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Development of Project-Based Information and Communication Technology Vocasional Skills Book for Special Junior High School

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ABSTRACT

ICT vocational skills subject at Special Junior High School did not have a learning book for special need students. As a result, the students who have intellectual disabilities have many problems to learn independently. This condition also impacted on student learning outcomes that did not reach the targeted competencies. The purpose of this research is to produce a project-based ICT vocational skills book for Special Junior High School that is valid, practical and effective for learning uses. This study uses research and development (R&D) method with 4D model through Define, Design, Develop, and Disseminate stages. The data were collected using a questionnaire and one group pre-test and post-test design. The results of the study, it concluded that the project-based ICT vocational skills book for Special Junior High School is feasible, very practical and effective for learning use.

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1. INTRODUCTION

The industrial era 4.0 and 21st century skills indicate that skills of using information and communication technology (ICT) is a must in order to be able to compete in the face of global change [1]; [2]; [3]. Therefore, Special Education School as providers of education for students who have intellectual disabilities provide vocational skills ICT subjects at junior and senior high school as an option to develop skills in the computer field for the provision of self-reliance and the profession through learning theory and practice [4].

Observations at SLB Negeri 1 Harau obtained that ICT vocational skills were learned by ninth grade students of special junior high school with mild mental retardation. People with mild mental retardation has an IQ between 69-55 are capable of reading, writing, and simple arithmetic [5]. Mild mentally retarded students have little vocabulary. Most of these students master simple language for daily needs. ICT skills learning activities used teacher-centered method so the students tend to be passive in class [6], [7], [8]. In addition, learning resources are form from separate material sheets and use language that is difficult to understand by student [9], [10]. As a result, students find it difficult to learn independently and score result of learning ICT vocational skills is low that 25% of students got "good" predicate and 75% of students got "average" predicate as show at Table 1. Therefore, learning materials are needed that can help students learn actively and independently to improve student competence and learning outcomes [11].

Table 1. ICT Vocational Skills Subject Score Result

Predicate	Percentage
A (Very Good)	0%
B (Good)	75%
C (Average)	25%
D (Deficient)	0%

The purpose of this research is to develop a project-based ICT vocational skills book that can be used as learning materials and independent learning resources for students, as well as to produce valid, practical and effective books to improve student competency and learning outcomes [12].

Book can be interpreted as a combination of sources of information in the form of subject matter in certain fields of science that are systematically sorted according to learning activities to attract interest in learning, stimulate memory, and improve learning outcomes in printed form and bound into a single unit. Books can be the basis in determining teaching methods and provide opportunities for students to repeat lessons independently or learn new lessons [13].

The concept of project-based learning is a learning model that involves students actively in learning activities through direct and realistic project work activities to achieve attitude, knowledge, and skill competencies [14]; [15]; [16]. The project-based learning model involves students directly in research activities to work on and complete a learning project [17].

The combination of book concepts and project-based learning in this study is expected to produce products that can help teachers and students find learning resources and create student-centered active learning so the students can achieve maximum learning outcomes [18]; [19].

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2. RESEARCH METHOD

This study used research and development (R&D) method with 4D model through Define, Design, Develop, and Disseminate stages [20]. The participants of this study are 10 ninth grade special junior high school student of SLB Negeri 1 Harau, 2 material experts and 2 media experts from Padang State University, and 2 teachers of ICT vocational skills subjects. There are some methods to collect data in this study such as observation, interview, questionnaire, and test.

The validity of the book was tested by media and material experts and analyze by Aiken's V coefficient. The practicality of the book was tested by teachers and students, and

3. RESULTS AND DISCUSSION

There are 4 stages of 4D model, this project-based book development procedure uses the 4D method which can be broken down into several stages. The result as follows:

3.1. Define

The define stage is the earliest stage in the 4-D development method. At this stage, several analyzes are carried out which form the basis for developing a project-based skills book on ICT vocational skills. The description of the analysis at this stage is as follows:

3.1.1. Front End Analysis

Observation and interview with teachers and students in SLB Negeri 1 Harau obtained that ICT vocational skills subjects are theoretical and practical, so learning resources are needed that can direct students to carry out practical activities in computer laboratories. In practice, the teacher explains the theory with the lecture method. As for practice, the teacher demonstrates in front of the class. However, students find it difficult to follow the teacher's directions, and the teacher also finds it difficult to monitor student activities.

Description of some of these issues can be addressed by developing teaching materials that can be used with practical, easy to understand and attractive to students, and can direct the learning centered on students. One form of solving these problems is the development of teaching materials in the form of project-based ICT vocational skills books.

3.1.2. Student Analysis

Based on observations made at SLB Negeri 1 Harau, information was obtained that ICT vocational skills were learned by students of special junior high school with mild mental

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retardation in ninth grade. Mild mentally retarded students have little vocabulary. Most of these students mastered simple language for daily needs.

3.1.3. Task Analysis

Task analysis was conducted to identify the main skills discussed in the form of material analysis and competencies to be achieved in learning. This study refers to the learning materials for t curriculum at SLB Negeri 1 Harau which contains the selected skills in the curriculum structure. The competencies expected in this material can be observed in table 2.

Table 2. Basic Competencies of ICT Vocational Skills for Ninth Grade (*Paint*)

No	Knowledge Competencies	Skills Competencies
1	Remember the functions of toolbars and menus	Use toolbar and menu bar
2	Remember how to draw using various techniques	Draw using various techniques
3	Remember the product manufacturing procedure	Doing product manufacture
4	Remember the product printing procedure	Doing product printing

3.1.4. Concept Analysis

Based on the basic competencies, the learning of ICT Vocational Skills is basically carried out in the form of practicum activities and producing products. To achieve this competence, students are expected to actively participate in learning by following work steps or procedures that produce products [21].

3.1.5. Specification of Learning Objectives

The specification of the learning objectives of ICT Vocational Skills is that through theoretical and practical learning activities, students can remember and make image products from image processing devices (*paint*).

3.2. Design

The design stage aims to design learning materials in the form of project-based ICT vocational skills books [22], [23]. This project-based ICT Vocational Skills Book is designed in the following format:

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3.2.1. Cover Page Design

The design of the front page of the project-based ICT skills book contains the title of the book, subject, class, and topic of the material. On the front page there is also author's identity.

Figure 1. Cover Page Design

3.2.2. Preface Page Design

Section Page Preface provides an introduction of the book.

Figure 2. Preface Page Design

3.2.3. Table of Content Page Design

The table of contents page contains information about page numbers that can lead students to the next material or the desired sheet.

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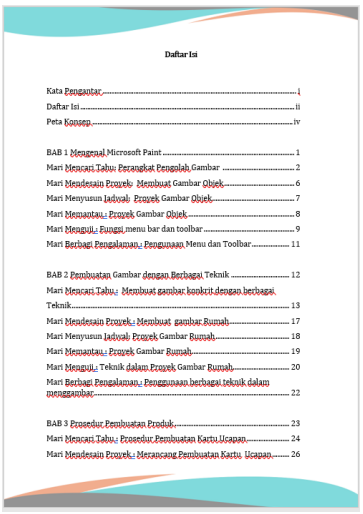
Daftar Isi

Figure 3. Table of Content Page Design

3.2.4. Concept Map Page Design

The Concept Map page contains a schematic description of the material contained in each chapter discussion

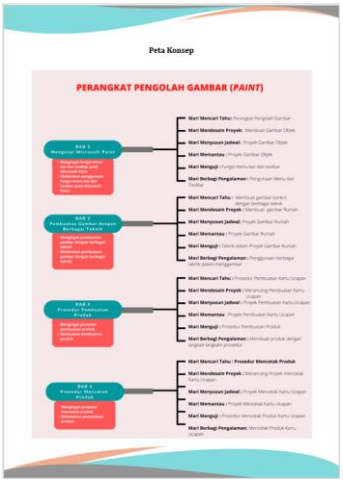

Figure 4. Concept Map Page Design

3.2.5. User Guide Page Design

The User's Guide page contains instructions for the sections of the book, as well as a description of the contents of each section of the book.

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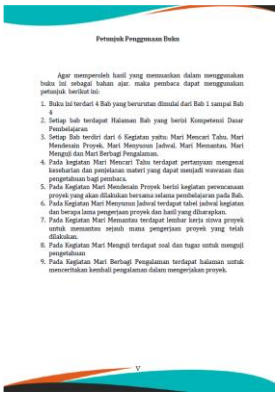

Figure 5. Concept Map Page Design

3.2.6. Chapter Page Design

The Chapter page contains the chapter number and the title of the discussion material that is equipped with basic competencies.

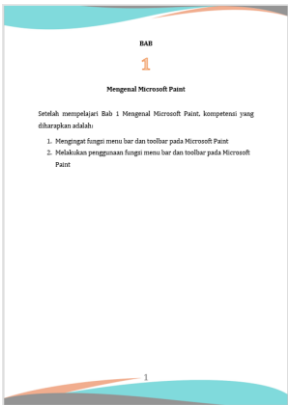

Figure 6. Chapter Page Design

3.2.7. Let's Find Out Page Design

The Let's Find Out page contains question boxes and study materials. In the question box, there are questions about real daily conditions.

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Figure 7. Let's Find Out Page Design

3.2.8. Let's Design Project Page Design

The Let's Design Project page contains project assignments that direct students to achieve basic competencies on learning topics.

Figure 8. Let's Design Project Page Design

3.2.9. Let's Schedule Page Design

The Let's schedule page contains a table for the preparation of the project work schedule that has been previously planned.

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Figure 9. Let's Design Project Page Design

3.2.10. Let's Monitor Page Design

The Let's Monitor page contains student worksheets that can be used as project work portfolios to facilitate monitoring changes in student abilities.

Figure 10. Let's Monitor Page Design

3.2.11. Let's Test Page Design

The Let's Test page contains assignments to evaluate students' abilities. Assignments are given in accordance with the competencies that are the target of student achievement.

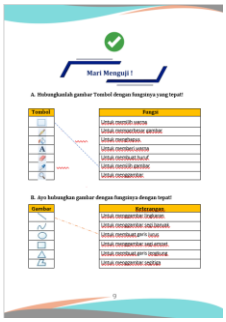

Figure 11. Let's Monitor Page Design

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3.2.12. Let's Share Experience Page Design

In the let's share experience page, students are directed to retell their experiences during learning as a form of reflection and confirmation of the competency achievements in the discussion material.

Figure 12. Let's Monitor Page Design

3.3. Develop

At this stage, testing of the ICT skills book that has been designed is carried out, in order to know its validity, practicality and effectiveness. The following test are:

3.3.1. Validity Test Data

The validity test was obtained based on the validator's responses to the project-based ICT skills book which had several simple revisions. Based on the advice given then carried out a revision in order to obtain a valid and worthy book to use in as learning materials on study. The results of the validation of the responses given by the validator to the project-based ICT vocational skills book developed can be seen in table 3.

Table 3. Validator Result

No	Validator	Validation Value	Category
1	Material Expert	0.86	Valid
2	Media Expert	0,84	Valid

3.3.2. Practical Test Data

The results of the practicality test were obtained from the responses of practitioners as well as students. Based on the responses given, the practicality of project-based ICT vocational skills books can be seen in table 4.

Table 4. Teacher and Student Responses to the Practicality of Books

No	Responder	Percentage	Category
1	Teachers	90	Very Practical
2	Students	82	Very Practical

3.3.3. Effectiveness Test Data

3.3.3.1. Cognitive Learning Outcomes

The test subjects were first given a pre-test before using the book and a post-test after learning after using the book. The result can be seen at table 5

Table 5. Pre-Test, Post-Test and Gain Score Statistics

No	Test	Average Score	Category
1	Pre-Test	54	Incompetent
2	Post-Test	83	Competent
3	Gain Score	0,666	Effective

3.3.3.2. Psychomotor Learning Outcomes

Effectiveness seen from the Student Worksheet on the activities of the project. The analysis showed 9 out of 10 students achieve mastery that has been set. This means that 90% of students achieve completeness scores so that project-based ICT vocational skills books are said to be very effective in improving psychomotor learning outcomes or in other words improving students' skills.

Table 6. Student Psychomotor Learning Outcomes

No	Score	Number of Students	Category
1	≤75	1	Incompetent
2	75 ≥	9	Competent

3.3.3.3. Affective Learning Outcomes

Testing the effectiveness of the book project-based ICT vocational skills to the learning outcomes of affective student analysis of completeness affective value of learners. The

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results of the analysis of the affective assessment of the students showed that 9 students had achieved completeness scores. This means that 90 % of students achieve completeness so that project-based ICT vocational skills books are very effective in improving students' attitudes.

Table 7. Student Affective Learning Outcomes

No	Score	Number of Students	Category
1	≤75	1	Incompetent
2	75 ≥	9	Competent

3.4. Disseminate

After passing the test of validity, the practicalities and effectiveness and obtaining valid, practical and effective in Phase of Development , the book project-based ICT vocational skills can be said to be feasible for ddisseminate. The distribution was carried out to teachers of ICT subjects at Special Education School and students at SLB Negeri 1 Harau. Teachers and students give positive and enthusiastic responses when receiving books and listening to explanations about the use and contents of books.

4. CONCLUSION

Based on the results of the book development research that has been carried out, the following conclusions are obtained :

a. The methods of research and development with 4D model that passes resistant define, design, develop and disseminate produces teaching materials in the form of a project - based ICT vocational skills book for Special Junior High School.
b. The resulted of this research is a project -based ICT vocational skills book for Special Junior High School that was valid and suitable for use in learning based on the validity test by material experts with a validation value of 0.86 in the valid category and 0.84 media experts in the valid category .
c. The resulted of this research is a project -based ICT vocational skills book for Special Junior High School that is very practical evidenced by the results of the test the practicalities of the teachers the skills of ICT SLB and participant students SMPLB. The percentage of practicality of books based on teacher responses is 90% in the very practical category and students' responses are 82% in the very practical category .
d. The resulted of this research is a project -based ICT vocational skills book for Special Junior High School that effectively improve the outcomes of learning the participant students. It is proved from the comparison of the results of study participants students before and after using the book . The results of the calculation of the gain score obtained

a value of 0.666 with a medium category . Meanwhile, for psychomotor and affective learning outcomes obtained classical completeness of 90% with a very effective category.

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