E-Module: Design A Learning Material With Rowntree And Hannafin Model For Higher Education

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Abstract:—The purpose of this article is to design the steps in developing independent learning material in the form of e-modules. E-modules are learning materials based on information and communication technology (ICT) that have interactive properties because of the ease of navigation, display of images, videos, and feedback through formative tests. The methodology used is the research and development of the modified Rowntree adaptation with Hannafin and Pack. The results of this article are conceptual and procedural models for the development of independent learning materials in the form of e-modules.

Index Terms:—E-module, Design, Learning Material, Higher Education

1 INTRODUCTION

At present the world of education faces very difficult challenges in dealing with the current of globalization. The current of globalization requires educational institutions to formulate education that can answer the challenges of globalization. One of the challenges of globalization in education is the advancement of information technology. The progress of developing Information and Communication Technology (ICT) has an influence on various aspects of life including the learning process. So the world of education now needs to take advantage of technological advances. One of them is a practitioner of Islamic religious education. Islamic religious education is one of the basic theoretical and practical subjects. Therefore, this course needs to be presented in a creative way so that it can be effective and efficient. Islamic education is one of the general compulsory subjects taught at the Faculty of Science and Technology of the Nahdlatul Ulama University in Lampung. The material in the curriculum is nationally the same and has a lot of content. Learning time is too little so learning in this course is less effective and efficient. There are several previous studies that are relevant including: research from Chong, Yunos & Spahat, The Development and Evaluation of an E-Module for Pneumatics Technology. The results showed that the e-modules were developed in accordance with the characteristics of students, learning strategies, presentation of learning and software applications. The developed e-module is suitable as an alternative learning material to help pneumatic learning in the subject of industrial automation. [1] L. Pombo, et.al, Evaluating an Online E-Module for Portuguese Primary Teachers: Trainees' Perceptions.

The aim of this study is to evaluate the implementation of the e-Science module, which was created at Bradford College (UK) and adapted for trial by science teachers in Portuguese. The results show that the majority of teachers recognize that e-modules can enhance new skills during the course, such as ICT skills, which have an impact on classroom practice and enhance their professional development both in the personal domain and in the practice domain. It is also recognized by tutors that the main advantage of using an e-learning platform is to enable it to adjust to individual needs by considering the rhythm and different learning styles. [2] Fajaryati, et.al, E-module Development for the Subject of Measuring instruments and Measurement in Electronics Engineering Education. The results showed that in the beta test of the learning aspects, in terms of material and evaluation and multimedia aspects, e-modules were each considered to be feasible and quite feasible. Four indicators namely text, images, animation and video are all generally considered feasible. In terms of usage aspects, e-modules are considered feasible where two indicators, namely instructions and navigation, are generally considered to be very feasible by all respondents. [3] Christova, Future Developments of E-Modules: The Role of Interactive Tools and Multimedia in Teaching European Studies Online. The results of this study state that e-modules are a growing online learning tool in the European Union. The role of multimedia and interactive tools in this e-learning environment is very important with regard to increasing the transfer of knowledge and skills to users from online platforms. [4] Porcaro, Ten Guiding Principles for Designing Online Modules that Involve International Collaborations. The results of this study state that in compiling online modules together more effective and relevant. (David Porcaro, 2014). Kumar, Development Of E-Module For Physiotherapy Ethics For Final Year Students Of Bachelor Of Physiotherapy: A Pilot study. The results show that e-Modules make learning easier, and can create independent learning and can be read according to their convenience. [5] Tirta, Development of Integrated and Dynamic E-Module Statistics with R-Shiny and Mathjax. This research discusses the development of e-modules integrated with computer simulations. So that the e-module that was developed contains mathematical notation well accompanied by examples in the form of simulations, Pathon, et.al,Subjects Student Perceptions of E-Module Learning in Atomic and Core Physics. The results of this study are students' perceptions of the atomic and core physics e-modules which are on average 83.5% (core structure material)
and 89% (radioactivity material) with good category.[6] DJ Naval, researching about the Development and Validation of Tenth Grade Physics Modules Based on Selected Least Mastered Competencies. The results showed that the developed module could be accepted by physics class. Modules developed are effective in terms of knowledge acquisition. Therefore, this research shows that the module developed can be a useful tool for learning basic physics.[7] Based on the research conducted by researchers on relevant previous studies above, the relevance of the research by the authors is to discuss the electronic modules (e-modules). However, there are differences from any existing research with the research that the author is studying at this time, namely the content of the courses developed and the development design models used. In this study, researchers developed a conceptual model for developing an e-module for Islamic religious education courses for students of the Faculty of Science and Technology at the Nahdlatul Ulama University in Lampung.

2 LITERATURE REVIEW
Development model A recommended set of activities that defines a process for successful instructional design.[8] Educational technology proposes that effective learning materials and systems can be made efficient through certain developments.[9] The definition of instructional development is: A systematic approach to the design, production, evaluation, and utilization of complete systems of instruction.[10] Russell, and Smaldino (2002) Define instructional development as “the process of analyzing needs, determining what content must be mastered, establishing educational goals, designing materials to reach the objectives, and trying out and revising the program in terms of learner achievement.”[11] Development is a business that is carried out consciously, planned, directed to help increase the effectiveness of learning by producing a product. The products produced in the development have gone through several stages such as the stages of design, development and expert validation. There are many learning design models known in learning systems with different orientations. Gustafon and Branch divided it into three categories related to its use, namely: (1) Classroom-Oriented Models, (2) Product-Oriented Models, (3) System-Oriented Models (Kent L Gustafson, 2002). In choosing which appropriate model will be used to overcome a problem, an analysis is needed that shows the suitability of the existing model categories with the problems that occur. If the problems in learning need to be a product innovation then the category that matches the product-oriented model. The product development model is characterized by four main assumptions: (1) instructional products needed, (2) what needs to be produced and not selected or modified from existing materials, (3) emphasis on trials and revisions, and (4) used by students with facilitators.[12] Independent learning is a learning process that provides opportunities for students to improve students' abilities and skills in learning without the help of others. Self-Directed Learning is any increase in knowledge, skill, accomplishment, or personal development that an individual selects and brings about by its own efforts using any method in any situation at any time.[13] According to Knowles (1975) explained self-directed learning skills: determining learning needs, expressing learning clearly and implicitly, determining learning materials, and implementing appropriate learning strategies and assessing learning outcomes.[14] Some scholars see self-directed learning as a process of organizing the instruction (Harrison, 1978), focusing their attention on the level of learner autonomy over the instructional process.[15] Furthermore, according to P. Bharathi, self-directed learning can be defined as increasing knowledge, skills, accomplishments or personal development that individual selects and brings about by his / her efforts using various methods throughout their lives.[16] Independent learning is one of the most important aspects in the field of adult education and learning.[17]

3 METODE
Method used in this research is the research and development. Research and development (R&D) is the process of researching consumer needs and then developing products to fulfill those needs. The purpose of R&D efforts in education is not to formulate or test theory but to develop effective products for use in schools. Such products include teacher-training materials, learning materials, sets of behavioral objectives, media materials, and management systems. research and development used of adaptation of the rowntree model [18] for the development of independent learning materials in the form of printed modules and modified with the Hanafin and pack models [19] for the development of online learning materials.

4 RESULT AND DISCUSSION
The design model that fits the product to be developed is the Rowntree model modified with the Hannafin and Peck models. The selection of Hannafin and Peck's model design as a development model for developing electronic modules (e-modules) is because the hanafin and peck models are software-oriented product development models. So that it is very relevant to what will be developed by researchers, namely electronic modules (e-modules) that use software. The conceptual model and procedural models in this study are as below:

![Figure. a Draft Conceptual Development Model E-Module](image-url)
Development is the third step in the product development process. The development step includes the activity of making, modifying the learning model. In other words, the activities of selecting, determining methods, media and learning strategies that are appropriate for use in delivering program material or substance. Development of electronic module learning materials (e-modules) for Islamic religious education courses include: material collection activities. Then proceed with the writing module print activities, preparation of making flowchart view, and making storyboards with the help of hardware and software needed. Make a coding, and put the material into a computer and trial product development.

4 Product Validity, Evaluation and Revision Product
validation is carried out through review by experts, small groups and large group tests. In carrying out formative evaluation, four steps are carried out, namely one to one expert validation. This is called the first revision. One to One Student Validation. Students are asked to use instructional materials and discuss them. In this evaluation a readability test and ease of access to teaching materials and interviews were conducted. Based on the results of the evaluation, a second revision was made. Small group validation. Instructional materials are re-evaluated to a small group. Readability tests are carried out and readability to access teaching materials. On the basis of the results of this evaluation a third revision was made. Large group validation involves all science and technology students. This trial is to see the effectiveness of the results of developing products that are developed.

5 CONCLUSION
At this time the world of education faces the challenges of globalization in the field of education, one of which is the advancement of information technology. So that the world of education now needs to take advantage of technological advances. One of them is an Islamic religious education practitioner. Islamic religious education is one of the basic theoretical and practical subjects. Therefore, this course needs to be presented in a creative way so that it can be effective and efficient. To overcome this problem, it is necessary to develop learning materials that are in accordance with the needs of students to support achieving the learning objectives, using e-modules. The results of this article are conceptual models in developing independent learning materials for Islamic religious education courses in public universities.

REFERENCES

Analysis Media
analysis becomes something very important in achieving learning success.

d. Technology Analysis Technology
analysis that supports the ability of students of the Faculty of Science and Technology of the Nahdlatul Ulama University in Lampung on Islamic religious education courses is: a computer laboratory is available that can be used for e-module learning without disrupting the schedule of computer practicum. There is an official website of the Lampung Nahdlatul Ulama University that can be used to help the learning process.

e. Situation Analysis Situation
analysis that supports the learning process in Islamic religious education courses at the Faculty of Science and Technology of the Nahdlatul Ulama University in Lampung is: Students have basic skills in the field of information technology. Students have their own laptops, and the faculty has a computer laboratory that can be used for computer-based learning. E-module learning materials can help students learn independently and can be accessed anywhere and anytime. Study Programs and Faculties support forms of learning innovation in an effort to improve student abilities.

2 Product
Design Design is the stage after the analysis process where this stage is not a follow-up or core activity of the analysis step. Learning design is also said to be a design in the learning process. The design is prepared by studying the problem, then finding a solution through identification of the requirements analysis stage in the previous process. One of the objectives of this stage is to determine the appropriate design of learning products so that students can achieve goals in the education process, especially in achieving learning objectives that have been determined in the learning process. In this design phase it is carried out with the following terms of reference: designing learning syllabus, designing problem grids, designing cover module designs, designing hardware and software needed for learning by using electronic modules (e-modules).

3 Development

Figure b. Draft Conceptual Development Model

E-Module


