



Faculty of Mathematics and Natural Science
Yogyakarta State University



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Proceedings

“ The Global challenges on the development
and the education of mathematics and science “

3rd ICRIEMMS

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Implementation, and Education of
Mathematics and Science 2016**

**“ The Global challenges on the development
and the education of mathematics and science “**

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Preface

Bless upon God Almighty such that this proceeding on 3rd International Conference on Research, Implementation, and Education of Mathematics and Sciences (ICRIEMS) may be compiled according to the schedule provided by the organizing committee. All of the articles in this proceeding are obtained by selection process by the reviewer team and have already been presented in the Conference on 16 – 17 May 2016 in the Faculty of Mathematics and Natural Sciences, Yogyakarta State University. This proceeding comprises 9 fields, that is mathematics, mathematics education, physics, physics education, chemistry, chemistry education, biology, biology education, and science education.

The theme of this 3rd ICRIEMS is ‘*The Global Challenges on The Development and The Education of Mathematics and Science*’. The main articles in this conference are given by six keynote speakers, which are Prof. Allen Price, Ph.D (Emmanuel College Boston USA), Ana R. Otero, Ph.D (Emmanuel College Boston USA), Dr. Michiel Doorman (Utrecht University, Netherlands), Prof. Dr. Marsigit, M.A (Yogyakarta State University), Asst. Prof. Dr. Warakorn Limbut (Prince of Songkla University, Thailand), and Prof. Dr. Rosly Jaafar (Universiti Pendidikan Sultan Idris, Malaysia). Besides the keynote and invited speakers, there are also parallel articles that presented the latest research results in the field of mathematics and sciences, and the education. These parallel session speakers come from researchers from Indonesia and abroad.

Hopefully, this proceeding may contribute in disseminating research results and studies in the field of Mathematics and Sciences and the Education such that they are accessible by many people and useful for the Nation Building.

Yogyakarta, May 2016

The Editor Team

Forewords From The Head Of Committee

Assalamu'alaikum warahmatullahi wabarakatuh

May peace and God's blessings be upon us all

First of all, allow me to thanks to God, Allah SWT, who has been giving us blessing and mercies so we can join this conference. Ladies and Gentlemen, it is my great honor to welcome you to Indonesia, a unique country which has more than 17,000 islands, more than 1,300 ethnic groups, and more than 700 local languages, and I am also very happy to welcome you to Yogyakarta, the city of education, culture, tourism, and a miniature of Indonesia. We wish you be happy and comfortable in attending the conference in this city.

The third International Conference on Research, Implementation, and Education of Mathematics and Science (ICRIEMS 3rd) 2016 is organized by the Faculty of Mathematics and Science, State University of Yogyakarta. In this year, theme of the conference is : The Global Challenges on The Development and The Education of Mathematics and Science. This conference are dedicated to the 52nd anniversary of Yogyakarta State University and to face challenges of Asean Economic Community in 2016.

This conference facilitates academics, researchers and educators to publish and disseminate their research in the fields of pure, application and education of Science and Mathematics. Furthermore, the purposes of the conference are to establish interaction, communication, and cooperation among academics, researchers and educators at an international level.

On behalf of the committee of this conference, I would like to express our highest appreciation and gratitude to the keynote speakers, including:

1. Allen Price, Ph.D. (Associate Professor of Emmanuel College, Boston USA)
2. Ana R. Otero, Ph.D. (Emmanuel College, Boston USA)
3. Dr. L.M. (Michiel) Doorman (Associate Professor of Utrecht University, Netherland)
4. Prof. Dr. Marsigit, MA. (FMIPA, Universitas Negeri Yogyakarta)
5. Asst. Prof. Dr. Warakorn Limbut (Faculty of Science, Prince of Songkla University, Thailand)
6. Prof. Dr. Rosly Jaafar (Faculty of Physics, Universiti Pendidikan Sultan Idris, Malaysia)

Furthermore, we inform you that the papers presented in this conference are about 200 papers from 302 applicants, who come from various countries and various provinces throughout Indonesia. Therefore, I would like to give my appreciation and many thanks to the presenters and participants who have been actively involved in this seminar.

Finally, I would like to thank the committee members who have been working very hard since half a year ago to ensure the success of the conference. However, if you find any shortcomings and inconveniences in this conference, please forgive us. We would very

happy to receive your suggestions for improvement in the next conference. Thank you very much.

Wassalamu'alaikum warohmatullahi wabarakatuh.

Yogyakarta, May 2016

Dr. Warsono, M.Si.

Forewords From The Dean Of Faculty Of Mathematics And Sciences, Yogyakarta State University

Assalamu'alaikum warahmatullahi wabarakatuh. My greetings for all of you. May peace and God's blessings be upon us all.

On behalf of the Organizing Committee, first of all allow me to extend my warmest greeting and welcome to the International Conference on Research, Implementation, and Education of Mathematics and Sciences, the third to be held by the Faculty of Mathematics and Science, State University of Yogyakarta, one of the excellent and qualified education universities in Indonesia. This conference is also celebrate the 52th Anniversary of State University of Yogyakarta.

This conference proudly presents keynote speeches by six excellent academics, these are: Allen Price, Ph.D., Ana R. Otero, Ph.D., Dr. Michiel Doorman, Prof. Dr. Marsigit, MA., Asst. Prof. Dr. Warakorn Limbut, and Prof. Dr. Rosly Jaafar, and around 200 regular speakers.

The advancement of a nation will be achieved if education becomes a priority and firmly supported by the development of technology. Furthermore, the development of technology could be obtained if it is supported by the improvement of basic knowledge such as mathematics, physics, chemistry, and biology. The empowerment of this fundamental knowledge may be achieved by conducting research which is then implemented in developing the technology and the learning process in schools and universities.

This international conference is aimed to gather researchers, educators, policy makers, and practitioners to share their critical thinking and research outcomes. Moreover, through this conference it is expected that we keep updated with new knowledge upon recent innovative issues and findings on the development and the education of mathematics and science, which is in accord with the theme of the conference this year. All material of the conference which are compiled in the abstract book and proceedings can be useful for our reference in the near future.

This conference will be far from success and could not be accomplished without the support from various parties. So let me extend my deepest gratitude and highest appreciation to all committee members who have done an excellent job in organizing this conference. I would also like to thank each of the participants for attending our conference and bringing with you your expertise to our gathering. Should you find any inconveniences and shortcomings, please accept our sincere apologies.

To conclude, let me wish you fruitful discussion and a very pleasant stay in Yogyakarta.

Wa'alaikumsalam warahmatullahi wabarakatuh

Yogyakarta, May 2016
Dean Faculty of Mathematics and Science
Yogyakarta State University

Dr. Hartono, M.Si.

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Yanita

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Validity of Physics Module Using Cooperative Learning Model With Peer Assessment

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Abstract—This research is motivated by the various in the speed of learning and passive students during learning. In addition, SMA Muhammadiyah 1 Banjarmasin no modules are used in physics learning. This study aimed to describe the validity of modules developed in class X SMA Muhammadiyah 1 Banjarmasin. Physics module validation consists of material and media validation. Validation of the material consists of content quality, organization, language, evaluation, and glossary. The media validation consists of consistency, format, appeal, the shape and size of letters, and language. The results showed the validity of the module is very valid category. It was concluded that the physics module using cooperative learning with peer assessment eligible for use in learning.

Keywords: *validity, physics module, peer, assesment*

I. INTRODUCTION

Paradigm the teacher learning had changed. This is occurs in learning physics. The teacher is source of knowledge turned into a facilitator, tutor, and learning partner. Learning of paradigm had changed from teacher center to student center does not only have an impact on the methods and learning activities, but also the methods of assessment. Therefore, the learning process is directed to develop the potential of students to be able to achieve qualifications and competency.

The learning process in schools is still a lot of emphasis on developing the potential of student as individuals and less to develop the potential of students as a group. The success is only rated as independence rather than interdependence. Therefore, learning with individual approaches need to be combined with group-based approaches. One group-based learning model is cooperative learning. Cooperative learning is a learning situation that involves two or more individuals who are attempting to have a shared educational experience [1].

Besides to developing the potential of students in the group also need innovation in learning. One innovation in learning is developing instructional media. One of instructional media could be used are learning materials. That learning material could be used is a module. The module is to reduce the various in the speed of learning through self-learning activities. The use of modules in learning can involve students activities [2]

Ideal learning process should be followed by a proper assessment. One method of learning outcomes assessment on student center is peer assessment. Application of peer assessment in learning is not mean to replace the conventional assessment method but to be a supporting assesement. Peer assessment is a direct appraisal not only of what has been learned (outcomes) but also of the where-to and the how of learning (processes). More specifically, using peer assessment helps students to develop certain skills in the areas of, for example, communication, self-evaluation, observation, and self-criticism [3].

First observations in physics learning at class X SMA Muhammadiyah 1 Banjarmasin were found: (i) students are passive in learning; (ii) there are various in the speed of learning (iii) there are not found learning materials as form of module and there are learning materials from the publisher. An alternative to solving the problems is developed the physics module using cooperative learning with peer assessment. Therefore, the research aimed to describes the validity of physics module using cooperative learning with peer assessment at class X SMA Muhammadiyah 1 Banjarmasin.

II. METHOD

Validation of the research are conducted by validator (material specialists, media specialists, and physics teachers. The instruments used for validation is the validation sheet. The results of validator assessment were analyzed using the average score. The results of average scores adjusted with aspects criteria as in Table 1 [4].

Table 1. Criteria Validation Aspects of Material and Media

No	Interval	Category
1	$X > 3.20$	excellent
2	$2.40 < X \leq 3.20$	good
3	$1.60 < X \leq 2.40$	average
4	$0.80 < X \leq 1.60$	weak
5	$X \leq 0.80$	poor

The average score is used to calculate the validity. Criteria of validity shown in Table 2 [5].

Table 2. Criteria of Validity

No	Percentage	Criteria of validity
1	85.01 - 100.00	Very valid or can be used without revision
2	70.01 - 85.00	Valid or can be used but with minor revision
3	50.00 - 70.00	Not accurated, it is not recomended to be used because it should be revised majority
4	0.00 - 50.00	Invalid or may not be used

III. RESULT AND DISCUSSION

Validation of physics module consists of material validation and media validation. Validation of the material consists of content quality, organization, language, evaluation, and glossary. The media validation consists of consistency, format, appeal, the shape and size of letters, and language. The results materials validation of module shown in Table 3.

Table 3. The Results Materials Validation of Module

Aspect	Average score	Category
content quality	3.94	excellent
organization	4.00	excellent
language	3.75	excellent
evaluation	3.25	excellent
glossary	4.00	excellent
percentage	95.59	
validity	very valid	

Aspects of content quality is excellent category. There are shown: (i) modules are developed in accordance with the basic competencies and learning objectives; (ii) material in modul accordance with physics concept; (iii) the picture presented in the module can be help students to understand the material. Aspects of organization is excellent category. That is shown the material in the modules be arranged as systematic and coherent. Aspect of language is excellent category. That is shown the language used in accordance with the spelling enhanced. Aspects of evaluation is excellent category. The tasks and competency tests in the module can to measure the achievement of learning goals. Aspects of glossary is excellent category. That is indicates the presentation according to the glossary of terms and accuracy in alphabetical order. Overall, the results material validation of module is 95.59% and be categorized as very valid.

Table 4. Results Media Validation of Module

Aspect	Average value	Category
consistency	3.67	excellent
format	3.50	excellent
appeal	3.50	excellent
the shape and size of letters	3.80	excellent
language	3.00	good
percentage	89.42%	
validity	very valid	

Table 4 shows the results media validation of module. Aspects of consistency is excellent category. That is shows the consistent using of shapes, font size, and spacing. Aspects format is excellent category. That is shows the using of the column is in conformity with the shape and size of paper, the layout and format in accordance with the typing paper format. Aspects appeal is excellent category. That are shows the image and the size of images in a clear and attractive. Aspects of the shape and size of letters are excellent category. Those are shows the shape and size of the letters on the module is easy to read. Aspects of language is good category. That is shown the language used in accordance with the spelling enhanced. Overall, the result media validation of module is 89.42% and be categorized as very valid.

The results of the materials and media validation are very valid category. The validation results is shows the module eligible for use in learning. Designing and developing modules are need to pay attention to some elements among other formats, organization, font size, empty spaces and consistency. Those are produced learning modules be able for effective learning [6]

IV. CONCLUSION

The results of the validation of materials and media are very valid category. The validation results is shows the module eligible for use in learning

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