

Developing An Instructional Model Blended Learning On Appropriate Technology Course

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Abstract: This article discusses the development of an instructional blended learning model for acquiring appropriate knowledge on technological subjects. This research combines physical classroom teaching with online academic technique to produce an appropriate blended learning model for technology courses. This developed model is designed to enhance learning outcomes, motivation, and student independence. The research subjects were education engineering. This study makes use of the Research and Development method with the ADDIE development procedure (Analysis, Design, Develop, Implementation and Evaluation). The results obtained from this development study are blended education learning techniques analysed by experts as valid, practical, effective in improving student learning outcomes, motivational, and independence. Based on the findings of this study it was concluded that the blended learning model can be used as a guide to inculcate the right technological knowledge on engineering students.

Keywords: Blended learning, effectiveness, model of learning, practicality, validity

INTRODUCTION

Appropriate technology is a course in electrical engineering education study programs. The knowledge to be achieved in this learning this course is to enable students have the ability to develop ideas into technological products or prototypes that will suit people's needs, answer questions and provide solutions to community needs, , easy to operate, environmentally friendly, and can produce added value from economic aspects. Higher education learning requires students to be more active than lecturers in or outside the class room during academic teaching hours.

Joyce, Weil and Showers (1992:14) illustrated the role of educators and students in a learning model. Rusman (2010:136) classified these into four components namely, syntax, social system, reaction principle and support system.

The development of this educational learning model isn't only centred on classroom lectures but on the utilization of e-learning media. The new academic learning model was chosen because its learning outcome is an appropriate technological product manufactured to overcome the challenges associated with the classroom learning style thereby enabling direct assessment.

Ahmed et al. (2008: 1) stated that the blended model replaced the traditional classroom teaching technique with other e-learning strategies such as: web-based instruction, streaming video, audio, synchronous and asynchronous communication, etc.

Soekartawi (2006:1) states that one of the newest models is called blended e-eLearning (BEL). The model, BEL, is designed to provide information technology, structured physical activities, and real world practice.

This learning model is a teaching model that isn't limited to time, place and situation so that this learning can increase interaction between lecturers and students. It can be conducted by a combination of physical classroom teachings with e-learning by utilizing electronic media. Husamah (2014: 12) explains that blended learning is a combination of various technologies, such as multimedia technology, CD rooms, video streaming, virtual classes, voice mail, e-mail and teleconference, and online text animation.

According to Munir (2009: 99-101), online learning tools are additional, complementary and substitute academic teaching equipment. They function as an additional material and enable the learner to have the freedom to choose whether to use electronic learning material or not, thereby, eliminating the necessity for learners to access learning materials online.

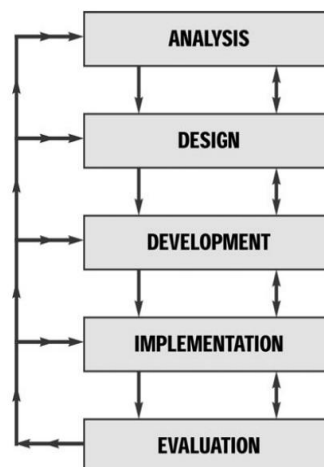
Aytac (2009) explains that blended learning activities include the collection and construction of online knowledge in groups, publishing electronic components, such as gathering virtual ideas, discussions, some forms of reciprocity, evaluation and assessment and several other techniques.

According to Putri Fitriasari et al (2018), blended learning has the potential to increase student learning independence. Ruhama Desy (2017) explains that it can ameliorate learning independence which encourages student-centred learnings not limited to space and time. Blended learning can improve student learning independence. Brookfield (2000:130) beams that learning independence is self-driven, nonpartisan ability to achieve educational goals.

The competencies to be achieved in this quest for knowledge contain concepts at the beginning and projects at the end of the learning process, so that it requires learning capable of involving active students independently without eliminating physical classes. By using the blended learning model, students information and knowledge will be easily enhanced. Developing the academic teaching process using the blended learning method makes it unique, strategic, and accurate in the learning process.

METHOD

The research and development model was used in conducting this research. The development method is a research method used to produce and test the effectiveness of new products (Sugiyono, 2010). ADDIE (Analysis, Design, Development, Implementation and Evaluation). The development model of ADDIE according to Molenda (2003) can be seen in the following figure:



Development of the ADDIE Model

The five ADDIE steps developed are: 1) Analysis, which is the first preliminary research step, 2) Design, is the second development step of planning or designing a blended learning model, 3) Development, which is the third essential step, consists of testing the validity of the product model to be produced, 4) Implementation, involves the carrying out of practical tests on the model, and 5) Evaluation, which is the fifth step, is used to determine if the learning model being carried out is successful, in accordance with the initial expectations.

Data validity, practicality and effectiveness were obtained using data collection techniques in the form of questionnaires with Likert scale and provision of academic outcomes tests before and after using the blended learning model. The subjects used for the trial were 47 Electrical Engineering Education Program students, in their second semester (January-June 2018), at the Faculty of Engineering, Padang State University (UNP).

The improved learning outcomes can be analyzed using the gain score normalized (normalized gain score) by Hake (1999).

RESULT AND DISCUSSION

This is an educational research program with a development model ADDIE (*Analysis, Design, Develop, Implementation, Evaluation*).

Analysis Phase

This stage begins with a preliminary study by conducting a needs analysis, which is the first step in conducting a development research. This stage aims to raise and establish basic inconsistencies associated with the proposed system. The stage comprises of the following phases:

Curriculum Analysis

Analysis of this curriculum refers to a synopsis and Lecture Event Unit on appropriate technology subjects.

Student Analysis

Student analysis comprises of a study of students characteristics including their level of intellectual development. The test subjects in this study were the second semester (January - June of 2018) students of Electrical Engineering Education study program at the Faculty of Engineering, Padang State University. The students who undertook the appropriate technological courses were between the age ranges of 19-22 years.

The ability of students to think independently, allows for the development of knowledge and understanding. This allows students to study independently and make use of technology in learning. Students will better see and experience for themselves how the technology works independently.

Design Stage

At this stage the blended learning model is designed by paying attention to the learning components namely, syntax, social system, reaction principle and support system. The following four components are discussed in detail:

Syntax

This is a learning sequence of activities. Syntax is the act of describing a model. It is the process of describing in series of activities called stages. Therefore the model must be clear and different stages must be applied. This blended learning model is divided into various stages of physical and online academic process.

Social system

The social system of the blended learning model is the synchronization between lecturers and students. The interaction between these two is essential in every academic activity. The dimension of social interaction in associated with educational interaction is the relationship between lecturers and students. The referred interaction here is when the lecturer advises students to indulge in e-learning classes, conducts discussions and issues out instructions through e-learning. This helps to grow students urge to adopt the use of e-learning in their educational pursuit.

Principle of Reaction

The development of the proposed model, is also seen based on the principle of reaction, such as the attitudes of educators to students. When the lecturer uses this educational teaching strategy, students tend to using pay adequate attention.

Support system

The support system of the model is the elements that can assist in the implementation of learning objectives.

Stage Develop

At this stage the development of the blended learning learning model is carried out in appropriate technology subjects. The development here is the improvement of the learning model before the trial is conducted.

In validating the model, the syntax, social system, reaction principle, and support system are substantiated. In media, the software engineering, visual communication, and learning aspects are validated. And in the material, the quality of the material, and the quality of learning are validated. The results of the evaluation of each aspect given by the validator were analysed using the Aiken's V. statistical formula. The results obtained were validation values for the product design produced.

The results of the analysis of the validity test to the expert learning model obtained an average of $0.86 > 0.667$, that of media experts was $0.83 > 0.667$, while that of material experts was $0.85 > 0.667$. Blended learning model is declared valid from model validation, media and learning material.

Stage of Implementation

Before the implementation was conducted, 47 students of the Department of Electrical Engineering in their second were assessed .

Practicality

The practical results of the blended learning model of the response of lecturers obtained an average practical value of 0.85, which is in the very practical category. While that of students obtained an average of 0.88. This shows that the representation of the data is very helpful for lecturers and students in carrying out the learning process.

Effectiveness Differences in Pre-test and Post-test Results

The effectiveness of the learning outcomes is done by analyzing the student learning outcomes by conducting tests on them. The test was conducted twice; at the beginning where students had not yet used the developed blended learning model known as the pretest and after they must have used the tool.

Improving student learning outcomes before and after calculation ,produced a gain score. The blended learning model is said to be effective if the gain score obtained is 0.3 or at least in the medium category. However, the score obtained is 0.38 which is in the medium category. Therefore, the blended learning model is effective.

Evaluation Stage

This stage describes the evaluation of the development of the proposed model in teaching technological subjects. The evaluation is carried out starting from the analysis, design, develop, and implementation stages. This resulted in product revisions that served to perfect the developed model. Suggestions from the validator in the revision of this product with regards to physical academic and online learning techniques.

CONCLUSIONS

The resultant learning model is expressed as a practical learning technique based on the response of lecturers and students, as well as effective as evidenced by an increase in learning outcomes in appropriate technology courses.

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