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2013

Turning Dreams into Reality: Current Trends in Mathematics, Science and Computer Science Education

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PREFACE

The Seminar under the theme "Turning Dreams into Reality: Current Trends in Mathematics, Science and Computer Science Education" is conducted by Faculty of Mathematics and Science Education, UPI at October 19, 2013. The aim of the seminar is to provide a forum where teachers and researchers can exchange didactical, pedagogical, and epistemological ideas on mathematics, science, and computer science education which is expected to stimulate research in those areas. The seminar also provides an exceptional opportunity for all participants to contribute to the world of mathematics, science, and computer science education.

Some of outstanding scientists and educators from Germany, Australia, Hongkong, Malaysia, Singapore, Netherland, and Indonesia joined in this seminar made the seminar trully international inscope. There were 485 participants, had many fruitful discussions and exchanges that contributed to the success of the seminar. 153 papers discussed in the parallel session. The papers were distributed in 6 fields. 42 papers in mathematics or mathematics education, 19 papers in physics or physics education, 23 papers in chemistry or chemistry education, 25 papers in biology or biology education, 9 papers in computer science or computer science education, and are 18 papers in science education. Of the total number of presented papers, 153 included in this proceeding.

Genereus support for the seminar was provided by SEAMEO QITEP in Science and Himpunan Sarjana dan Pemerhati Pendidikan IPA Indonesia. The support permited us to gave an opportunitiy for a significant number of young scientists and persons from many universities and other institutions brought new perspectives to their fields.

All in all, the seminar was very seccessfull. We expect that these future seminar will be as stimulating as this most recent one was, as indicated by the contribution presented in this proceeding.

Chief of Organizing Committee ,

Dr. Sufyani Prabawanto, M.Ed.

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CALCULUS LEARNING MODEL FOR PROSPECTIVE TEACHERS BASED E_LEARNING

Supandi[(1)] , Widya Kusumaningsih[(1)], Lilik Ariyanto[(1)] , Ellah Nurlaelah[(2)], Turmudi[(2)]

[(1)]Department of Mathematics Education, IKIP PGRI Semarang, Indonesia.
[(2)]Department of Mathematics, University of Indonesia Education

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ABSTRACT

Information and communication technology (ICT) is a set of tools and other technologies that are used for the manufacture, storage, management and communication of information. ICT is used in education to support the teaching and learning process in collaboration with student activity. This study focused on the development of learning tools in the form of Lesson Plan and the Student Worksheet to improve the creativity of students in the learning process. Form creativity of students is presented in the form of their work in completing the Student Worksheet. In Student Worksheet has also been on the characters that have been written in the indicator in the Lesson Plan. This research is using a learning-based Learning Management System (LMS) with Moodle application. Through the application of Moodle LMS with the characters that appear include: discipline, responsibility, self-contained. The research was conducted in the Department of Mathematics Education at Teachers' Training College (IKIP PGRI) Semarang Calculus course for first year students. A questionnaire has been administrated for collecting the data. The results of this research are: learning using ICT, which is characterized by the development of learning tools and enhaced student's creativity, as well as advantages and disadvantages of learning using ICT.

Corresponding Author:
Supandi
Department Of Mathematics Education , IKIP PGRI Semarang, Indonesia
Phone : 081383101134
Email : hspandi@gmail.com

1. INTRODUCTION

Learningi nTeachers' Training College Calculus PGRI Semarang current study focuses on the development of cognitive abilities but rather over ride character education. Results of research that has been conducted inTeachers' Training College PGRI Semarang conclude that e-learningis used in an effective web-based learning. Previously, Ariyanto [1], also conducted a study on the material Geometry, Geometry conclude that learning using multimedia such as instructional video is very effective to increase the activity and motivation f learners. Character in the learning achieved include improving student discipline and creativity that has a positive effect on student learning outcomes.

Mathematics education requires a new paradigm made innovations and integrated learning , including using ICT media . As one example of the results of research Rosenberg [2], states that e -learning that uses Internet technology to transmit a series of solutions to improve the knowledge and skills of students buzzing . This is supported by the Ritz [6] states that the useful application of technology to aid learning and increase knowledge . This can be done by integrating technology into science and math . The research of Manuela Paechter , Brigitte Maier [3] showed that when the concept of a material science or applied already obtained expertise in student learning will refer to tarap advance , whereas when the independent learning skills already acquired , refer students to online learning . While Prayito [5] in his research concluded that e-learning has been implemented which provide good impact is that it can complete the learning outcomes of students and foster active learners.

On the other hand character education through a planned effort tby planting system behavior values (character) to resident education, which includes knowledge, awareness and volition, and actions will shape the whole person[7]. Since one of the goals of character education by Su'ud, et al[7] is to develop students'

abilityto beself-sufficient human, creative, responsible and insightful nationality. The results that have been done [5] that explores the character education lesson study shows that through the character of students, among others, discipline, responsibility and able to work together to increase. Results of this study indicate that the use of models of learning can increase and develop character.

The main problemofthisresearchis to design alearning modelbased e-learning aswhat isappropriateforstudentsin order toassiststudentsinexercising theirclassroom learning.The purposeof this studyis to developlearningtoolstoimprovestudentacademicachievementthroughinstructional design-based e-learning. In particular, the purposeof this studywasGeneratesdesign-based learning e-learning. The products withtheleamingtoolssyllabi, lesson plansandteaching materials, learning modelsandtheimplementation oflearning-based e-learning.

2. RESEARCH METHOD

Preparation of design and the learning is done in a laboratory scale. Activities to be carried out include:

a. Conducting Needs Analysis
   Needs analysis was conducted to determine Calculus-based Learning Design E-learning as to what is appropriate to foster student creativity and character PGRI Semarang Teachers' Training College. Needs analysis was conducted by observation, interviews with the lecturer of the course of Calculus, and reviewing the results of previous studies as well as literature from books, papers, and articles.
b. Compile Draft Learning Design
   At this stage of planning to make the draft Design Learning Calculus-based e-learning to foster creativity and character, preparing materials and material sources
c. Validate Draft Learning Design
   Results of drafting Calculus-based learning design e-learning to foster creativity and character first tested the validity of the experts involved 6 people consisting of 2 people Calculus matter expert, 2 expert evaluation and learning and 2 multimedia expert. Validation is intended to anticipate user error. Matter experts provide an assessment of the content of the material, learning experts assessing aspects of learning, while the multimedia experts provide an assessment of the aspects of the display and programming aspects. Data validation results matter experts, learning experts and multimedia specialists consider to revise the calculus-based learning design e-learning to foster creativity and character.
d. Revised Draft Learning Design
   Validas by a team of experts, instructional design instructional materials and devices that have been validated to be repaired if there are discrepancies or errors in the draft, then revise the draft research design the learning according to the records and input from expert validation. The results of this revision to the students and then tested on a small scale the individual trials.

3. RESULT AND ANALYSIS

Development carried outin this study isintheform oflessonlearning, learning-based Student's Worksheet andc-learning. In this research,E-learning usinglearningmanagement system(LMS).

3.1. Lesson Plan

The validator obtained from the assessment feedback, corrections, and suggestions are used as consideration in doing repair or revision lesson plan . Discussions with the validator while other revisions can be seen in Table 1. From Table 1, Lesson Plan general improvement lies in how the character and creativity appear explicitly in the learning process. Thus it can be used lesson plan clearly and can be used by anyone who uses it.

Table1. Revision lesson plan

o	Before Validation	After Validation	Explanation
-	Indicators of cognitive load on the Lesson Plan, Affective and Psychomotor Character appears on each indicator Creativity in Lesson Plan had entered in the indicator	Indicators on the RPP enough on Cognitive and affective. Desirable traits must not appear all Creativity is more explicitly visible in the indicator	Adapted to the material Customizable characters dengna material

3.2. Student Worksheet

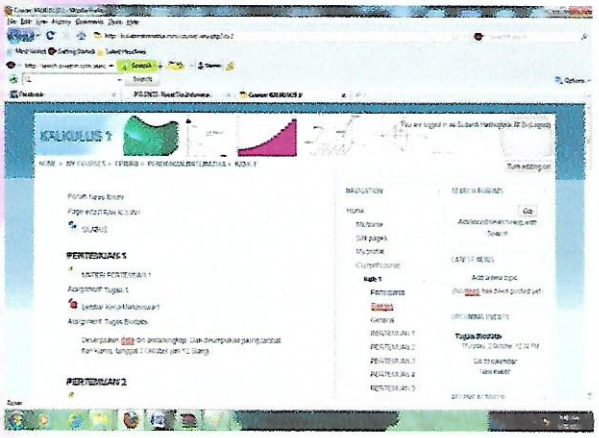
The validator obtained from the assessment feedback, corrections, and suggestions are used as consideration in doing repair or revision Student Worksheet. Some errors and suggestions validator can be seen in Table 2. In the Student Worksheet improvement is more on how the questions presented in it can be a guide for students, so that students become creative mindset and not monotonous. In relation to questions about the Student Worksheet presented contextually so that students will be many different perspectives, but remains in critical thinking to find solutions of each of each matter.

Table2. Revision Student Worksheet

o.	Before Validation	After Validation	Explanation
	Student's Worksheet contains questions guided exercises About the matter presented in the abstract	The questions and exercises should be building concept Problem presented contextually	Student creativity can flourish

3.3. Advantages and disadvantages of E-learning

Design of e-learning instructional media as in Figure 1 below brings benefits to students that students can access lecture material anytime and anywhere as long as it has a connection to the internet. Students can do their job without having to follow lectures and to collect the duties well. With the use of e-learning in the student can work independently so the ideas can be written in the work of Student's Worksheet. Students can interact with the professor candidly and freely regardless of others' opinions. Thus students will increase the sense of responsibility towards himself in following the learning process.



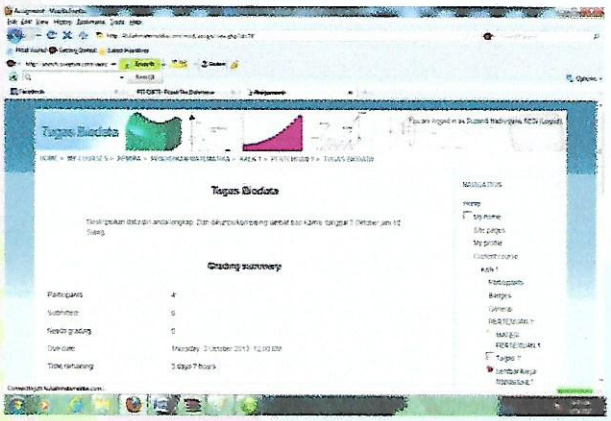


Figure 1. Design E-leaning Calculus I

Weaknesses of learning by usinge-learning or ICT in general the learning process ridak appear. Because that leads into the ICT-based learning ore-learning is the result rather than the process. Communication between students and students and even students with the professor ould be very limited. So emotional, or learning discussions that appearas if the lecture material alone, do not touch on things like how the social nature of communication inworking together is not visible in the process.

4. CONCLUSIONS

Design learning tools such as lesson plans and Student's Worksheet in ICT-based learning in e-learning opportunities for students to be able to think creative in exploring the information lectures. Creativity is still within the framework of critical thinking is to look for a solution of the problem issues in the lecture Calculus I. So that characters such as self, responsibility, confidence will remain in the student mindset. With learning support learning e_learning more open to ideas.

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