

**THE DEVELOPMENT OF REALISTIC MATHEMATICS EDUCATION-BASED
BLOG AT LINEAR ALGEBRA COURSE IN UIN SUSKA RIAU**

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Abstract

More sophisticated technology tools from laptops, smartphones, tabs and others make students dependence to use them and bring it everywhere they are. It would be better if they are used by the students to learn, not just for social networks such as Facebook, Twitter and others, but can be used for student's learning. The purpose of this research is to develop a blog based on the Realistic Mathematics Education (RME) in Algebra courses so that the students can access courses they need anywhere and at any time, review the effectiveness of blogs in supporting learning process algebra, review the practicality blog to use by students to have lecturing processes, use of sophisticated technology tools to support the learning process.

The development model employed the model of Dick and Carey (2009). This development model steps was started by writing targetted competences, to analyze learning, to identify basic ability, to write performance objectives, develop instrument assessment, to select and develop learning materials, to design and conduct formative evaluation, to revise, and design and develop summative evaluation.

The research results showed that validation of Educational Technology Expert of 88.7% and 89.71% by Mathematics Content Expert stated that the blocks with the RME approach was effective and practical, and could make the students understand the concepts of Algebra related to the real world. The results of testing a small group was 83.25%, and 85.50% for test large groups. From the tests that were done through pre-test and post-test, through the test of $t > t_{table}$, it was obtained calculation results of $t_{count} = 6.48$, while the values of the t_{table} with significant levels of 5% and 1% were 2.09 and 2.84 respectively. Thus there were differences in the average value of learning achievements prior to and after the use of the blog-based learning (RME). In other words, the development of RME-based blog was effective to be used as a learning media and source to improve students' understanding of the Algebra materials.

Key Words : *Blogs, Algebra, Realistics Mathematics Education (RME)*

A. Introduction

As the times growing and more sophistication of technology tools from laptops, smart phones, Tab and others make students dependence to use and always bring them everywhere they are. The existences of these technological tools have a lot of benefits, ranging from as a means of communication and social networking, up to as a learning medium.

Math learning is not quite with learning process begins with lecturers to explain the algorithm with some examples, and then students do the exercises in accordance with the

example given by lecturers. The students are almost never given the opportunity by the lecturers to understand the rationale behind the algorithms that are taught to them. Lecturer focused the students to remember "the ways" they teach in solving the problem rather than to stimulate them to construct knowledge, so that the knowledge gained by the students is less meaningful and quickly forgotten .

In mathematics learning in higher education, there are a few things that tend to be ignored by the lecturers, which is characteristic of the topic being taught and student characteristics. From many mathematical topics that are taught, there is an easy one, so that the subject can be understood by the students just by listening to the explanation from the lecturer. Most of other topics will be understood if the presentation is accompanied by illustrations and drawings. Meanwhile, there are also topics to understand that requires *hands-on* activities or *learning by doing*. These conditions indicate that lecturers "should not" use the same learning methods from time to time. Lecturers need to select and use models, approaches, methods, or various media, making it easier for students to study a topic, and make the students actively in learning.

In addition, in terms of media usage, lecturer should use a simple, attractive, easily accessible media and close to the student life. Additional tools biasly used by lecturers as media are computer technology. Because through a computer program (internet), the users allows to save, organize and manipulate information, including text data and numerics (Eggen & Kauchak, 2012). In this modern era, the students are not strange with the internet. With the Internet, students can access a variety of information, ranging from the world of entertainment, social networking sites, even learning materials. However, many students today who prefer to use the internet to chat on social networks such as facebook, twitter, and others . It would be nice if they are used by the students to learn, not just on social networks such as Facebook, Twitter and others, but can be used for students' learning, such as Linear Algebra material.

Linear algebra is one of the mathematical material that is easy to understand if the presentation is accompanied by illustrations and drawings. In addition, many Linear Algebra material that can be associated with contextual problems. Therefore, researchers are interested in creating a Realistic Mathematic Education-based blog on Linear Algebra in UIN Riau Suska. Realistic Mathematics Education (RME) approach is one approach that uses real-world context in the delivery of learning, where students are expected to be more motivated because they feel that math is very close to the real world. It's the real thing will be easier to remember than abstract ideas. Math will be easy to learn if you can see its application in the real world. According to John Dewey (Uno, 2012), linking learning to one's life makes more meaningful learning, can learn something through experience, attention, and change; find it easier to run other activities conducted by a real and meaningful situations, so that students feel that learning mathematics has a great advantage because it can be applied in everyday life. Beside it with the blog Linear Algebra courses, students can access courses they need where anytime and anywhere, review the effectiveness of blogs in supporting learning process algebra, review the practicality of use student blogs to conduct the lecture, as well as the use of sophisticated technology tools to support the learning process. According to Sukiman (2012) through blogs bring significant benefits for students. Lecturers can lead the student to focus on the ideas or writing, or both. Thus, students can develop analytical abilities and faculty can learn to be a better writer and communicator.

Based on the background of the problem, this study focused on answering several questions as follows : 1) how is the expert response to the development of an EMR-based blog on Algebra course? 2) how is the media expert response to the development of an EMR-based blog on Algebra course? 3) how the test responses of learners in small groups towards the development of an EMR-based blog on Algebra course? 4) how the user response (educators) in field tests against the development of an EMR-based blog on Algebra course? 5) how is the

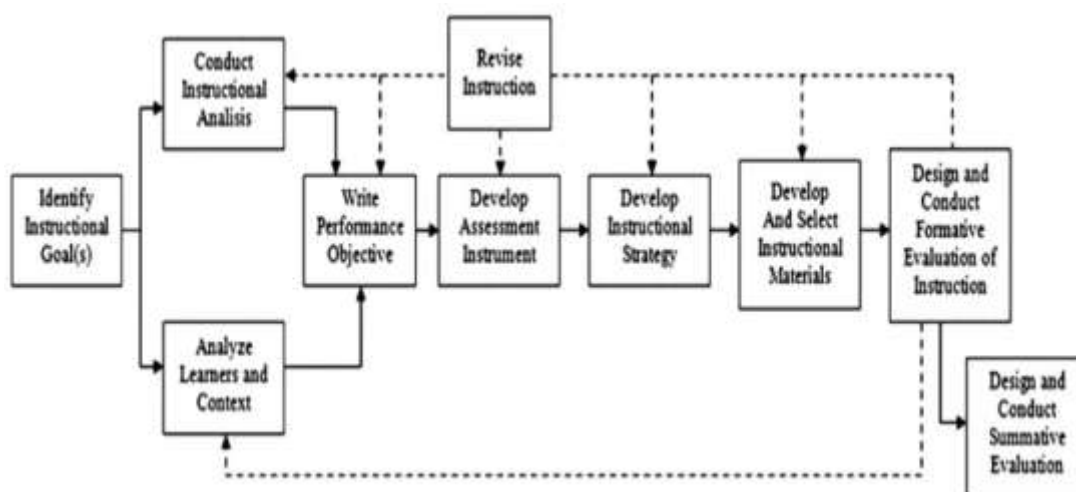
effectiveness of research products, which can be measured by looking at the difference between the scores of pre-test and post-test learners in the learning achieved by using RME-based blog ?

B. Method

This type of research used is the development (research and development/R & D). The use of this development research is based on the opinions Richey (Richey & Nelson, 2000) that facilitates the development of a research study of new models, equipment, and procedures that can reliably anticipate their effectiveness and efficiency. In this way, it can be determined the relevance from specific-context of the findings to other teaching and learning environment as well as to identify new general principles of design, development, and evaluation. When associated with this research that wants to create a blog based on the RME Linear Algebra courses that meet the valid, practical and effective criterias.

The design and procedures used in this study is a model of Dick and Carey (2009) with system oriented This model has ten following steps (Dick and Carey, 2000) . Picture 1 Figure 4.

The first step, second and third model of Dick and Carey are categorized into preliminary research activities. These activities include the identification of competencies to be achieved in a Linear Algebra course, learning analysis, and analyze the basic skills of students. The fourth, fifth, sixth, seventh steps are to write the specific purpose of learning or better known as the indicators of achievement of learning achievements of Linear Algebra course, the development of standard reference tests the development of learning strategies, and developing and selecting instructional materials is a further blog development steps. The next activities of development steps are evaluated in the eighth step which was to develop formative evaluation. Formative evaluation is done to see the advantages and disadvantages of the development of the blog.



Picture 1. Development Model of Dick and Carey (2009)

Formative evaluations are conducted with the mechanism of one to one evaluation, small group evaluation, and field trial evaluation. One to one is done by experts of Educational Technology and Mathematics. After technology and maths experts provided materials' improvement and certain considerations, and put them in a blog to be tested by the user as much as 3 people from each of the different levels of ability and small group evaluation was conducted to 6-9 users, as well as field trial evaluation conducted on 20 - 30 users. Field

evaluation or referred to by the term field trials was conducted on students of Mathematics Education Program. Data collection instrument used in this study was a questionnaire and observation sheet. Questionnaire was designed for experts and for field trials. Meanwhile, the observation sheet was designed and used when we conducted field trials. Revisions were made at each step.

In this study, it was used two data analysis techniques : 1) a qualitative descriptive analysis techniques, 2) quantitative analysis techniques. Descriptive analysis techniques are used to process data from the test results matter experts, media specialists, and educators a small group of participants in the field test, whereas quantitative analysis is used to process the data obtained from the questionnaire in the form of descriptive percent.

The data was processed on the field test data from the pre-test and post-test. Pre-test achievements were given to students before the lecture with a problem-based learning blog, while the post-test was given after they understood the blog with the problem-based learning.

C. Discussion

Based on the steps undertaken, EMR-based blog development product, the blog can be unlocked through <http://risna-wati-math.blogspot.com>. Product development of the blog was further validated and tested. The results were as described as follows :

1. Data of Validation Results from Educational Technology Specialists.

As a whole based on the indicators assessed by the Expert Technology from design blog, as well as the suitability of the content of the expected performance, experts recommended that the development of an EMR-based blog was well categorized, and it deserved to be used with the percentage of 88.7%.

2. Data of Validation Results from Matter Expert.

Validation that was performed by material experts recommended that RM -based blog deserved to be used. Indicators of material truth and relevance to the basic competences and learning indicator reaches 100% accuracy rate. This means that the competency has been referred to the necessity of learning. Ease of understanding the material on blogs, attractiveness, clarity of material, systematic presentation of the material presented had been very good. Matter expert assessment of the components related to the design of the blog; subject's contents that include affective, cognitive and psychomotoric, which means it has to meet several capabilities; quality of the learning interaction; appropriateness of instructional media learning of life skills. Overall data that was obtained from validation results of matter experts on a blog based on the category of RME were very good around 89.71%.

3. Results Data of Small Group Test.

Small group trials of 3-6 people as a whole was obtained a percentage rate of users reached 86.56 %. This quality means developing an EMR-based blog was in the category of fit for use. Users expressed that blog can be studied either independently or in groups, anytime and anywhere. This approach can make the students learn to understand and meaningful.

4. Result Data of Field Test

The next test is to lecturers, before being tested, it was priorly socialized to lecturers of Linear Algebra course, this blog was being piloted to two lecturers, field trial data on lecturers of Linear Algebra course, the lecturer stated that this blog was easily understood by the students, because it is directly related to their real life. Then the blog was directly tested on a large group of about 20 people, from the processed data it was obtained the percentage of 85.50 % with good qualifications. Based on the results of the assessment and expert reviews on both media and materials, as well as individual testing, both small groups, to field test, the problem-based learning-based blog was with good category.

5. Different test of Pre-test and Post-test

Based on the tests that were tested through pre-test and post-test, through the test of $t_{count} > t_{table}$,

it was obtained the calculation result of $t = 6.48$, while the value of the t_{table} with significant levels of 5 % and 1 % were 2.09 and 2.84 respectively. Thus, there are differences in the average value of learning achievements before and after using blogs based on problem-based learning. In other words, the development of RME-based blog was effective to be used as a media source and learning to improve students' understanding of the material Algebra.

Of the overall aspects evaluated and tested, it can be said that the development of this blog was well categorized, in terms of fit to use as a medium of learning. Blog is a website that is easy to use. This facility can quickly post thoughts of someone, interact with others, to publish the papers, announcements and other much more advantages. Because it is easy and practical, blogs can be used not only for communication but also used as a medium of learning that allows everyone to access. Huette (2006) also described the benefits of using blogs in the classroom, among other things : 1) to promote critical thinking and analytical, 2) to encourage creative thinking, intuitive and associational thinking, 3) can encourage analogical thinking, 4) has the potential to increase access and exposure to quality information, and 5) combining solitary and social interaction .

RME incorporates the views of "what is mathematics, how students learn and how mathematics should be taught. Mathematics education should lead students to use a variety of situations and the opportunity to re-invent mathematics in their own way (Sutarto Hadi, 2005). Through the blog, combined with real objects to make students learn more relaxed, less anxious, because students can adjust the problem or understand an answer discovery materials at the time the ability to think and learn. Wang, Haertel, and Walberg (1992) emphasized the importance of reducing the anxiety of learning, particularly fear to do wrong, and to make students confident (Harmin and Toth, 2012:68). Furthermore Harmin and Toth stated that all students have individual learning styles, so the student can do and learn in accordance with the time he needs, without any pressure. Learning without the pressure will be more meaningful.

Other advantages of developing blogs with RME based are as follows : 1) the student can ask for the help of people who preferred to give understanding to those who are less problems when they understand ; 2) can evoke the spirit of learning, because it is followed by an attractive display, good presentation of the material, in fact the problem. 3) make it easier for students to reinvent mathematics concepts in accordance with the characteristics of realistic mathematics ; 4) to train students to solve math problems, with the understanding that has been obtained in advance ; 5) makes it easy for lecturers to check student understanding authentically, in accordance with the instructions in the blog. In addition to advantages also has its limitations include 1) not all students have an internet connection ; 2) material developed is limited to materials related to the real world.

D. Summary

Based on the formulation of the problem, the results of the data analysis and discussion in this study, conclusions can be drawn. 1) learning technology experts responded that the development blog RME -based learning was very good and it deserved to be used; 2) learning materials experts responded that the block-based EMR was appropriate and feasible for use in learning. 3) students as subjects for a small group test commented that the –based math blog was good, because it could improve our understanding of Linear Algebra subjects; 4) lecturers of Linear Algebra course in field tests provide a response that blocks mathematics through problem-based learning was good and fit for use in the learning process; 5) based on the t test conducted got the results of t_{count} (6.46), thus it can be said that $t_{count} > t_{table}$ either on significance levels of 1% (2.84) and 5 % (2.09). This means that there were differences in the average value of student results after using blog through RME-based learning.

Based on the research results, discussion and conclusions can be recommended : 1) educators ought to have a strong desire and willingness to learn and make creative design that is appropriate with learning system as learning needs in the classroom, in addition to the educators also need to have creativity using ICT, both in the individual learning condition and study group. 2) based on the data obtained, this study is limited to the pre-experimental phase with a significant t-test results, the research can be carried out by quasi-experiments involving the control group.

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