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DEVELOPMENT OF LEARNING MODELS FOR PROGRAMMING ALGORITHMS

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Research Highlights

This research aims to develop a learning model of Programming Algorithms and the Data I Structure of e-learning assistance. Research and development of this model will produce products in the form of print modules, learning designs and e-learning assisted media for Algorithms and Data I Structure courses. Development of learning models for Programming Algorithms and Structure of Data I for e-learning assistance using the Dick and Carey model design modified with the Trollip and Alessi models. The steps taken in the development of this model are preliminary research, planning and model development, validation, evaluation and revision of the model, and implementation of the model. Validation results from experts consisting of 93% learning design experts, 95% material experts, and 87% of media experts recommend that this development model is used in learning Programming Algorithms and Structure of Data I. As for the implementation of individual trials are achieved 95% achievement, a small group trials reaching 95%, and a field test achieved 96% success. The conclusion of the expert validation process and the results of trials, that the development of learning models of Programming Algorithms and Structure of Data I for e-learning assistance is feasible to be used in learning.

Keyword: Learning Model, Algorithm, E-Learning.

Research Objectives

The implementation of education in Indonesia is expected to improve the quality of education so as to produce students who are able to face the challenges of the times. Along with that, the development of Information and Communication Technology (ICT) affects education, in this case is internet assisted learning. The use of the internet in learning, also called *e-learning*, can help students achieve optimal learning outcomes. This is where the learning process takes place centered on students with lecturers acting as motivators and facilitators. Programming and Data Structure Algorithms I is one of the courses that utilize information and communication technology in the learning process. In the Information Technology College (STTI) NIIT, the I Programming and Data Structure Algorithm is difficult for students to learn because in this course students are required to understand the concept and have an understanding of the correct logic to solve the problem. Student learning outcomes in this course still need to be improved. Based on the needs analysis, it was found that the use of learning models, approaches, strategies, methods and media selection in this course was not maximal. So in this study a learning model was developed for the subject of the I Programming and Data Structure Algorithm assisted by *e-learning*. In the process of making programs using programming languages, program makers are required to know the Programming Algorithm. This is because through the Programming Algorithm, it can be created an accumulation of clear instructions to show the steps to solve the problem in making the program (Primary, 2014).

Methodology

The research methods used are research and development (R & D) or research and development research models. Development research in the field of education (in research on learning innovation development) is a research method that contains 3 main components, namely: (1) Development Model, (2) Development Procedure, and (3) Model Trial or Development Product. The development of an e-learning assisted learning model in this study used a model that adapted from the Dick & Carey Model in collaboration with the Trollip and Alessi media development model. Theassisted learning model was *e-learning* chosen because it can be used

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more effectively in terms of place and time. The procedure for developing the learning model of the Programming and Data Structure Algorithm assisted by *e-learning* has 4 steps in sequence, namely: preliminary research, model planning and development, followed by validation, evaluation, and model revision, ending with the implementation of the model. The feasibility of the learning model is proven based on the results of the validation carried out by material experts, design and learning media as well as the results of trials on the research subject. The effectiveness of the learning model developed was tested through a paired t-test of the results of the pretest and posttest data obtained by informatics engineering study program students and information systems at the NIIT Information Technology College in the field test.

Results

The results of this study indicate that the Learning Model of Data Structure and Programming Algorithm assisted by *e-learning* has proven its feasibility and effectiveness. It can be seen from the results of expert validation and the results of field trials showing an increase in student learning outcomes after this development model was implemented. This explains that the learning must be in accordance with the needs of students who will later be able to generate positive attitudes of students, interests, motivations for the subjects followed, thus students will be able to optimize the abilities that exist in him so that learning will be more meaningful. This is in line with the research of Azis (2015) which states that students' positive attitudes towards certain disciplines are important in achieving learning goals (Azis, 2015).

Findings

Research on the development of learning models of the I Programming and Data Structure Algorithms assisted by *e-learning is* useful in encouraging students to be more independent and active in learning, as well as providing students with a broad opportunity to communicate, using *forum* tools found on the *web*. This model can accommodate students with diverse abilities and different learning styles. The completeness of learning can be achieved through the application of this learning model. This study also recommends that a revision of SAP (Lecture Program Unit) and syllabus be held for the I Programming and Data Structure Algorithm courses at STTI NIIT. Subjects and programming languages are adapted to the development of ICT. Lecturers are expected to have a *website* to support the development ofassisted learning models *e-learning.*

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