



ICOMSET 2017

**2nd International Conference on
Mathematics, Science, Education
and Technology**

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Table of contents

Volume 335

2018

Previous issue Next issue

The 2nd International Conference on Mathematics, Science, Education and Technology
5–6 October 2017, Padang, West Sumatera, Indonesia

[View all abstracts](#)

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Published online: 25 April 2018

Preface

OPEN ACCESS 011001

The 2nd International Conference on Mathematics, Science, Education and Technology

View abstract PDF

OPEN ACCESS 011002

The 2nd International Conference on Mathematics, Science, Education and Technology

View abstract PDF

OPEN ACCESS 011003

The 2nd International Conference on Mathematics, Science, Education and Technology

View abstract PDF

OPEN ACCESS 011004

Peer review statement

OPEN ACCESS

012007

Adsorption and Pore of Physical-Chemical Activated Coconut Shell Charcoal Carbon

E Budi, U Umiatin, H Nasbey, R A Bintoro, Fi Wulandari and E Erlina

View abstract PDF

OPEN ACCESS

012008

Characterization of Silica Sand Due to The Influence of Calcination Temperature

R Ratnawulan, A Fauzi and A E S Hayati

View abstract PDF

OPEN ACCESS

012009

An Investigation of Seismicity for the West Sumatra Region Indonesia

S Syafriani

View abstract PDF

OPEN ACCESS

012010

Optical Properties of Fe₃O₄ Thin Films Prepared from the Iron Sand by Spin Coating Method

N Yulfriska, D Rianto, F Murti, Y Darvina and R Ramli

View abstract PDF

OPEN ACCESS

012011

Analysis of Seismotektonic Patterns in Sumatra Region Based on the Focal Mechanism of Earthquake Period 1976-2016

F P Indah, S Syafriani and Z S Andiyansyah

View abstract PDF

OPEN ACCESS

012012

Analysis of Crystal Structure of Fe₃O₄ Thin Films Based on Iron Sand Growth by Spin Coating Method

D Rianto, N Yulfriska, F Murti, H Hidayati and R Ramli

View abstract PDF

Biology

OPEN ACCESS

012013

In Vivo Tes of Dicofol on Cocoon Production and Viability of Earthworm *Pontoscolex corethrurus* Fr. Mull

R Sumarmin, N K Huda and E Yuniarti

View abstract PDF

OPEN ACCESS

012014

Tristania Sumatrana Effect On Female Mus Musculus Fertility

S Syamsurizal

View abstract PDF

OPEN ACCESS

012015

Morphometry and Lens of Eyes Bilih Fish (*mystacoleucus padangensis*, Bleeker)
from Lake Toba, North Sumatra and Lake Singkarak, West Sumatra

A Razak

View abstract PDF

OPEN ACCESS

012016

The Addition of Several Mineral Sources on Growing Media of Fluorescent
Pseudomonad for the Biosynthesis of Hydrogen Cyanide

L Advinda, M Fifendy and A Anhar

View abstract PDF

OPEN ACCESS

012017

Growth and Tomato Nutrition Content with Bandotan (*Ageratum Conyzoides* L)
Bokashi Applied

A Anhar, R Junaldi, A Zein, L Advinda and I Leilani

View abstract PDF

OPEN ACCESS

012018

Ethnobotany in Traditional Ceremony at *Kanagarian Sontang Cubadak Padang*
Gelugur Subdistrict, *Pasaman* District

M Des, R Rizki and H Hidayati

View abstract PDF

OPEN ACCESS

012019

Pollen Morphology of *Caesalpinia pulcherrima* (L.) Swartz in Highland and
Lowland West Sumatra

R Fitri and M. Des

View abstract PDF

OPEN ACCESS

012020

Leaf Trichomes Morphology of *Hyptis suaveolens* (L.) Poit. (LAMIACEAE)

M Chatri, A Baktiar, M Mansyurdin and P Periadnadi

[□ View abstract](#) [PDF](#)

Papers

Physics

OPEN ACCESS 012001

Magnetic Susceptibility and Heavy Metals in Guano from South Sulawesi Caves

H Rifai, R Putra, M R Fadila, E Erni and C M Wurster

[□ View abstract](#) [PDF](#)

OPEN ACCESS 012002

Development Radar Absorber Material using Rice Husk Carbon for Anechoic Chamber Application

Z Zulpadrianto, Y Yohandri and A Putra

[□ View abstract](#) [PDF](#)

OPEN ACCESS 012003

Crystal Structure Analysis of Electromagnetic Wave Absorber Material $BaFe_{12-x}Ti_{x/2}Zn_{x/2}O_{19}$ Based

M Delina, N Nenni and W A Adi

[□ View abstract](#) [PDF](#)

OPEN ACCESS 012004

Effect Of Milling Time on Particle Size of Forsterite (Mg_2SiO_4) from South *Solok* District

S Sarimai, R Ratnawulan, R Ramli and A Fauzi

[□ View abstract](#) [PDF](#)

OPEN ACCESS 012005

Early Warning System of Flood Disaster Based on Ultrasonic Sensors and Wireless Technology

W Indrasari, B H Iswanto and M Andayani

[□ View abstract](#) [PDF](#)

OPEN ACCESS 012006

A PIPO Boost Converter with Low Ripple and Medium Current Application

S Bandri, A Sofian and F Ismail

[□ View abstract](#) [PDF](#)

Electrical Quantities

D Despa, G.F Nama, M.A Muhammad and K Anwar

[View abstract](#) [PDF](#)

OPEN ACCESS

012064

Development of Gravity Acceleration Measurement Using Simple Harmonic Motion Pendulum Method Based on Digital Technology and Photogate Sensor

Yulkifli, Zurian Afandi and Yohandri

[View abstract](#) [PDF](#)

Education

OPEN ACCESS

012065

How Games are Designed to Increase Students' Motivation in Learning Physics? A Literature Review

V Tinedi, Y Yohandri and D Djamas

[View abstract](#) [PDF](#)

OPEN ACCESS

012066

Validity of High School Physic Module With Character Values Using Process Skill Approach In STKIP PGRI West Sumatera

M Anaperta, H Helendra and R Zulva

[View abstract](#) [PDF](#)

OPEN ACCESS

012067

Effectiveness of Adaptive Contextual Learning Model of Integrated Science by Integrating Digital Age Literacy on Grade VIII Students

A Asrizal, A Amran, A Ananda and F Festiyed

[View abstract](#) [PDF](#)

OPEN ACCESS

012068

Implementation Authentic Task to Enhance Problem Solving and Self-Management for Physics College Students

Festiyed, D Djamas and D Pilendia

[View abstract](#) [PDF](#)

OPEN ACCESS

012069

The Development of Virtual Laboratory Using ICT for Physics in Senior High School

M Masril, H Hidayati and Y Darvina

[View abstract](#) [PDF](#)

Emotional and Spiritual Quotient Approach Improve Biology Education Students' Acceptance of Evolution Theory

R Darussyamsu, M Fadilah and D H Putri

[View abstract](#) [PDF](#)

OPEN ACCESS

012091

Validity of Learning Module Natural Sciences Oriented Constructivism with the Contain of Character Education for Students of Class VIII at Yunior Hight School

K Oktarina, L Lufri and M Chatri

[View abstract](#) [PDF](#)

OPEN ACCESS

012092

Development Biology Worksheet Oriented Accelerated Learning on Plantae and Ecosystems for 10th-Grade Senior High School Students

D A Dipuja, L Lufri and Y Ahda

[View abstract](#) [PDF](#)

OPEN ACCESS

012093

Identification of Conceptual Understanding in Biotechnology Learning

E Suryanti, A Fitriani, S Redjeki and R Riandi

[View abstract](#) [PDF](#)

OPEN ACCESS

012094

Development of Learning Models Based on Problem Solving and Meaningful Learning Standards by Expert Validity for Animal Development Course

L Lufri, R Fitri and R Yogica

[View abstract](#) [PDF](#)

OPEN ACCESS

012095

The Implementation of Research-based Learning on Biology Seminar Course in Biology Education Study Program of FKIP UMRAH

T Amelia

[View abstract](#) [PDF](#)

OPEN ACCESS

012096

Guiding Development Based Approach Practicum Vertebrates Taxonomy Scientific Study Program for Students of Biology Education

M Arieska, S Syamsurizal and R Sumarmin

[View abstract](#) [PDF](#)

PREFACE

On behalf of the Steering Committee, I would like to thank you for your participation in the 2nd International Conference on Mathematics, Science, Education and Engineering (ICOMSET2017) which has been held at Grand Inna Muara Hotel and Convention Center in Padang, West Sumatera, Indonesia from October 5 (Tuesday) through 6 (Friday), 2017.

This 2nd ICOMSET is organized by the Faculty of Mathematics and Natural Science, Universitas Negeri Padang. The main objective of this conference is to provide an international platform for researchers, Academicians as well as industrial professionals from all over the world to present Their research results in Mathematics, Science, Education, Technology, and other related fields. This conference also provides opportunities for the delegates to exchange new ideas and application experiences, to establish research relations and to find partners for future collaboration.

I would like to express my sincere appreciation to all the participants, financial sponsors, exhibitors, supporting organizations and all the committee members who has made ICOMSET 2017 successful. With these strong support, we are sure ICOMSET will be beneficial to all the participants, and you enjoy Padang.

We are looking forward to meeting you in the next ICOMSET.

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Development of Learning Models Based on Problem Solving and Meaningful Learning Standards by Expert Validity for Animal Development Course

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Abstract. The purpose of this study is to produce a learning model based on problem solving and meaningful learning standards by expert assessment or validation for the course of Animal Development. This research is a development research that produce the product in the form of learning model, which consist of sub product, namely: the syntax of learning model and student worksheets. All of these products are standardized through expert validation. The research data is the level of validity of all sub products obtained using questionnaire, filled by validators from various field of expertise (field of study, learning strategy, Bahasa). Data were analysed using descriptive statistics. The result of the research shows that the problem solving and meaningful learning model has been produced. Sub products declared appropriate by expert include the syntax of learning model and student worksheet.

1. Introduction

The demands of the government on improving the quality of higher education in Indonesia have surfaced in various mass media and Education meetings. They have taken serious action to make this happen. A similar thing is being done also by the higher education. Level of education quality can be known by looking at the quality of the learning process, which is expected to be the key to the formation of individuals who are able to apply science properly and correctly. However, based on a preliminary study on one of the subjects in college, especially in the Department of Biology FMIPA Universitas Negeri Padang (Animals Development) found unsatisfactory results. The data found is the difficulties of students understanding the concept, the students are unable to re-explain the related material, the students cannot describe the pictures and they cannot think at a higher level.

This problem is related to the student's low-mindedness to understand the concept of animal development. The ability is often known when students take the final exam of the semester. Students tend to answer wrongly about a concept, while they should not be wrong. The conclusion is that students do not understand the concept well.

Based on the facts that have been stated previously, confirmed by the results of discussions with the lecturers of the field course of Animals Development arises an idea to solve problems or find solutions. The solution offered is to develop a model that requires students to have the ability to think high level and interpret the learning materials. Grabe and Grabe suggest that with meaningful learning the students will understand the content of the lesson more deeply [1]. Meaningful learning is much better when compared with rote-based learning [2].



This model was chosen to be developed on the grounds that students' ability after learning will improve through meaningful learning. Implementation of meaningful learning can be done by lecturers because they are professional in the field of learning so that role to prepare learners to be ready to join in society or level education [3].

In addition to the model, this research also develops teaching materials that are Problem Solving based worksheets and Concept Map based worksheets. Von Glaserveld states that with problem solving learning will lead to meaningful learning, because students will feel satisfied, happy and motivated to learn [4]. Concerning the concept map, Clinton has written that meaningful learning will be beneficial to the learning strategy of "finding relationships" between concepts [5].

This research is limited to validity test of model syntax and student worksheet. The validity of the model syntax and student worksheet is very important because it indicates the level of trust in something. Guba and Lincoln stated that the level of trust has 4 aspects, namely credibility, transferability, dependability and confirmability [6]. Validity describes the precision of the data that has been found [7]. Even the truth level of a data can be indicated from the validity of the data [8]. A good research is that the researcher can validate the research instrument as well as the data obtained [9].

2. Method

The method used in the research is development research. This research development method was adopted from the instructional development cycle model developed by Fenrich in 1997 as shown in Figure 1.

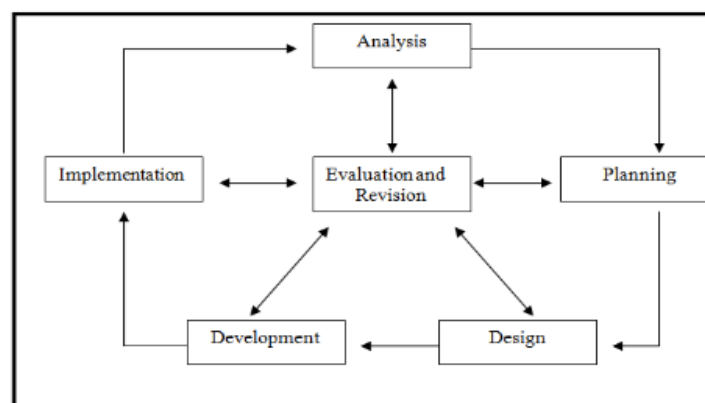


Figure 1. Developmental Cycle Procedure

The data collecting instrument in the study used a validity questionnaire that was first validated by the experts. Questionnaire has 5 scales with criteria strongly agree, agree, average, quite agree and disagree. Validator in this research is Dr. Yuni Ahda, M.Si., Dr. Ramadan Sumarmin, M.Si., Dr. Hardeli, M.Si., and Dr. Yerizon, M.Sc. The validation data obtained has been processed using the average analysis for the final result to interpret the entire product. These products include syntax module, student workbook based problem solving and student worksheet based on concept map. The interpretation values of validity data are (1) 1-1.79 is highly invalid, 1.8-2.59 is invalid, 2.6-3.39 is valid enough, 3,4-4,19 is valid and 4, 2- 5 is very valid.

3. Results and Discussion

Analysis of validation data by four validators to the syntax of the model obtained an average value of 4.3 with very valid criteria. The average value of the didactic indicator is 4.2, the average value on the construction indicator is 4.4, and the mean value for the technical indicator and linguistic is 4.3. Distribution of data more clearly can be seen in Figure 2.

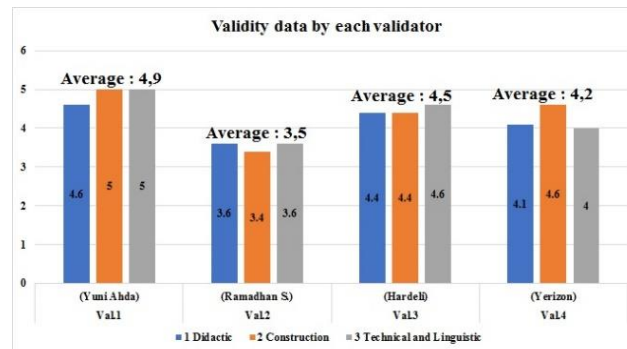


Figure 2. Validity Value of Model Syntax

Result of data analysis to student work sheet based problem solving got value 4.2 with criterion very valid. The average value on the indicator of eligibility of content got the number 4.3, the average value on the indicator language got the value 4.3, the average value for indicator presentation is 4.2, and the average value on the indicator graph is 4.2. Distribution of data more clearly can be seen in Figure 3.

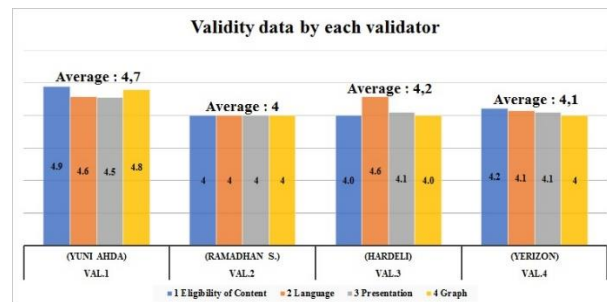


Figure 3. Validity Value of Student Worksheet Based on Problem Solving

The result of validation data analysis toward concept map based worksheet got value 4.3 with criterion very valid. The average value on all indicators (indicator eligibility of content, language, presentation, graph) is 4.3. Distribution of data more clearly can be seen in Figure 4.

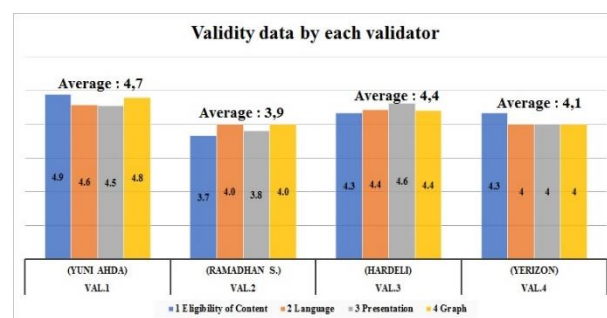


Figure 4. Validity Value of Student Worksheet Based on Concept Map

All products that have been developed and validated, are expected to be useful for lecturers as a consideration for use in learning, especially in the subject of Animal Development. This research can also be used as an example to develop the ability to produce learning model and student worksheet, so it is expected to create a better learning quality and different from usual. Different learning atmosphere than usual will be interesting for students to pay attention and understand the learning materials. Government demands that are in line with the background of this research so that teachers can create a

conducive learning atmosphere in order to encourage the realization of meaningful learning will be achieved.

Meaningful learning will have an impact on satisfactory learning outcomes in accordance with the learning objectives. There are three criteria to create meaningful learning that is (1) learning materials relevant to the daily life of the students, (2) the teacher's learning materials should also be meaningful for the students' life, and (3) the students' curiosity to connect the learning materials with the activities which is fun [10]. Novak explains that enjoyable learning is an integration between thoughts, feelings, and actions, which encourages students to be committed and responsible [10].

The syntax of the developed learning model leads the student toward meaningful learning. In essence, meaningful learning is much greater in meaning than just transmitting material from teacher to student. Meaningful learning builds opportunities for students to build their own knowledge, and the ability to share with other students [11]. Learning model that has been developed is the right choice in a learning process in general, and subjects of animal development in particular to give a positive influence on the process and student learning outcomes in the Department of Biology FMIPA UNP in the course of Animal Development.

The accuracy of choosing teaching materials that will be used in the learning process will accelerate the acceptance of the contents of the given material. If students easily accept the subject matter and they are able to understand it, then learning it will become more active and advanced. Judging from the aspect of the truth of the contents, the worksheet based on problem solving and student worksheet based on the concept map is considered very valid so that it can be stated that the student worksheet contains the material in accordance with the curriculum in the college, according to the stage of student development and their needs, the content of the material is correct, it is assumed to be able to increase the knowledge and understanding of the students and can create meaningful learning process, so it is good to be used as learning resource in learning in the subject of Animal Development.

From linguistic aspect, the work sheet of problem solving student and student worksheet of concept map given value is very valid because the description of the material in both worksheet of this student can be read clearly, clear explanation of information, spelling according to Indonesian rule and already using effective sentence and efficient. Judging from the presentation aspect, student work sheet based on problem solving and student work based on the concept map is considered very valid because the learning objectives formulated are clear, the design of student worksheets in accordance with the rules of development, stimulate learning motivation with color and picture, cover, build learning meaning and completeness of information. Then from the aspect of the graph, then the student worksheet is considered very valid because the selection of the right letter, font size, image layout and image selection.

Based on the assessment of the validators it can be drawn a conclusion that the model and worksheet of students can help students to improve their understanding in the course of Animal Development. Students are interested to learn by using this learning model because it can improve their understanding and ability to think high level. The validity test can provide a conclusion that the student models and worksheets that have been developed can be used in the learning process at different times with different specifications [13].

4. Conclusion

Based on data analysis and discussion, it can be made a generalization about the learning model and student worksheet (problem solving and concept map) for students in the course of animal development which has been developed has validity with very valid category. This development research has resulted in learning model and student worksheet for animal development students and can give description and input to related parties to continuously improve the quality of education, especially in the subject of Animal Development. The model and worksheet of students that have been developed will create a fun learning nuance and can realize satisfactory learning outcomes.

The research team suggested that it continues to develop the ability to be able to test the level of validity of an object, because each test of validity cannot be ascertained with absolute correctness. One reason is the ability of researchers to test and analyze the data validity. The calculation of the validity of an object will be influenced by the ability of researchers to collect and calculate data. Validity values cannot be separated from the possibility of error calculation techniques conducted by the researchers themselves. Therefore, the researcher receives all criticism and suggestion from the reader to improve the quality of this research.

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