which showed that the level of difficulty item in the medium category and level of discrimination in the good category. Out of initial 14 items, 3 items were excluded after the analysis of CVI, item difficulty index and item discrimination index. The revised 11-item test was found to have sufficient validity, reliability, item difficulty index and item discrimination index to measurement of enzyme concept mastery, critical thinking skills, and creative thinking skills.

Keywords: creative thinking skills, critical thinking skills, test development and validation.
DEVELOPMENT OF TEXTBOOK BASED ON IN SILICO STUDIES
ON BIOTECHNOLOGY COURSE

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ABSTRACT

Achieving 21st century competencies can be achieved through improving the quality of learning, one of which is through the development of textbooks based on research results in lecture activities. The developed textbook based on the results of research by presenting concrete data capable of realizing contextual learning so that it is expected to improve student understanding. This research is a development research that aims to generate textbooks based on in silico studies that are valid, practical and effective in Biotechnology courses, specifically on pharmaceutical biotechnology topics. The results of this research showed that the textbooks based on in silico studies that developed using ADDIE model are a) categorized very valid based on the results of an content expert (91.68%), media expert (83.58%) and practitioners’ assessment (91.22%), b) practically based on limited testing of college student and c) effective based on the assessment of achievement of learning indicators on health biotechnology topics that had a significant effect with p-value 0.009 < α (α = 0.05). This research concluded that the textbooks based on in silico studies which were developed have been proved valid, practical, and effective to increase learning outcome of college students on pharmaceutical biotechnology topics.

Keywords: in silico studies, biotechnology course, development research.
ACTIVATION OF CARBON AT DIFFERENT CONCENTRATION MICROSPHERE ADSORBENT AND ITS APPLY FOR IBUPROFEN ADSORPTION

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Abstract: In this study, we present the synthesis of microspheres carbon by mixing Pluronic F127 triblock copolymer which was used as a main pore size direction, gelatin as a codirecting agent, sucrose as carbon precursor and H2SO4 as a catalyst. The mixture solution carried out at hydrothermal reactor followed by evaporation, partial carbonization, and pyrolysis under nitrogen flow. After being microspheres carbon have activated by KOH solution at room temperature for 24 h using a variation of the KOH concentration at 5, 10, 15 and 20 (%w/v), respectively. Activated Microspheres carbon have characterized by SEM and FTIR. In this study, it was found that carbon mass after activation is increased due to the deposition of potassium and a free water molecule. The morphology of microspheres carbon after activation process observed as soccer balls-like with pore size 0.5-15 μm with numerous of carbonyl and hydroxyl group. In this study, it was found that The greater the activator concentration, the greater the adsorption capacity, due to potassium deposition and water molecules. Maximum adsorb capacity is at 20% KOH concentration at 35 minutes. Microspheres for drug delivery systems are interesting to study.

Keywords: Carbon microspheres, activation, concentration
Scientific Analysis of Ethnomedicine “Jamu Galian Putri”

In Context Secondary Metabolites Activity

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ABSTRACT

The tradition of drinking \textit{jamu} has become part of a culture in Madura, especially for women's organ care. The problem with female reproductive health is many while drinking \textit{jamu} still popular in Madurese women. Herbal Medicine is well known as able to maintain women's organ care. For treatment from within, teenage women can consume herbal medicine “Galian Putri.” The ingredients in this \textit{jamu} are believed to care of young women or girls in general, so that the body is always healthy, menstruation on time, eliminating menstrual pain, making the body fragrant because sweat does not smell, and preventing vaginal discharge This study purpose is to transform the traditional scientific knowledge Madurese about ethnomedicine “Galian Putri” into scientific knowledge. The output of research is a set of scientific knowledge as a result of the reconstruction of the traditional scientific of Madurese about efficacy that is on “Galian Putri.” In this research, a qualitative descriptive analysis the ethnomedicine of “Galian Putri” connected to the scientific knowledge related to chemical contents of “Galian Putri” with scientific laboratory analysis (phytochemical screening). The result concludes that “Galian Putri” can maintain the women's organ because in chemical compounds posses some secondary metabolites like tannins, flavonoids, pectin, steroids, alkaloids, saponins and phenolic compounds which has activity in maintaining women's.

Keywords: traditional knowledge; scientific knowledge; \textit{Jamu Galian Putri}; secondary metabolite activity
An urgent conservation call from endemic plants of Mount Salak, West Java, Indonesia

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Abstract. Mount Salak is part of Mount Halimun-Salak National Park in West Java, Indonesia. It is home to five endemic plant species that are very susceptible to human interference due to their close proximity to human settlements. The deforestation rate of the area was 1,473 ha or 1.3% of the total area each year. Using eleven line transects with a total length of 44.76 km, the present study aims at providing data on current population and conservation status of these five endemic plant species. The results showed that there was an urgent conservation call from Mount Salak as all five targeted species were unable to be located. Furthermore, two invasive species that might possess serious threat to the endemic plants were observed during the survey: markisa (Passiflora sp.; Passifloraceae) and harendong bulu (Clidemia hirta; Melastomataceae). Based on these results, the present study assigned all the endemic species as Critically Endangered according to the IUCN Red List Category and Criteria. To conserve all the endemic plant species in Mount Salak, several recommendations were given and discussed.
Physics-Based Learning Effectiveness PhET Simulation Model Using Problem Based Learning (PBL) For Self-Independent Learning on Material and Energy Enterprises Learners MAN 3 Sleman

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Abstract. This study aims to determine the effectiveness of the use of Phet simulation applications on smartphones Problem Based Learning (PBL) learning models of students' learning independence and the different effects of learning independence. The type of research applied was quasi experiment. Research design used Nonequivalent Control Group Design. The population in this study was all students of class X of MAN 3 Sleman which was divided into 8 classes. The sampling technique used cluster purposive sampling. Both classes are given treatment with the Problem Based Learning model assisted by the Phet application which was installed on each student's smartphone. The average level of learning independence of students in the modeling class after they participated in learning activities included in the good category, and in the implementation class included in the good category. The significance level shows the numbers in the effective category. So it can be stated that the learning independence questionnaire of both classes was effective, it can be concluded that the Problem Based Learning model assisted by the Phets application is effective in terms of the achievement of the learning independence of students in class X of MAN 3 Sleman in the academic year 2017/2018.
The role of bandung masagi to support character education of 2013 curriculum in integrated science lesson

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Abstract. Bandung Masagi is the implementation of a character education local wisdom, which is formulated by the Educational Departement of Bandung. This paper discusses the role of Bandung Masagi to support character education of 2013 curriculum in integrated science lessons. This study was conducted in five junior high schools for five weeks i.e junior high school 1of Bandung, junior high school 2 of Bandung, junior high school 5 of bandung, junior high school 12 of Bandung and junior high school 29 of Bandung. Research was conducted in each school for one week. We conducted observations of student activities related to their characters, interviews with science teachers and representatives of curriculum fields in each school. The data collection was performed using documentation method by observation, interview and teacher questionnaire. The research concludes that Bandung Masagi is very helpful for teachers and schools in achieving character education in accordance with the 2013 curriculum. This finding also shows that Bandung Masagi increases student interest in local culture, enhances religious value, defends the country and loves the environment. This fact shows that bandung masagi needs to be applied in all schools in the city of Bandung considering that not all schools have implemented this curriculum. For that, further preparation and socialization of the Educational Departement of Bandung, as well as a special syllabus are needed to support the teaching and learning process.

Keywords:Bandung Masagi Curriculum, 2013 Curriculum, Integrated Science, Descriptive Research Science Education
Using two tier based concept test to analysis profile of student understanding on the concept of simple harmonic motion

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Abstract. The purpose of this study was to analyze students understanding profile about simple harmonic motion conceptual. The subject of this study were eleventh grade student of sciences class in Surakarta2 State Senior High School with 90 students whose registered as student in the 2018/2019 school year. Sampling in this study used random sampling technique. To analyze students understanding profile used instrument of two tier test with 20 item. Instrument consists two level, first level is multiple choice questions and the second level is open ended free respons question which is the reason of student’s answer to the first level questions. The result of this study show that 12,9% of students understanding the concept of simple harmonic motion, 16% of students understand in part, 18,2% of students show misconception, 31,5% of students show specific misconception, and 16,5% of students didn’t understand the concept. The highest concept understand was in concept relation of velocity, angular velocity, displacement and acceleration in simple harmonic motion with 41,11%, and the lowest was in definition of simple harmonic motion with 0,74%.

Keywords: Two tier test, Understanding, Misconception
RECONSTRUCTION OF SCIENTIFIC KNOWLEDGE BASED ON INDEGENOUS KNOWLEDGE ABOUT NATURAL DYSES FOR BATIK THROUGH STEM INTEGRATED ETHNOSCIENCE APPROACHES

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Abstract: This Research aims to analyze scientifically of the knowledge of the community about batik processes and the types of local plants used as natural dyes for batik coloring di Zie Batik. This research was conducted by observation and interviews with traditional Batik Zie Batik owners and craftsmen located in Malon Gunungpati Village, Semarang Indonesia. Interviews related to the knowledge of batik owners and craftsmen regarding batik skills, tools and batik materials, batik processes and techniques, creative ways to produce quality batik motifs and products; and the benefits of making batik. In this study also explored the types of plants and natural dyes for the production of Zie Batik motifs. Questions are focused on the content and context of Science, Technology, Engineering and Mathematics (STEM). The research instruments were in the form of observation and interview sheets that related knowledge about batik processes and techniques, the types of local plants as coloring natural batik, and the colors produced. Data analysis was carried out by analyzing all data from the results of research and interviews, then reconstructing Scientific Knowledge through the stages of verification, reduction, validation, and conceptualization in the content and context of STEM Integrated Ethnosains. The results of the study found that the knowledge of batik owners and craftsmen was obtained by parents, supported by courses and training, and reading references. The results showed that the materials and tools for batik consisted of printing machines, canthing, alum, tunjung (natural salt), soda ash, lime and vinegar; and natural dyes, cotton fabrics, candles and other batik devices. Observations and interviews at the research sites found at least nine local plants for natural dyes, among them are putri malu leaves as green coloring, mahogany seeds and skin as brown, areca nut, jelawe, turmeric, and secang as yellow or orange. While rambutan skin, mango steen peel as red, mango leaves, advocate leaves, noni, and mimosa seeds as brown or dark red. The results of scientific science reconstruction revealed that natural dyes contain secondary metabolites. The results of this study from the STEM aspect, it is known that batik owners and craftsmen know the right batik techniques and methods, creative ideas on how to produce quality colors and batik products, and have traditional sales management.

Keyword: Reconstruction, natural dyes, STEM, and Ethnoscience
SYNTHESIS OF NiO / CaO/MgO FROM MADURA LIMESTONE AND ITS CATALYTIC ACTIVITIES FOR TRANSESTERIFICATION REACTION OF Reutealis trisperma Oil

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ABSTRAK

Biodiesel is one of promising biofuel option that is being developed by Scientists. Biodiesel is produced through the transesterification reaction of vegetable oils and short chain alcohols in the presence base catalyst. The several studies about modification of CaO catalyst aim to increase CaO catalytic activity. Modification of CaO catalyst was carried out by reducing particle size, increasing surface area and increasing catalyst basicity. NiO / CaO was synthesized using impregnation of natural CaO from Bukit Jaddih Madura with various concentration of Ni-nitrate. The results of this study show that the presence of NiO in CaO can improve crystallinity, reduce the size of the crystals and increase the effectiveness of CaO catalyst. The best catalyst obtained in 5% NiO / CaO showed the highest percentage of methyl ester 98.32% at conditions reaction temperature 85°C, reaction time 3 hours, mole ratio of methanol to oil is 9:1 and hydrothermal reaction method.

Key Word: Biodiesel, NiO/CaO, hydrothermal
MODEL EDUCATIONAL MANAGEMENT VALUE SYSTEM THROUGH LEARNING (E-LEARNING) AT POSTGRADUATE SCHOOL UNINUS BANDUNG WEST JAVA

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Abstract

Management and Development of the Industrial Age 4.0 encourages the world of education to produce a generation that is ready to compete, resulting in the emergence of creators of various web-based applications, Edmodo is one of the web-based e-learning applications widely used in educational institutions. One way to prepare through the use of the basetechnology web is the application of e-learning. Uninus SPs is one of the educational institutions using Edmodo. Various facilities at Edmodo greatly support elearning activities so that interactive communication between students and lecturers will occur. Various features and facilities in the Edmodo application are easy to understand and use. The problem now is that all facilities at Edmodo have not been used optimally. Other facilities such as value management and quizzes on Edmodo are rarely used. The research aims to find solutions to problems and apply elearning so that the use of Edmodo as an Elearning application can be run more optimally. The method used is classroom action research and research and development. Implementation is carried out in the course (MOP & K) of the Postgraduate School Management (S2) Students with an average response of 67% and an average score of 79.2

Keywords: E-Learning, Web Base Technology Management, classroom action research, research and development.
THE DEVELOPMENT OF SCIENCE CRITICAL THINKING ASSESSMENT ON CONCEPT OF LIGHT AND OPTICAL DEVICES

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Abstract

Creative thinking skills is one part of the high order thinking skills (HOTS), teachers must be able to think creatively designing instruments to measure student’s high level of thinking. The purpose of this study is to develop science creative thinking instruments about the concept of light and optical devices. The research method used was research and development. This study involved 20 teachers from 20 Elementary Schools in district scope of Ternate North City, North Maluku. This study and development has produced 23 items of science creative thinking instruments on the concept of light and optical devices. Instruments are developed based on indicators of creative thinking, namely; Fluency with 6 questions (26.09%), Flexibility with 6 questions (26.09%), Originality with 5 questions (21.74%), and Elaboration with 6 questions (26.09%). The instrument had been validated by education experts, curriculum and assessment with valid and reliable results. The instrument was also empirically tested with the results of validity ($r_{11} > r_{tab}$, 0.76) on valid category, reliability 0.76 on high category, difficulty level and distinguishing power on medium category. The creative thinking instrument of science has tested to Elementary school teachers of North Ternate City District about 20 teachers with the following results: Fluency 63.83%, Flexibility 65.67%, Originality 56% and Elaboration 51.33%. From these results, the average can be received with percentage 56.21% and considered under moderate category. Teacher's understanding toward the assessment of science creative thinking is not in a good category yet. Therefore, teachers should always develop their pedagogical competence by actively participate in various professional development activities.

Keywords: Development, Science creative thinking instruments

Information Literacy: An Alternative to Support Learning Outcomes in Biological Students
The background of this research based on the view that information literacy often considered a separate skill in students, but information literacy also needs to be linked to learning material. The purpose of the study was to determine the effectiveness of information literacy skills on learning outcomes in material Structure of Plant Development. The quasi-experimental research method with the design of the pretest-posttest control group design study. The population in the study were all biology majors at the Universitas Negeri Malang in 2018/2019 and a sample of 120 students each in 2 study groups. One study group consists of 2 classes. One study group use to control model and the second study group applies to the experimental model. The results showed that information literacy skills had a significant impact on the achievement of biology student learning.

Keywords: Biology student, Information literacy, Learning Outcomes.
The Effect of Fly Ash Characteristics on Compressive Strength Geopolymer

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Abstract. The production of fly ash produced from coal combustion continues to increase at any time, resulting in environmental problems due to the increasing amount of material dumped in landfills. Conversion of fly ash into geopolymers is one of the right ways to reduce the problem of coal ash waste. In this study used fly ash from four different sources in Indonesia as the basis for making geopolymers. The alkali activator solution used in this study was a mixture of NaOH and Na\textsubscript{2}SiO\textsubscript{3} solutions. The process of making geopolymers is done by dissolving fly ash in an alkali activator solution. The resulting geopolymer compressive strength is 42.46; 46.71; 33.5; 42.46 MPa. The results of the analysis of the characteristics of fly ash indicate that the most dominant factor influencing this research is the size of fly ash particles. Fly ash with a larger particle size will produce geopolymers with lower compressive strength.

Keyword : fly ash, characteristic, geopolymer, compressive strength.
The Effect of Organizational Culture, Leadership, and Job Satisfaction on the Teachers' Performance

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Abstract. This study aims to determine the effect of organizational culture, leadership, and job satisfaction on the teachers' performance in the state junior high schools in the East Jakarta. We applied a survey method with a sample of 131 teachers taken randomly. Data collection was done by distributing questionnaires and the data were analyzed using path analysis. The results of this study conclude that: 1) organizational culture, leadership, and job satisfaction have a direct positive relationship to teachers' performance; 2) school culture and leadership have a positive direct relationship to job satisfaction. We recommend that improving teachers’ performance can be done through school culture, leadership, and job satisfaction.

Keywords: leadership, pedagogic competence, school culture, self learning, teachers’ development
IBUPROFEN ADSORPTION USING ACTIVATED MICROSPHERES CARBON AT VARIOUS ACTIVATION TIME

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Abstract: For the first time, carbon microspheres successfully synthesized by using block copolymer F127 combined with gelatin, sucrose, and H₂SO₄ as soft template, source carbon, catalyst, respectively. The following step of synthesis are hydrothermal treatment, evaporation, carbonization and pyrolysis treatment under nitrogen flow. Microspheres carbon results have activated by a 10% KOH solution at room temperature for 12, 24, and 48 h, respectively then characterized by SEM and FTIR. The Activated microspheres carbon have used for ibuprofen adsorption. The characterization results showed that carbon microspheres carbon as marbles-like morphology with a diameter of 1-10 μm completed by C-OH, -CH₃, CN, -CNN, C=O, C=C, NH₂, CK functional groups as the most. So this study shows that increasing activation time of the microsphere carbon have enhanced the equilibrium time and which is reach equilibrium at range 15-25 min and adsorption capacity range at 55.1-59.9 mg g⁻¹. So carbon microspheres in general conclusion could be potentially as Drug Delivery material.

Keywords: Activation, Microspheres carbons, Time
SPHERICAL MARBEL-LIKE CARBON (SMC) FROM GELATIN FOR INFLAMMATORY MOLECULE ADSORPTION

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Abstract. In this study presented a soft template method for synthesis spherical marbel-like carbon (SMC) using Polyoxyethylene-Polyoxypropylene Block Copolymer as main template, gelatin as co-template, and sucrose as source carbon. The mixture of those three chemicals have catalyzed by strong acid then subsequently carried out at hydrothermal reactor followed by evaporation and partial carbonization. The black resulted powder have pyrolized at high temperatures under nitrogen atmosphere followed by the washing process. The SMC was activated by KOH solution at temperature -9°C; 29°C; 35°C for 24 hours, followed by filtering and drying. The activated spherical marbel-like carbon (ASMC) was analyzed by SEM, and FTIR instrument. ASMC have applied in inflammatory molecule adsorption using ibuprofen solution 0,1 mg/g and 20 mg adsorbent. The adsorption kinetic investigated by uv-vis spectrophotometer. The result SEM shows that ASMC morphology have shape as marble-like with the range size closely with 1-10 μm. The FTIR result show that ASMC have had numerous carbonyl and hydroxyl functional group which was predicted could increase the interaction between ibuprofen and adsorbent. The interesting phenomenon was observed which is the increasing adsorption capacity of ASMC as well equal as the increasing activation temperature. In the future, ASMC could be potential material for drug delivery system.

Key Words: Adsorbent, gelatin, ibuprofen, KOH, SMC, soft template, temperature
DEVELOPING ASSESSMENT OF HIGHER ORDER THINKING SKILLS IN PHYSICS LEARNING BASED ON LOCAL WISDOM

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ABSTRACT

This study aims to develop assessment of higher order thinking skills in physics based on local wisdom. This research through four (4) stages of development: defining, designing, developing, and distributing. The results show that the validity value of 3.94 on the rating scale of $3.0 \leq SV \leq 4.0$ with a very valid category and can be implemented with small revisions. The practicality of assessment is obtained from the readability of assessment instruments with a percentage of 81%, the level of difficulty of the instrument with a percentage of 72%, and responses from respondents with a percentage of 83%. Assessment effectiveness is obtained from learning completeness, where classical completeness is 100% and indicator completeness is 90.5%. Thus the assessment of higher order thinking skills in physics based on local wisdom can be said to be feasible to be disseminated.

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Keywords: Assessment, Higher Order Thinking Skills, Physics Based on Local Wisdom

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Development of Outdoor Learning Worksheet to Achieve Collaboration Skill on Momentum Impulse Subject

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Abstract

Collaboration skill as one of 21st century skill is needed by the student to support their social life. So it feels necessary to build worksheet that enable the student to understand physics concept more easily and able to develop their collaboration skill. This research aims to develop outdoor learning worksheet that feasible and able to achieve student's collaboration skill. The product was developed based on outdoor learning model on momentum impulse subject. The worksheet developed by R&D method. The worksheet consists of discussion and experiment section. The worksheet was evaluated by the lecturer, it was stated feasible and got remarkable score in 80.25. Trial experiment to test the worksheet was held in SMA N 1 Sleman, Yogyakarta. Fifty students from two class were participated as sample. The aspects of collaboration skill that being measured are productivity, responsible, flexibility and compromise. Collaboration skill assessment was done by observation method when the students work in small group. From the observation we got collaboration skill of class A as 3.44 and class B as 3.67. Both of those value categorized as very good in four scale. Based on that we can concluded that outdoor learning worksheet could achieve collaboration skill.

Keywords: development, worksheet, 21st century skill, collaboration; outdoor learning

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TREFINGER LEARNING MODEL WITH RME PRINCIPLES
ON ENHANCING CREATIVE THINKING SKILLS
AND MATHEMATICS ACHIEVEMENT

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ABSTRAK

Pembelajaran saat ini harus berorientasi pada pembentukan kompetensi pendidikan abad 21 yang mendorong siswa berpikir kreatif dalam menyelesaikan masalah. Penelitian ini bertujuan untuk mendeskripsikan keterampilan berpikir kreatif dan hasil belajar matematika siswa yang mengikuti pembelajaran matematika dengan model pembelajaran Treffinger dengan menggunakan prinsip PMR lebih baik daripada siswa yang mengikuti model pembelajaran konvensional. Penelitian ini dilaksanakan pada siswa kelas V se-kecamatan Lelak Kabupaten Manggarai menggunakan metode eksperimen dengan desain kuasi-eksperimen dengan metode posttest-only control group design. Penelitian ini melibatkan 101 orang peserta didik kelas V sebagai sampel penelitian, yang diambil dengan teknik random sampling. Teknik pengumpulan data untuk memperoleh data tentang keterampilan berpikir kreatif dan hasil belajar matematika menggunakan soal essay test masing-masing 5 butir soal yang telah divalidasi oleh lima orang pakar dan telah dilakukan uji validitas dan reliabilitas butir secara empiris. Analisis pengujian hipotesis menggunakan MANOVA dengan taraf signifikansi 5%. Hasilnya menunjukkan bahwa secara simultan keterampilan berpikir kreatif dan hasil belajar matematika siswa yang mengikuti pembelajaran matematika dengan model pembelajaran Treffinger dengan menggunakan prinsip PMR lebih baik dari pada siswa yang mengikuti model pembelajaran konvensional.

Kata Kunci: hasil belajar matematika, keterampilan berpikir kreatif, model pembelajaran Treffinger dengan prinsip PMR
The Development of Android-based Science Learning Media on Human Eyes Topic

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Abstract. Either field or literature studies recommended the need of learning media on human eyes topic which present learning objectives, materials, evaluations, and assessments. Also, the learning media should be able to support independent, interactive, and fun learnings. Learning media is developed through the steps of research and development. The developed product was an android application named “Human Eye Optics.” The product characteristics were: providing menus: learning objectives, materials, simulations, exercises, and evaluations; each menu has sub-menus such as eye parts, viewing process, and eye disorders; having five interactive and communicative simulation submenus; materials are described attractively through the use of full-color text and images; the teacher can use it as a learning device since it has covered learning objectives, materials, quizzes, exercises, and evaluations with assessment; the application could be referred to as an independent and repeatable learning source; and usable at anywhere and anytime. The product feasibility was categorized as “excellent” with a score of 4,60. The same thing went with the practicality which belonged to the “excellent” category with a score of 4,51. The effectivity achieved “high” with an n-gain of 0,76 while the average student activity was 89,02% and declared to be “very good.”
Development of Ethnoscience Approach in The Magazine Theme Madura Salt to Improve Student’s Character

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Abstract

This study aims to develop science teaching materials that are ethnoscience related to the theme of Madura salt which is expected to influence students’ character. Ethnoscience based teaching material is interest research because it deals with efforts to develop and preserve the values of local wisdom that considered in curriculum development especially in the face of the increasingly rapid industrial revolution era. This type of research is the Research and Development (R & D). The research used the ADDIE development model which consists of analyze, design, development, implementation, evaluation stages. The subjects of this study were students from SMPN 2 Socah Bangkalan. Data analyzed with qualitative and quantitative descriptive. Based on the research, it can be concluded that the results of the average assessment of the feasibility test of the material aspects are 85.79% validity with appropriate categories, reliability 96.22% with very high-reliability categories and the media aspect is 91.76% validity with appropriately used without revisions, reliability of 95.08% with a very high. Integrated science type webbed based on ethnoscience salt theme was declared feasible for use in learning and effectively used for the formation of student’s characters.

Keywords:
ethnoscience, magazine, salt, Madura
Preparation Of Reflective Pedagogy Paradigm Learning For The Lecturers Based On Computational Chemistry

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The study aim to prepare lecturers on reflective pedagogy paradigm (RPP). This research was mixed methods. It was conducted with 9 students and a model lecturer (mantee) who underwent mentoring. It was held in 4 meetings and observed by 2 observers. The assessment was conducted using data triangulation to a model lecturer based on: video recording, reflection by mantee and students. The measure of process success was based on video recordings by ≥70%. The lecturer’s reflection to demonstrate the readiness in the teaching, and the student’s reflection is ≥ 60%. The results of mantee and student at every stage are: 81%, 69%, 88%, and 50%; 72%, 92%, 73%, and 85% of context, experience, reflection, and action. The results of evaluation there was a significant difference before and after the learning based on RPP (p = 0.035). So, mentees was able to manage RPP and able to make students active to learn from theory to practice.

Keywords: reflective, pedagogy, computational, chemistry, organic
Soil and banana crops (*Musa paradisiaca* L.) risk by chromium (Cr) accumulation through leachate and its health risk assessment

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**Abstract.** The leachate effluent of Semarang landfill is directly flew to the upper course of Kreo river is a fact that make Kreo river is possibly contaminated by heavy metal. Many banana trees are planted around the contaminated soil. This research is conducted to observe the distribution and the bioaccumulation of Cr in the banana trees and health risk index (HRI) of people around the Waste Water Treatment Plan of Semarang landfill’s leachate contamination area. The measurement of bioaccumulation factor as the basic data for environmental safety and as the evaluation of wastewater processing is conducted through Cr level measurement. The research shows 1) Cr concentration on WWTP Jatibarang Semarang landfill’s effluent leachate in the rainy season exceeds the environmental safety limit. 2) Cr concentration in the water before and the after of effluent leachate contamination is under the standard. 3) Cr contamination in the soil around Jatibarang landfill’s effluent leachate contamination area exceeds its limit. 4) The bioconcentration factor shows the banana trees can accumulate Cr from soil to the tree. 5) Most of Cr accumulation in the banana trees is translocated to the air and to the root of the tree. 6) The banana fruit from the Cr contaminated soil is safe for consumption.
Entrepreneurship Education Models In Improving Skills

Creative Industries Made From Plastic Recycle

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ABSTRACT

This research aims to develop entrepreneurial model by using the methods of Research and Development (R D &) to students of ELEMENTARY SCHOOL Muhammadiyah 5 South Jakarta amounted to 50 people. As for the content model of entrepreneurship that have been developed are: (1) the initial introduction of waste-based creative industry; (2) the practice of basic skills; (3) innovative skills that produce creative products made from waste. This research can yield models that effectively improve the skills of the creative industries-waste. This research has also been done by some earlier researchers on aspects of ability, profesional, social and personal skills are still common. In addition it has been developed in support of increased knowledge about waste management-based movement in the 3R (reduce, reuse, recycle) Muhammadiyah 4 Samarinda in East Kalimantan, Nadiroh (2018), supported also by the results of the research of Natalia Lia (2017), stating that, "Model of learning the skills of potential Local-based Polytechnic, and utilization of waste Newsprint as the main ingredient in the manufacture of bags and Sandals exploited as useful products, both in the bag products from woven paper, place tissue of woven paper, as well as a product design that produce creative and innovative, with eco-friendly."
Abstract

The research is experimental research with the aim of improving the quality of fermented milk form of yogurt. Yogurt drink is a beverage that many people love. Fermentation milk in this research using Lactobacillus bulgaricus bacteria and Streptococcus thermophiles bacteria derived from one of the products of the yogurt plain and done added carbohydrates. The fermented quality of milk is determined by its accuracy. The addition of carbohydrates is expected to increase the viscosity of yogurt. Organoleptic observations were made on color, taste, texture and acceptability. There were four treatments in this experiment, namely control (without adding carbohydrates) and adding carbohydrates 5%, 10% and 15% per liter of milk. The results obtained from 32 respondents, for the taste it is preferable to add 10% carbohydrates, for colors it is preferable to add 10% carbohydrates, for texture it is preferred to add 10% carbohydrate and for receiving power 15% carbohydrate is preferred. The conclusion of this experiment can be conveyed that the addition of 10% carbohydrates is preferred overall.

Keywords:
milk, fermentation, quality of yogurt
Development of Creative Thinking Skills Through STEM-based Instruction in Senior High School Student

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ABSTRACT

Creative thinking is one of the abilities in the 21st Century that must be mastered by students. The difficulty of developing students' creative thinking is because teachers in the school do not make a collaboration between technology and science in learning. The purpose of this study is to develop creative thinking through the application of Science Technology Engineering and Mathematics (STEM) based learning. This research was conducted at 1 Kerinci Public High School. The sample include 90 Students divided into three classes namely Ekperiment Class 1 (EK1) are given STEM-based learning, experiment Class 2 (EC 2) given Science Engineering Mathematics Learning (SEM) and Control Class (CC) given conventional learning. The method used is a quasi experiment with pre-post control design. The instrument used was 12 essay questions validated by 7 experts. The results were analyzed using Anova mixed method with the General Linear Model. The results show that STEM-based learning improves creative thinking skills by 0.663 or 66.3% in the medium category, this shows that STEM-based learning is effective in developing students' creative thinking, STEM-based learning also provides experience to students in collaborating between technological science, engineering and mathematics in optimizing learning.

Keyword: Creative thinking skills, STEM, 21th century skills.
The effect of creativity on the learning outcome of middle-school students in the earth structure and layer topic

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Abstract. This research aimed to find out the effect of high and low creativity on the students’ learning achievement. This research was conducted at MTs Negeri 2 Surakarta 2017/2018 Academic Year. The research method used was experimental research. The sampling was done using simple random sampling technique. The data were collected using multiple choice objective test to obtain the learning achievement data in the Structure and Earth Layer topic and observation sheet to obtain creativity data. The data analysis used was parametric statistical test with one-way ANOVA test. Based on the statistical analysis performed, it was obtained that the sig. value was 0.000. Because the sig. value is < 0.05, it can be concluded that Ho is rejected. This shows that high and low creativity has an effect on the students’ learning achievement in the Structure and Earth Layer topic. The result indicates that students who have high creativity have higher learning achievement.
The development of mental model diagnostic tests to identify high school students’ mental models in atomic concepts and chemical bonding

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Abstract. The purpose of this study was to develop a "two tier diagnostic test" mental model instrument to uncover the mental models of high school students in atomic structure and chemical bonding concepts. The test development was carried out in several stages which are: 1) Concept analysis; 2) Clinical interview; 3) Development of diagnostic instruments; and 4) Instrument validation. Clinical Interview were conducted toward nine selected students from class X, XI, and XI of science program. The interview was accomplished by media containing questions about the concept of atomic structures and chemical bonding. The interview results were used for developing the next two tier instruments. The instrument validation was carried out in two stages. The first stage is through the CVR (Content Validity Ratio) technique from Lawshe which was conducted by five experts in the field of chemical education who gave a value of 1.0. The second stage was through written tested on 177 students of class 10th, 11th and 12th science programs to test the validity and reliability. The result of this study reveals that the instrument of the "two tier diagnostic test" mental model has Cronbach’s Alpha value was 0.772 (high category) reliability coefficient. Furthermore, this test can be used for research on mental models in chemistry.
Abstract. In the current development of globalization and modernization, the nation's cultural values must be preserved, one of which is Javanese ethical values, which are the principles of Javanese people's life which are manifested in harmony and respect. This -value value needs to be disseminated to the younger generation, especially students of SMP that the noble values of national culture remain stable. This paper is based on research conducted at SMPN 25 Semarang and Semarang Tanah Mas Theresiana Junior High School year 2018. The purpose of this paper is to provide an overview of the forms of socialization Java ethical values as a lifestyle in junior high school students in North Semarang conducted by the school as formal education institution. The method used in this research is qualitative method. Data collection techniques used in the study: observation (observation), interview and documentation. In testing the validity of the data using triangulation techniques. Data analysis uses qualitative data analysis interactively with stages: data collection, data reduction, data presentation, conclusions or verification. The results of the study were that socialization was carried out in the forms of: (1) installation of posters and slogans , (2) exemplary models of teachers, (3) order and sanctions, (4) reprimands, (5) supervision, (6) collaboration with student’s parents, (7) invite leaders / experts and socialization. Although socialization has taken place in various ways, violations of Javanese ethical values are still carried out by a small number of middle school students in North Semarang .
Developing d-Worksheets by Applying 7 Steps of Problem-Based-Learning to Enrich Students’ Critical Thinking Skills

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ABSTRACT

Critical thinking is important for students in developing critical thinking skills. Critical thinking is able to determine actions related to a wide variety of information. The benefit of critical thinking is to prevent students from the massive influence of hoax news that is widely circulating today. Critical thinking also plays a key role in making decisions. This ability can be developed in lectures through the right method. To make it more optimal, learning can obviously be managed to use good quality worksheets. The objective of this study is to design a draft of digital worksheets (d-Worksheets) based on the Problem-Based-Learning (PBL) that is valid for improving students' critical thinking skills. The research procedure used Borg & Gall’s method classified into four steps, namely 1) Analysis of products to be developed, 2) Initial product development 3) Expert validation and revision 4) Small-scale field trials and product revisions. The research results show that the form of d-Worksheets draft using Adobe Flash is compatible with laptops or computers. The draft of d-Worksheets contains information, images, and interactive videos. The draft was designed for the health science lecture on the health topic of a human circulation system, implementing seven steps of PBL, and referring to expected critical thinking skills. Thus, the draft of d-Worksheets is developed to meet the feasibility according to experts, but it requires further revisions. The draft can increase critical thinking skills according to the experts and students’ experiences.

Keywords: Digital Worksheets, Problem-Based-Learning, Critical Thinking Skills.
Conservation Efforts of Springs Based on Community in Prawoto Village, Sukolilo District, Pati Regency

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Abstract. The springs in Prawoto Village are the main source of water that is very reliable in meeting the community's clean water needs. Increasingly high population makes the community's need for clean water also increase. So, conservation efforts are needed for springs so that the sustainability of the springs in the village is maintained. Every region, especially rural areas, usually has local wisdom that is able to contribute to environmental conservation efforts, as well as in Prawoto village, Sukolilo Subdistrict, Pati Regency, which also has local wisdom that plays a role in the conservation of springs. The purpose of this research was to know conservation efforts carried out by the community through the role of tradition and local culture in the Prawoto Village, Sukolilo District, Pati Regency. The method used was a case study. Data collection techniques with interviews. Sampling was done by Purposive Sampling. The results showed that the conservation of springs could not be separated from the role of tradition and local culture of the community which included cleaning the springs, not taking things and protecting large trees around springs, bancakan (syukuran), cutting buffalo, and puppets. The activities of tradition and local culture are always maintained by the community and become a form of effort from conservation of springs.

Keyword : Conservation, Culture, Springs, and Tradition.
This study aims to describe the frequency of cognitive assessment techniques based on teaching experience. Experience indicates the supports of teaching profession of educators. Professional tutors are expected to construct and use the techniques of scoring as well. One of the dimensions of student’s ability is become learning objectives at once. The object of assessment is the cognitive dimension associated with thinking of student’s ability. In this study, a descriptive survey (quantitative method) has eighteen experiences tutors from three non-formal schools. The research sample is purposive determined. Data collection is done using question form and data analysis using descriptive statistics to obtain an average frequency of learning assessment technique. The results showed that the dominant assessment techniques used in non-formal science tutor are written tests namely on average by as much as 32 times in a semester. A group of tutors with 5 to 10 years of teaching experience using more diverse assessment techniques. In descriptive, it can be said that the use of the frequency spectrum of cognitive assessment techniques coupled with the experienced tutors with a tendency in the written test. However, the conclusions of these studies have not been able in the general. Therefore, further, the research is needed with a representative sample of research on the same topic. In addition, the tutor and/or researchers can also investigate the use of assessment techniques for the combinations be developing learning effectiveness and efficiency.

Keywords: science cognitive assessment, teaching experience, diverse assessment techniques
EFFECTIVENESS OF SUBSTANTIVE TECHNICAL EDUCATION AND TRAINING

FOR ISLAMIC SENIOR HIGH SCHOOL BIOLOGY TEACHERS

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Abstract

The purpose of this study was to determine the effectiveness of substantive technical education and training program for Islamic High School (Madrasah Aliyah/MA) throughout Central Java and Yogyakarta. Quantitative research with "One-Group Pretest-Postest Design" research design was used. Population and samples were taken from all Biology teachers throughout Central Java and Yogyakarta with a total of 33 participants. Instruments for data retrieval were questions about pretest and posttest. The data were in the form of participants’ pretest and posttest results. Based on the Wilcoxon test results, it obtained t count -3.083, while p = 0.002 <0.05, it could be concluded that substantive education and training can effectively improve the material mastery for Madrasah Aliyah biology teachers. The materials were the analysis of Graduate Competence Standard (SKL), Core Competence (KI), Basic Competence (KD), Biology Indicators of Madrasah Aliyah, essential material of anatomy and physiology of animals and plants, cells, animal and plant tissues, metabolic processes, biotechnology and their application, genetic in inheritance, and the practice of Madrasah aliyah biology learning.

Keywords: effectiveness, biology teacher, education and training, substantive technical
EFFORTS TO IMPROVE INDONESIAN LEARNING OUTCOMES USING INTEGRATIVE LEARNING METHODS

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Abstract - The results of this study showed that using an integrative method can increase the activity of learning and learning outcomes in learning Indonesian students in grade IV SDN IV Selat Kapuas Hilir. It can be seen from: 1). Activities learners in learning Indonesian by using integrative learner class IV SDN IV Strait Hilir Kuala Kapuas be better, it can be seen from the attention of students to the teacher’s explanations, learning centered on the learner, learners in asking that the activity of the participants students in the first cycle with both categories with a average 3 and the second cycle there is an increase categorized well, with a average 3,9 2). There is a learning outcome Indonesian students in grade IV SDN IV Strait Kapuas Hilir Lesson year 2016/2017 with a percentage increase of 43%. The average scores of students in the study was 66.8 with the first cycle in the classical completeness 50% and increased to 83, 7, with classical completeness 93% in the second cycle. Researchers used the method is to use the design of classroom action research (CAR) that seeks to solve or answer problems faced in the present situation. For data collection techniques used were observation and tests. While in this study using the analysis of the average value and the percentage of completeness class classical study.

Keywords: Integrative, Learning Outcomes, Methods
THE EFFORTS OF LEARNING OUTCOMES AND MOTIVATION IMPROVEMENT THROUGH COLLABORATIVE LEARNING BASED ON E-LEARNING WITH COURSE REVIEW HORAY ON BASIC CHEMICAL SUBJECT

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ABSTRACT

E-learning-based collaborative learning has proven to be an effective type of learning to improve student learning outcomes and motivation. However, the course review horay (CRH) is crucial to this learning as a supporter of learning. It is proved that E-learning-based collaborative learning with CRH not only improves learning outcomes and motivation, but also shows the relationship between motivation and learning outcomes. The previous learning that did not use the CRH do not demonstrate the relationship between motivation and learning outcomes. This study applied 3 cycles which were conducted through lesson study. In Cycle I, the learning was performed by utilizing cooperative learning based on e-learning. After that, in Cycle II, the learning was performed by using collaborative learning based on e-learning. Furthermore, during Cycle III, the process of learning was conducted by utilizing a collaborative model based on e-learning with CRH. It was found that there was an improvement in learning outcomes before and after learning in each cycle. If it is compared, the motivation and learning outcomes in Cycle II was higher than those in Cycle I, and the motivation and learning outcomes in Cycle III was higher than they were in Cycle I and II.

Keywords: collaborative, e-learning, course review horay, lesson Study

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The Effect of Blended Learning Model on the Students' Learning Outcomes.

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Abstract

This study investigates the effect of integrated virtual project based – learning model on the students' learning outcomes in English for Civil Engineering subject. This study involved students in Civil Engineering Department, Universitas Negeri Semarang taking English subject as the population of this study. The simple random sampling technique was used to obtain 35 students as samples of this study. This study employed quasi – experimental design, one-group pre-test post – test design. The data were collected using tests consisting of pre-test and post-test, interviews, and observation. The quantitative data were analyzed using descriptive and inferential statistics by using SPSS V.23. The Wilcoxon test showed that 24 positive ranks, 2 ties, 9 negative ranks with sig. value = 0.045. Therefore, there were significant differences in the mean values in the pre – test and post – test group. The results showed that the implementation of the model could improve the students' learning outcomes which was indicated by on the Wilcoxon test. N-gain test = 0.06 revealed that the effectiveness of integrated virtual project based learning model is low.

Keywords: blended learning, project – based learning, learning technology, learning model.
THE INFLUENCE OF OUTDOOR LEARNING MODELS ON CRITICAL THINKING ABILITY

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Abstract. This study aims to: (1) Knowing model of outdoor learning subject specific pedagogy that is feasible to use (2) Knowing the effect of outdoor learning model on critical thinking ability of Students. This study used quasi-experimental. Subjects in this study were X MIA 4 and X MIA 5 Sleman 1 State Senior High School registered as students in the 2017/2018 school year. Sampling in this study used purposive sampling technique based on certain criteria. Class X MIA 5 was an experimental class using experiment-based outdoor learning models while class X MIA 4 was a control class taught using conventional models. Data collection techniques used questions related to critical thinking skills. The instrument used was test of critical thinking skill which 5 indicator and 8 sub indicator. Learning tools developed were lesson plans, student worksheet, and critical thinking assessment instruments. Before being applied, learning tools were validated by experts to measure their feasibility. Measurement of whether or not there is influence of the model application on critical thinking skills used t test. The results of this study (1) the quality of learning devices of outdoor learning model according to expert material assessment were very good categories, (2) outdoor learning models effectively applied to upgrade critical thinking ability.
CONSTRUCTION OF INTERGRATED SCIENCE LEARNING MATERIAL INTEGRATED TYPE TO DEVELOP STUDENTS SCIENTIFIC LITERACY

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Abstract

Science learning in curriculum 2013 emphasizes to integrated learning approach that can improve the efficiency and effectiveness of learning and achievement of basic competencies. In addition, scientific literacy of junior high school students in Indonesian is low. Based on this, it is necessary to construction of integrated science learning materials. Integrated science learning materials can be compiled by integrated type. The purpose of this research is to describe construction, determine the feasibility and effectiveness learning material. The research method used is Research and Development (R&D). Construction of learning materials refers to the 4-D development model that reduced into 3-D. Feasibility test using questionnaire whereas effectiveness of learning materials using objective test and questionnaire. The results showed that learning material is very feasible to used in limited test on average percentage of each aspect >76% whereas effectiveness of learning material showed that learning material can improve scientific literacy of student on probability value is ($p$) Sig = 0.000<$a$ = 0.05 and average percentage of teacher and student response is 79.24 % and 80.90% with very good category. Thus, it is concluded that learning material very feasible to use in developing scientific literacy of student in the school.

Keywords: Learning Material, Integrated Science, Integrated Type, Scientific Literacy
Moodle as Media E-Learning in Physics Class

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Abstract. The 21st century is characterized by technological developments. This has an impact on all aspects of life including education. At this time, technology is one component in education that cannot be ignored. The purpose of this study was to map the student response to e-learning moodle after using it in class physics. Experimental research model with one-shot case study desained use in this study. Data collection through questionnaire at the end of learning. The results show that students have good response to e-learning, with average mark of perceived usefulness to e-learning is good, e-learning self-efficacy is good, perceived ease to use to e-learning is good, attitude to e-learning is good, and e-learning system usage is good. To better understanding of moodle as e-learning in physics study, advantage and obstacle is explained in the discussion.

Keywords: moodle; e-learning physics, students response
SUSTAINABLE STRATEGY: KARIMUNJAWA NATIONAL PARK
MARINE ECOTOURISM, JEPARA, INDONESIA

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ABSTRACT

Natural resource-based tourism frequently brings tradeoff in its development. The status of Karimunjawa Island as the National Park leads to consequence that the ecosystem in tourism area needs to be protected. The target setting of Karimunjawa tourists certainly brings potential negative environment impact, such as marine area contamination and coastal habitat destruction, and also harmful social impact, such as the disappearance of local identity, the change in its community’s economic and social structure. One aspect considered capable to bridge the tradeoff is education quality. The aims of research are as follows: (1) Analyzing the potential ecotourism in Karimunjawa National Park; (2) Analyzing the sustainable tourism using the education-based tourism model through identifying the internal and external environment in Karimunjawa National Park. Those objectives are conducted by using the descriptive analysis, the IFAS (Internal Factor Analysis Strategy) and the EFAS (External Factor Analysis Strategy). The result of research indicates that the educational aspect may become the strength and also the opportunity in developing Karimunjawa National Park Ecotourism. The weakness related to the educational quality is overcome by a strategy that utilizes the development opportunity of vocational education in tourism sector. Karimunjawa National Park has potential aspect that can be conducted and developed based on its potential ecology, its natural resources including fauna, the government’s support, the organization, and the society in supporting the facilities and infrastructure. Based on the internal factor analysis strategy (IFAS) and the external factor analysis strategy (EFAS), the aggressive strategy needs to be conducted by consistently growing the ecological spirit and the natural preservation since the early period in every level of education. It requires the massive education on the significance of ecosystem preservation to the tourism actors and the tourists either the domestic or foreign ones. The stakeholders’ support at the central and regional level has significant role, especially the policies that include the tourism and ecotourism education to the curriculum. The technology development is utilized to educate the society in line with the increase in market expectation on the clean and natural tourism destination and also on the back-to-nature lifestyle of the society.

Keywords: ecotourism, edutourism, tourism, strategy, Karimunjawa
THE MOVEMENT OF STEM EDUCATION IN INDONESIA: SCIENCE TEACHERS’ PERSPECTIVES

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ABSTRACT

Indonesia as a large country with a wealth of natural resources and abundant human resources, should be a nation that plays a large role in the development of science and technology. STEM education can be used in other scientific fields by utilizing the principles of science, technology, engineering and mathematics as a basis for learning and developing potential students. This study aimed to examine more deeply teachers’ perceptions regarding STEM education in Indonesia including understanding of STEM definition. Subjects in this study were consisted of 117 science teachers from Indonesia. A set of questionnaire which comprises open-ended and closed-ended questions about teachers’ perceptions and understanding regarding STEM education and 21st century skills preparation were developed and applied. Responses from science teachers were analysed through interpretive methods in which the participants’ own meanings and points of view were sought. The result indicated that STEM education is quite well understood by teachers. It is important that we focus on teachers because they play a critical role in the success of new reforms. The implication is that there is a great need for awareness-raising at both government and teacher levels to embrace STEM education.

Keywords: STEM education; 21st century skills
Improving Science Process Skills by Considering Cognitive Style and Cognitive Development

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This study was aimed to analyze the effectiveness of cognitive style-based scientific learning (CSBSL) strategy to improve students’ process skills. This study was carried out by implementing one group pre-test-post-test design in science classroom of two elementary schools with different qualifications. The research results showed that the learning strategy could improve almost all the students’ science process skills from poor to good categories. The weakest science process skills of the elementary school students were abilities of conducting experiments that included indicators of stating hypotheses or operational questions to be tested, identifying and controlling variables and making operational definitions. This learning strategy enables to accommodate differences of both students’ cognitive development and cognitive style (e.g. field dependence/FD and field independence/FI), so that it was effective to optimally improve the science process skills. The CSBSL Strategy provides a significant contribution in improving students' science process skills early through learning process

Keywords: cognitive style, field dependence, field independence, learning strategy, science process skills
Preparation of authentic assessment instruments on instrumental analysis practice project-based to improve graduate competence

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Abstract. The instrument has been tested to measure students' competency level. Competencies measured include mastery of instrumentation analysis concepts, basic laboratory skills, instrumentation analysis skills, critical thinking skills, and scientific work skills. Mastery of instrumentation analysis concepts is assessed through tests, basic laboratory skills and instrumentation analysis skills assessed through observation, critical thinking skills and scientific workability assessed through product assessment in the form of designs and reports from the project. The test results obtained that information from 30 test questions mastery instrumentation analysis concepts there is only 25 valid questions and measurement instruments mastery of the overall concept reliable with reliability 0.845. Authentic assessment instruments and rubrics as guidelines for evaluating basic laboratory skills, instrumentation analysis skills, and critical thinking skills, scientific work skills were tested through 6 observers. Overall the results of the inter-rater reliability test obtained by interclass correlation (ICC) above 0.7 which means that authentic assessment instruments are valid and reliable.
THE INFLUENCE OF MODEL A DEMONSTRATION INTERACTIVE WITH MEDIA PROPS AGAINST THE CRITICAL THINKING SKILLS AND LEARNING MOTIVATION OF HIGH SCHOOL STUDENTS.

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Abstract

The research was conducted in SMA Negeri 2 Kotabumi North Lampung District school year 2017/2018. This study aims to Determine how much influence the use of Interactive Demonstration models with medi props against critical thinking skills and learning motivation grade XI. This type of research is quantitative research methodsExperimental quasy design. The population in this study is a class XI IPA 1 and XI IPA 2, means of the data collection in the form of tests, non-test, and documentation. Based on the results Obtained by the achievement for the critical thinking skills of the experimental class average value (79), while the control class average value (67). For motivation to learn Obtained experimental class props percentage (86%) while the percentage for the class gained control of (77%). Based on correlation test of significance of 0.009> 0.05, then there is a significant correlation. The results Showed that the effect of the media aided Interactive Demonstration models props significant effect on critical thinking skills and learning motivation.

Keywords:
Interactive Demonstrations, Critical Thinking Skills, Learning Motivation,
Creative Problem Solving; Implemented Study in Biology Content

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Abstract:

The form of classical teaching was still the mostly used in teaching and learning form but for certain fields other forms of teaching are needed such as creative problem solving. The purpose of this form of teaching aimed at teaching students to think at a higher order thinking skill, one of which is problem solving that requires creative thinking skills. This study aimed at determining students' prior knowledge in solving problems creatively using creative problem solving. The focus of this study was a discussion of environmental pollution using the teaching steps of creative problem solving. Respondents were students of Study Program of Biology Education. The research instrument was a discussion sheet with the topic given "environmental pollution". Data analysis used was descriptive statistics. The results of data study were; (1) the results of the students' achievement were 6 (34.5%), 7 (20.8%), 5 (17.2%), 8 (13.8%), 4 (10.3%), 3 (3.4%), (2) the results of Creative Problem Solving (CPS) were; clarification 58.6%, ideate 72.4%, and developing 27.6%. It can be concluded that students were less in solving problems creatively in "environmental pollution" material.

Keyword: Creative Problem Solving, environmental pollution, students’ achievement
The Strategy of Optimizing The Use Of Farmer’s Card in Village Kalisalak and Sidomulyo,
Subdistric Limpung District Batang

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Abstract

The objective if this research is to analyse the benefit and any issue in implementing such farmer’s card as well as to analyse the strategy to optimize the use of farmer’s card in Village Kalisalak and Village Sidomulyo. Such analysis method used in this research is mix method: qualitative descriptive analysis to identify the benefit and the issue of farmer’s card program. In arranging the strategy of program criteria that can be done and the strategy that can be prioritized to optimize the use of farmer’s card using Analysis of Hierarchy Process (AHP). Optimizing Strategy of the use of farmer’s card as the payment method for subsided fertilizer in Village Kalisalak and Village Sidomulyo implemented using tool analysis of AHP consecutively, it is chosen the aspect of Bank BRI, retailer stalls, farmers, and government. Overall, the order of alternative strategy of optimizing the use of farmer’s card in Village Kalisalak and Village Sidomulyo is the distribution of the Farmer’s Card and the account book assisted by the extension officer as well as the local village officer. Suggestion to this research is for the extension officer, bank, village officer as well as university to intensify the routine counselling, and the newest information sharing about technology or banking service for farmers.

Keywords: Farmer’s Card, Analysis Hierarchy Process, Optimizing Strategy

JEL Classification: Q14, G21, R51
Abstract. This study aims at developing an integrated Management Information System for Lecturers Credit Score Assessment (SIMPAKDOS). This research is an R&D research conducted in March-September 2018. The system itself is developed by conducting FAST method (Framework for the Application of Systems Techniques). Data collection methods used are interviews, questionnaires, and documentation. The data analysis method used are descriptive analysis, FGD (focus group discussion), and linear regression analysis. The development of Integrated SIMPAKDOS has been finished with the FAST approach. The results of the needs analysis show that the lecturers and staffs need Integrated SIMPAKDOS with approved content and conditions. The logical design prepared has been through FGD, expert validation, and trials to obtain input and validation from various stakeholders. System validation is carried out in two stages (development expert validation and system content expert validation) and the results show that Integrated SIMPAKDOS is valid and feasible to use. The test results also show that the interest of lecturers applying for promotion is included in the very high category, which is as many as 65% after using SIMPAKDOS. The use of Integrated SIMPAKDOS proved to have a positive and significant effect on the intention of lecturers to propose rank promotions.

Keywords. FAST, Lecturers’ Credit Score, SIMPAKDOS
Understanding the Relationship Between Marketing Mix Strategy and Sustainable Competitive Advantage of Private University in Central Java Indonesia

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Abstract. The purposes of this study are (1) to investigate the relationship between marketing mix strategy and sustainable competitive advantage, (2) to investigate the influence marketing mix strategy and image on positional advantage, and (3) to test image as moderating variable on the relationship between marketing mix strategy and sustainable competitive advantage. This research analyses the perspective of student. The research design is quantitative research by adding moderating variable. The population are students at a private university in Central Java, Indonesia. The number of respondents is 189 students. The data are obtained by using the questionnaire. Descriptive analysis and moderate regression analysis are used to interpret the data. The result shows that marketing mix strategy has positive and significant effect on sustainable competitive advantage and positional advantage. Image plays its role as moderating variable on the relationship between marketing mix strategy and sustainable competitive advantage. The other result shows superior image has significant and positive effect on positional advantage. The originality of this research is the existence of superior imagery as a moderating variable. It will strengthen the influence of marketing mix strategy on sustainable competitive advantage.
The present study aims to obtain information about students’ perceptions concerning the importance of multiple representations including macroscopic, submicroscopic, and symbolic level in chemistry teaching materials, the difficulties in learning voltaic cell, and the ability to present voltaic cell material through those three level of representations. Twenty one students of chemistry education program at the fifth semester, who are taking the subject of school chemistry in the one of the university in Indonesia, are selected as the participants. Questionnaires and interview are employed as the instruments in this descriptive research. They are utilized to gather the students’ perceptions about the characteristics of voltaic cell material, the students’ knowledge of multiple representations and those representations in chemistry teaching materials, and the rubric assessments of teaching materials based on those representations. This study indicates that the students consider the voltaic cell subject as difficult material. Even though they do not understand the multiple representations, they encourage to involve those representations in the teaching materials. Furthermore, the students’ ability of presenting the multiple representations are considered in the low category. They are not be able to apply those representations and associate one and another.

Keywords: multiple representations, prospective chemistry teacher, teaching materials, voltaic cells.
SCIENCE TEACHERS’ COMPETENCE IN UTILIZE LEARNING RESOURCES AT JUNIOR HIGH SCHOOLS

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Abstract

This study aimed to determine: (1) learning resources used by science teachers, (2) the ability of science teachers to utilize learning resources, and (3) the implications of using learning resources on the quality of science teachers in the learning process. This study was a field study with a qualitative approach. The subjects of this study was science teachers at SMP Negeri 3 Purworejo. Techniques used in data analysis was an interactive model by Miles & Huberman including data collection, data reduction, data display, and conclusion. The result showed that learning resources used by science teachers include in the environment around the school, the environment around the residence of learners, and learning outside of school. The ability of science teachers to utilize learning resources, overall all science teachers of SMP Negeri 3 Purworejo was able to use it. Implications use of learning resources on the quality of science teachers in learning process was teacher able to give more motivation, maximize learning time, and maximize creativity.

Keywords:

science teachers’, teachers’ competence, utilize learning resources.
IMPROVING TEACHERS’ UNDERSTANDING AND READINESS
IN IMPLEMENTING STEM THROUGH SCIENCE LEARNING SIMULATION

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ABSTRACT

This study was aimed to find out the improvement of science teachers' understanding towards the STEM concept; the improvement of teachers' readiness in implementing it; and the correlation between the understanding of STEM concept and readiness in implementing it in learning science. The participants were 51 Science teachers from several Junior High Schools in district of Ciamis who joined the workshop and Simulation of natural science learning Based on STEM concept. This research is a continuation of the research on understanding the STEM Concept and Teachers' Readiness towards STEM Implementation on science learning. The method of study used descriptive using instruments of questionnaires, document of lesson plan, and interview. The data were analyzed used descriptive statistic with the analyzed used SPSS version 25.0. Whereas, the data of interview and document were analyzed qualitatively. The results of the research indicate that the level of science teachers' understanding of learning uses the STEM concept was high. In addition, their level of readiness in implementing STEM-Based learning is also high. Thus, the correlation between the understanding of Science teachers towards the concept of STEM and their readiness in implementation in learning natural science is high.

Keywords: STEM, Understanding, Readiness, Implementation, Simulation

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The model of Science Proficiency of Indonesian students in PISA 2015

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Abstract. The objectives of this research are: (1) to find theoretical model that can illustrate the science Proficiency of Indonesian students, (2) to know the factor factors that predominantly influence the science Proficiency of Indonesian students. The research was conducted using ex post facto method using PISA 2015 data for Indonesia as many as 6088 student responses. Data analyzing used structural equation modeling which involve 14 observed variables and 3 latent variables and limited to the variables measured at student level. The research result showed that the Science Proficiency of Indonesian students are positively influenced by the background students and the quality of science learning. Student backgrounds can be indicated by Index of economic, social and cultural status and ICT Resources. The quality of science learning can be shown by indicators: disciplinary climate in science classes, teacher motivation in science classes of student choices, teacher-directed science instruction, and perceiving feedback. Science Proficiency of Indonesian students can be shown by indicators: environmental awareness, science self-efficacy, epistemological beliefs, eense of belonging to school, and plausibly value of science. The results also show that the background aspect of Indonesian students is more dominant in influencing science proficiency than the quality of learning.
Abstract The purpose of this study was to compare the increase in statistical reasoning abilities of middle school students between those who used modified project-based learning model by the commonly used project-based learning model. The researcher used a quantitative research method with a quasi-experimental research design and pretest-posttest. The research sample was two classes of 8th taken by random sampling technique. The experimental class uses a modified project-based learning model, while the control class uses a commonly used project-based learning model. The research data was obtained through written tests. The normality test shows that both the pre-test and N-Gain scores have a normal distribution. The analysis continued with one-way ANOVA test which showed a sig value < 0.05 which means there were no differences in the initial ability of statistical reasoning of the two groups. Whereas the N-Gain has a sig value > 0.05 which means the modified project-based learning model is better than the project-based learning model in improving students' statistical reasoning abilities, because using a modified project-based learning model is more stimulating to foster logic, systematic thinking, and analytical.

Keywords: Modified Project-Based Learning