

DEVELOPMENT OF INFORMATICS TECHNOLOGY AND COMPUTER BOOK BASED ON 4D MODELS

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ABSTRACT

This study aims to develop a textbook on the subject of Information Technology and Computers with a self-regulated learning approach. This research uses Development and Research method through 4D Model. The definition stage is carried out by determining the characteristics of the textbook that will be developed through the initial study. The design stage, namely by choosing the format and design of the textbook to produce the first correction (draft). The development stage is carried out to produce the second draft, third correction, and the final product of the textbook. The second correction is obtained through the revised expert validation results that have been recommended. The third correction is the acquisition of small group test results by taking randomly. Based on the results of field tests on students who are taking Computer Information and Technology courses, the final product is obtained from the textbook. One of the textbook features and tools developed is the project task feature. Based on the validation of the textbook and its supporting tools, the criteria are very feasible and ready to be used and can guide student learning independently through the features in the textbook. The development of this textbook is expected to help in developing not only Information Technology and Computers but also other materials that use computers.

Keywords: RnD, 4D Model, Informatic Technology, Learning Development

ABSTRACT

Penelitian ini bertujuan mengembangkan buku ajar pada matakuliah Teknologi Informatika dan Komputer dengan pendekatan belajar mandiri (*self regulated learning*). Penelitian ini menggunakan metode *Development and Research* melalui 4D Model. Tahap pendefinisian (*define*) dilaksanakan dengan menetapkan karakteristik buku ajar yang akan dikembangkan melalui studi awal. Tahap perancangan (*design*), yaitu dengan memilih format dan desain buku ajar untuk menghasilkan koreksi (*draft*) pertama. Tahap pengembangan (*develop*) dilaksanakan untuk menghasilkan koreksi (*draft*) ke dua, koreksi ke tiga, dan produk final dari buku ajar. Koreksi ke dua diperoleh melalui hasil revisi validasi ahli yang telah direkomendasikan. Koreksi ke tiga merupakan perolehan hasil uji kelompok kecil dengan pengambilan secara *random*. Berdasarkan hasil uji lapangan pada mahasiswa yang sedang menempuh mata kuliah Teknologi dan Informasi Komputer diperoleh produk final dari buku ajar tersebut. Salah satu fitur dan perangkat buku ajar yang dikembangkan yaitu fitur tugas proyek. Berdasarkan validasi buku ajar serta perangkat pendukungnya menghasilkan kriteria sangat layak dan siap untuk digunakan serta dapat menuntun belajar mahasiswa melalui fitur yang ada pada buku ajar tersebut. Pengembangan buku ajar ini diharapkan dapat membantu dalam mengembangkan tidak hanya dalam materi Teknologi Informatika dan Komputer tapi juga dalam materi lain yang menggunakan komputer.

Kata Kunci: RnD, Model 4D, Teknologi Informatika, Pengembangan Pembelajaran

INTRODUCTION

Education is the right place to improve human resources (HR) quality and is the initial foundation in educational practice. Improving resources quality human beings are also needed a quality education system. More education should be carried out by prospective teachers, as well as teachers who are professionals in the field of education carry out their duties and responsibilities as educators and teachers. (Sholichah, 2018)

In the world of education, skills are needed, especially in the field of computer technology and information. this is in line with the needs of the 4.0 revolution where everything around us can be done easily with the help of information technology and computers. Information, media and technology skills provide students with a great power to enhance their thinking, learning, communication, and collaboration and production skills. However, in order to utilize this power, students should first learn the skills needed to comprehend, manage and utilize this information, media and technology. (HAZAR & ÖZKURT, 2021)

Learning via technology has many advantages. The Internet provides current and up-to-date data. It stores vast amount of information that can be retrieved quickly and easily. For language learning purposes, it provides text in authentic language, unlike the contrived language usually found in books. (Akhmedov & Shuhkrat, 2021).

Undergraduate students who will later enter the world of work and industry are required not to be technologically savvy, that's why basic skills are needed in operating computer technology, especially in Microsoft materials. In addition, the COVID-19 pandemic conditions also have an impact on reducing the intensity of classroom activities so that learning is carried out more in online media and with learning video media. So besides Microsoft, material on video editing and simple design is also needed. In this study, the researcher wants to develop a book on computer and information technology for undergraduate programs that can be used for all courses in any undergraduate program.

METHODOLOGY

The development model is the 4D Thiagarajan model that has Define, Design, Develop, and Disseminate procedures. (Hendriana et al., 2021) Each Product development in this research is in the form of learning media. The media developed will be assessed by media experts and two lecturers.

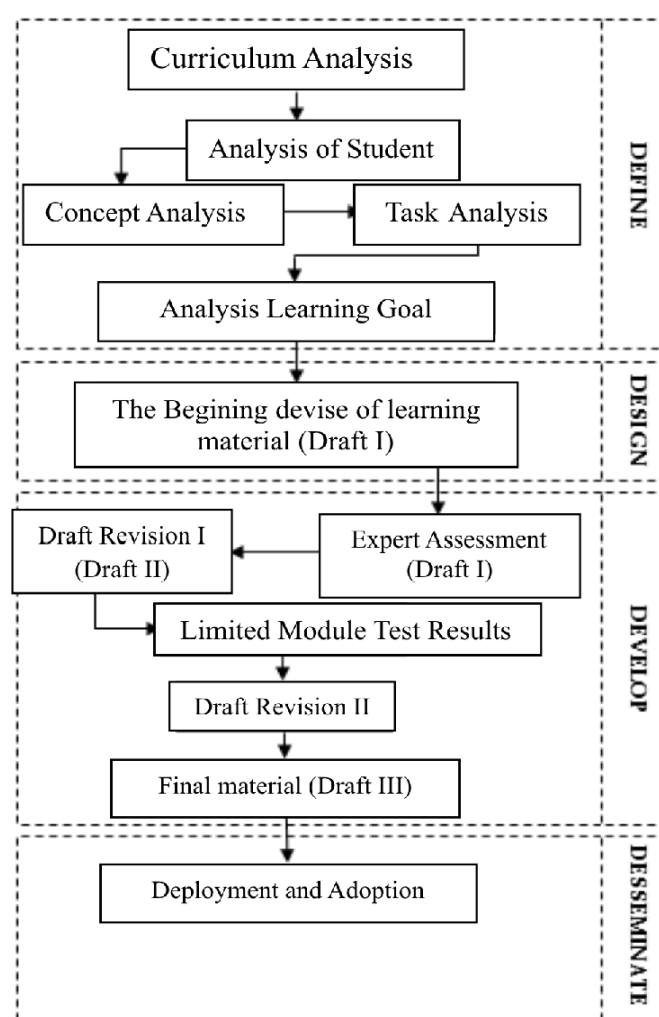


Figure 1. Model 4D by Thiagarajan

Define

In this stage, competency analysis is carried out covering the following limitation of competencies and related materials in the media are being developed. The purpose of this stage is to define and term of learning. Define consists of 5 parts that need namely curriculum analysis, collegian analysis, task analysis, concept analysis and the formulation of learning objectives.

Design

A draft of learning components is carried out in this stage. This aims to design a book format and book content materials will be developed and the description of the material will be discussed by experts. This stage is divided into two parts, namely the design and manufacturing stages. At the design stage, the drafting of components of book format and book content materials.

Develop

At this stage, it includes study and validation of the expert. Then, the media expert and two lecturers followed by revisions. This stage aims to produce a revised learning book media based on inputs and suggestions by experts the results obtained will be used as the basis for revision.

Disseminate

Disseminate stage is share the book to the collegian of STKIP Muhammadiyah Blora and to others campus look like PGMI of STAI Muhammadiyah Blora and etc.

RESULTS AND DISCUSSION

Results

The material compiled and developed at the definition stage is the result of a literature study and is adjusted to the syllabus and learning outcomes that are generally used in undergraduated program. The material that has been compiled is then discussed with cognate lecturers in the field of Basic Education and peer lecturers, and questionnaires are distributed to students who have previously finished taking courses as evaluation material to strengthen the material developed. The materials that have been compiled and developed based on the results of the definition stage are shown in Table 1.

Table 1. List of Materials Compiled

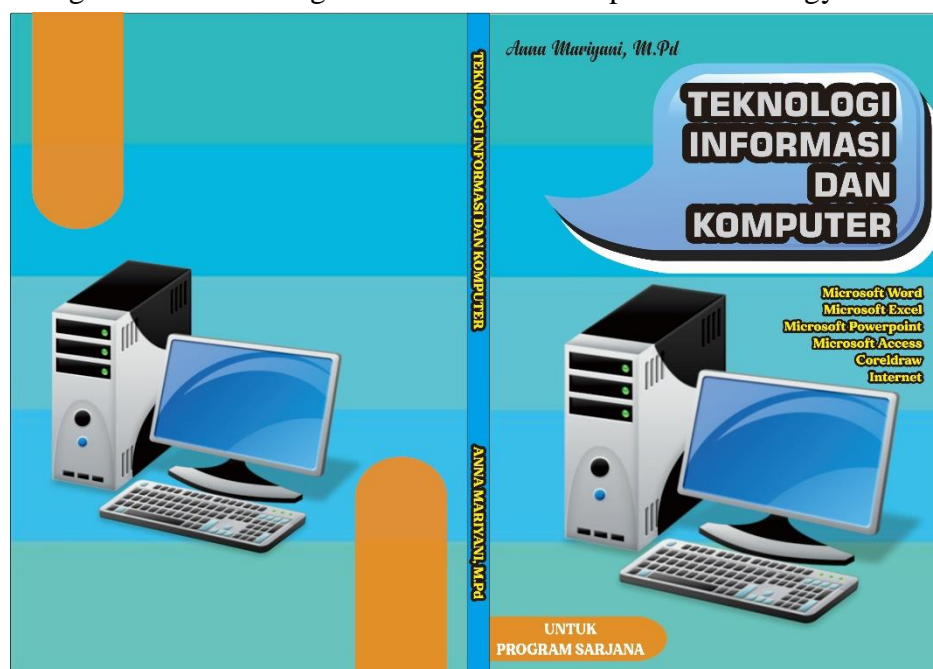
No	Materials	Sub Chapter
1	Microsoft Word	<ul style="list-style-type: none">- Layout- Alignment guides- Table- Insert pictures or video

		<ul style="list-style-type: none"> - Toolbar - Format paragraph - Numbered - Coloumn - Smart Art and Word Art - Chart
2	Microsoft Excel	<ul style="list-style-type: none"> - Page layout - Formulas Tab - Data Tab - Review Tab - View Tab - Menu Bar - Cells or Ranges - Sheet - Formula - Look up Function - Logic Function - Insert Graphic, Picture and Table - Link - Equation
3	Microsoft Powerpoint	<ul style="list-style-type: none"> - Worksheet Powerpoint - Toolbar - Dialoq Box Launcher - Document - Format - Insert Picture, Graphic, Table - Trantition and Animation - Theme and Template - Slides Powerpoint
4	Microsoft Access	<ul style="list-style-type: none"> - Entitas and Relationship - Toolbar - Relation and Table - Referential Integrity - Primary Key - Form - Report - Macro

5	Coreldraw	<ul style="list-style-type: none"> - Desain Object - Toolbar - Modificate Object - Logo Desain - Graphic Desain
6	Internet	<ul style="list-style-type: none"> - World Wide Web - E-commerce - Digital Marketing

Based on expert validation the results obtained with an average score for the content feasibility aspect of 3.55 with the "very good" category; linguistic aspect 3.78 with the category "very good"; the presentation aspect of 3.80 is categorized as "very good"; and the graphic aspect with a score of 3.83 in the "very good" category. The validation obtained is expected to produce book quality good teaching so that it can be tested at the next stage.

Figure 2. Cover Design Informatic and Computer Technology Book



The content of this books are Microsoft Word, Microsoft Excel, Microsoft Powerpoint, Microsoft Access, Coreldraw and Internet. All chapter are completely with project based learning step. So, the collegian can practice directly using this book.

The results showed that students with low abilities had the ability to regulate their own learning patterns which were also low. This is based on the results of the questionnaire given before the use of textbooks and the results of the students' initial ability tests, as shown in Figure 3.

Figure 3. Graph of Relationship Use Book with N-Gain Based on Initial Ability

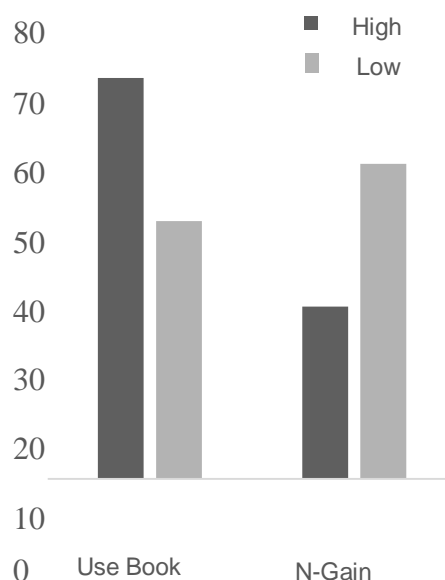


Figure 3 shows the results of textbooks influencing student learning processes independently. Students who have initial abilities and use high books get a not too high increase in grades. This is because the difference between the initial and final scores of the ability test conducted is not too large. A large-scale trial was conducted on elementary school teacher education students, STKIP Muhammadiyah Blora, which was divided into two classes. Students are given a questionnaire as an evaluation of the depth of the material that is considered lacking. Questionnaire on a trial scale big shows enough results satisfactory, which can be seen in Table 2. Improvements in the final stage are in terms of language, typo, adding quiz questions and assignments.

Table 2. Results of the Large-Scale Trial Questionnaire

Question	Percentage (%)
Book Materials:	
1. Ms Word	46
2. Ms Excel	24
3. Ms Powerpoint	10
4. Ms Access	5
5. Coreldraw	7
6. Internet	8
Researcher have finished teach all materials.	
- Really Agree	36
- Agree	64
Language of Researcher Clear to listen	
- Really Agree	56
- Agree	44
Researcher gives time for asking question	
- Disagree	26
- Really Disagree	74
Researcher learn application of the materials in daily activities	
- Really Agree	16
- Agree	84
Researcher gives the quis in the last section	
- Really Agree	46
- Agree	40
- Disagree	14

Figure 4. Book already for Disseminate



The disseminate stage is the stage of using a device that has been developed on a scale for example in other classes, at other universities, and by other lecturers.

Book based on project based learning is needed to learning process in informatic technology subject. The collegian directly use the stage of book then practice easier and quickly. For next development research need many books for appearing learning approach. The researcher have to improve their specification for better human resource to Indonesia.

CONCLUSION

The results of the product development of Information and Computer Technology textbooks obtained six chapter materials that have been approved to be applied in the content of the developed book, namely; Microsoft Word, Microsoft Excel, Microsoft Powerpoint, Microsoft Access, Coreldraw and the Internet. The textbook features Materials, Quizzes and Assignments. Based on the results of field trials, it was found that Information Technology textbooks and computers were able to provide an increase in students' independent learning abilities.

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