

## VALIDITY AND EFFECTIVENESS TESTS OF AN EARLY CHILDHOOD EDUCATIONAL TOYS DEVELOPMENT MODULE AT PG-PAUD FKIP OF THE SRIWIJAYA UNIVERSITY

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### ABSTRACT

This study aims to test the validity, reliability, practicality, and effectiveness of the instructional module developed for students in Early Childhood Education Study Program (PG-PAUD), Faculty of Teacher Training and Education (FKIP), Sriwijaya University, Indonesia. The research was conducted in four stages as follows: 1) designing teaching materials for early childhood educational toys development; 2) evaluating the validity and reliability of the module by related experts; 3) testing the practicality and effectiveness of the module prior to expert evaluation in a small group of students; 4) testing practicality and effectiveness of the module after revision in a larger group of students. A qualitative-descriptive technique was applied for the data analysis. The results showed reliability of the module's content and designs are 83.21% and 87.30% respectively. The mean gain-score achieved by students in practicality and effectiveness test before and after module's revision consecutively are 0.88 and 0.96. It suggests therefore, the module developed titled "Development of Early Childhood Educational Toys" worth to be categorized as valid, reliable, practical, dan effective.

**KEYWORDS:** teaching module, educative toys, early childhood education, early childhood teacher

### INTRODUCTION

Early childhood education aims to support children's growth to become ethical and responsible members of society. Therefore, early childhood education is more directed to support and monitor children's physical, psychological, social, emotional and cognitive development. The objectives of early childhood education must be well understood by stakeholders, especially teachers or prospective early childhood education teachers. There are seven roles of teachers in early childhood education that must be understood, namely communicator, facilitator, trainer, model, watchman, storyteller, and researcher (Miels, 2008).

Considering the importance of early childhood education for the development of the nation's society, every country in the world sets national standards for early childhood education. In Indonesia, the national standard for early childhood education is regulated in Regulation of the Minister of Education and Culture Number 137 of 2014. One of the aspects regulated in this regulation is the competence of teachers and/or prospective teachers. There are four competencies that early childhood education teachers must have namely pedagogical competence, professional competence, personality competence, and social competence. Pedagogic competence is the ability related to planning

educational program activities, care and protection, implementing processes and assessing educational outcomes (DIKTI Portal, 2014).

The early childhood educational teacher competence, in the end, can be seen from their ability to: (1) demonstrate mastery of core knowledge; (2) designing and implementing learning experiences that are appropriate for children's development; and (3) designing, creating, providing and maintaining safe and healthy children's learning (Agency Malaysian Qualifications, 2014). Thus, early childhood teachers must have the ability to identify, collect, and utilize all relevant resources used as children's learning media (Chukwbikem, 2013).

Apart from referring to the conventional teacher competency standards above, universities that provide early childhood teacher education study programs in Indonesia must also refer to the Indonesian National Qualification Framework. Early childhood teacher education study programs are required to design a curriculum that allows student-centered learning to take place. Consequently, the lecturers of the early childhood teacher education study program are always required to improve the quality of their lectures in terms of materials, strategies, and facilities (Wahyuningrum, 2017).

The problem is, in the study programs where researchers work, the Early Childhood Teacher Education Study Program, the Teacher Training and Education Faculty, Sriwijaya University, there is still a shortage of teaching materials that can help students develop these skills. For this reason, the teaching module on how to make educational toys needs to be developed. The goal, in addition to making the educational process more interesting but also encouraging active learning in students so that they can develop skills and adopt values and attitudes as desired (Busljeta, 2013).

Considering that modules can be categorized as teaching materials designed to help students learn on their own, it is important that the teaching modules meet the needs of students according to the learning outcomes planned in the curriculum. This research is our effort to determine the validity, reliability, practicality, and effectiveness of the teaching modules that we have developed so that they are really useful as teaching materials to meet the competencies of prospective early childhood teachers (Torrefranca, 2017).

The students targeted for the research were students in semester IV of the Early Childhood Teacher Education Study Program, Faculty of Teacher Training and Education, Sriwijaya University who took the Early Childhood Educational Play and Toys course. It is hoped that, after studying the module, the innovativeness and creativity of students in developing educational toys for early childhood will increase.

## **METHODS**

### **Research approach**

The approach applied in this research is the Research and Development (R&D) approach adopted from the Borg and Gall model. According to the Borg & Gall model, educational research and development is defined as a process for developing and validating educational products. The R & D model in education is cyclic in nature which begins by examining research results related to the product to be developed, making products, testing products in the field, fixing and eliminating product deficiencies based on field test results (Gall & Borg, 2002).

The first step we took in this study was to conduct a needs analysis in accordance with education quality standards and educational principles that must be understood by students of early childhood education study program who were the research targets. The results of the needs analysis indicate the need for teaching materials that can be used to promote student interest in learning and develop the ability to design educational play and toys for early childhood.

### **The teaching material**

The teaching material that has been made to be tested for validity, reliability, practicality, and effectiveness is an instructional module entitled "Development of Early Childhood Educational Toys". This module contains guidelines on how to make educational early childhood toys from materials that are easily available from the surrounding environment and are cheap and safe for children. The safety criteria include: not tapering, not sharp, not fibrous, not attracting children to put it in the mouth and swallow it (UNICEF, 2013).

As a teaching material that is intended as a work guide, this module contains instructions on the names and functions of educational toys, the tools and materials needed, how to make them, and how to use them in learning, as well as how to observe and measure their effects. The types of plays introduced in the module include plays for children aged 0-6 years that have been tested for their effectiveness, such as: multicolored flags, sounding socks, balloons activities, baby dolls, wooden toys, cans and sticks, and many more.

### **Validity and reliability test**

To determine the validity and reliability of the modules that have been made, we involve two experts, namely education science experts and graphic design experts, both of whom are lecturers at the Faculty of Teacher Training and Education, Sriwijaya University. Educational science expert, Dr. Sri Sumarni, was asked to assess the quality of the module content. Meanwhile, graphic design expert, Dr. Windi Dwiandika, was asked to assess the quality of the display (design) of the module.

There are three aspects of the content assessed by the expert namely language, presentation, and eligibility. Validity and reliability of the language aspects are indicated by: (1) readability; (2) clarity of information; (3) grammar conformance; (4) clarity and conciseness of content. The indicators of presentation aspects are: (1) systematics; (2) attractiveness; (3) the depthness and broadness of the material; (4) clarity; (5) suitability of the pictures used; and (6) insightness of the content. The

eligibility of the module's content based on the: (1) truthness; (2) conformity to learning needs; (3) logical grouping of parts; (4) benefitness of the content in broadening student horizons.

For the graphic design, there are three aspects of the module assessed namely lay out design, cover design, and typographical design. Validity and reliability of the lay out design are based on: (1) suitability of the cover display; (2) appropriateness of text and image layout; (3) attractiveness of colors used. Indicators of the reliability of cover design are indicated by: (1) attractiveness of cover color; (2) appropriateness of letter typed; (3) correctness of font size; (4) appropriateness of picture displayed on the cover. The indicators of typographical design are: (1) the attractiveness of font colors; (2) appropriateness of font types; (3) appropriateness of font size used in the text.

### **Practical and effectiveness test of the module**

There are two stages of test that are applied to assess the practical and effectiveness of the teaching material developed namely the limited test and the wider scale test. In the limited field test, there were 10 students of 4th semester taking the Early Childhood Educational Play and Toys course. Meanwhile, in a wider scale field test, the number of test subjects involved was 30 students.

In the first stage test, the limited test, students are asked to complete an assessment instrument for practicality and effectiveness of the modules prior to expert evaluation. The large-scale test is intended to measure the effectiveness of the module in helping students understand the contents of the Early Childhood Educational Play and Toys course after the module evaluated by experts.

The measurement techniques applied were pre test and post test. The pretest is given to students before they are given the module, while the post test is given after they have read the module. The questions asked in the pre-test and post-test are the same, consisting of 8 essay questions with the following indicators of achievement.

- 1) Describing the meaning of educational play tools in the context of early childhood education;
- 2) Explaining the benefits of educational play tools in the context of early childhood education;
- 3) Identifying the purpose of making early childhood educative play tools;
- 4) Explaining the principles of developing early childhood educative play tools;
- 5) Explain the use of early childhood educative play tools;
- 6) Describe the requirements for early childhood educative play tools;
- 7) Creating educative play tools to promote 3 aspects of early child development;
- 8) Making educative play tools to stimulate 5 aspects of early child development.

### **Data analysis**

Validity of the teaching module developed is analysed descriptively using the following formula (1).

$$p = \frac{\sum x}{\sum xi} \times 100\% \dots\dots\dots(1)$$

Where:

- p = Percent of reliability
- $\sum xi$  = Total score of the validator’s answer
- $\sum x$  = Total of the highest score

The level of module validity is determined based on the score given by the experts who provide assessment with the following criteria: very valid, valid, invalid and very invalid. Percent values of each validity criterion are 80-100%, 60-80%, 40-60%, and 20-40% respectively.

Next, the effectiveness of the module is based on the pre- and post test scores achieved by students calculated using the formula (2) below.

$$g = \frac{Po - Pr}{M - Pr} \dots\dots\dots(2)$$

Where:

- g =gain score
- Pr= pre test score
- Po= post test score
- M =maximum score

The achievement levels of the student are categorized as high, moderate, and low based on the g-values (gain score) of  $0.7 \geq g$ ,  $0.3 \leq g \leq 0.7$ , and  $0 \leq g$  respectively. Teaching material, the module, is declared effective if 75% of students are able to achieve a gain-score of more than 0.3.

**RESULTS**

**Content validity and reliability of the module**

Expert’s assessment results on the content reliability of the module developed are presented in Table 1. Among the 14 indicators of validity, readability was considered as highly conform, while the 13 other indicators were considered as conform.

**Table 1 Expert’s remarks for each validity indicator of the module content**

No	Indicators	Remarks
1	Readability	Highly conform
2	Clarity of the information	Conform
3	Grammar conformance	Conform
4	Clarity and conciseness	Conform
5	Systematic	Conform
6	Attractiveness	Conform
7	The depthness and broadness of the material	Conform
8	Clarity of the presentation	Conform
9	Suitability of the pictures used	Conform
10	Insightfulness of the content	Conform
11	Truthfulness of the content;	Conform
12	Conformity to learning needs	Conform
13	Logical grouping of the parts	Conform
14	Benefits of increasing student knowledge	Conform

Percent reliability of the teaching material based on the score given by the module content expert calculated using Formula 1 is 83.21%. Referring to the validity criteria, this percent of reliability suggests that the module developed worth categorized as very valid.

Table 2 represents assessment results on the design reliability done by the graphic design expert. All 13 conformity indicators of the design’s aspects of the teaching material we developed are considered as appropriate by the expert.

**Table 2 Expert’s remarks for each validity indicator of the module graph-designs**

No	Indicators	Remarks
1	Suitability of the cover display	Appropriate
2	Appropriateness of text and image layout	Appropriate
3	Attractiveness of colors used	Appropriate
4	Attractiveness of cover color	Appropriate
5	Appropriateness of letter typed	Appropriate
6	Appropriateness of font size	Appropriate
7	Appropriateness of picture displayed on the cover	Appropriate
8	Ahe attractiveness of font colors;	Appropriate
9	Appropriateness of font types	Appropriate
10	Appropriateness of font size used in the text	Appropriate
11	Typing accuracy	Appropriate

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12	Appropriateness of the layout	Appropriate
13	consistency of the layout on the material	Appropriate

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Calculation on the the score given by the module graph-design expert using Formula 1 resulted in a percent reliability of 87.30%. By referring the criteria of designs validity, this percentage value suggests that the module developed worth categorized as very valid.

### Expert's recommendation

Although both experts agree that the module, we developed is suitable for use in teaching and learning, they still provide constructive comments and suggestions.

Expert who assess the module content provide comments and suggestions to researchers as follows.

- The examples of toys recommended in the module should focus on materials that are readily available from the surrounding environment;
- Sentences that confuse the reader should be corrected

Meanwhile, expert who assess the graphic design of the modules required researchers to do not use repetitive word or sentence on the module cover.

### Practicality and effectiveness of the module

The results of the practicality and effectiveness test of the module in a small group of students, before the module is corrected according to the suggestions of experts, are presented in Table 3. While the results of practicality and effectiveness test of the module after revision presented in Table 4. The scores presented in both tables are the gain-scores achieved by students calculated according to Formula 2.

The data in Tables 3 and 4 show that both before and after the revision, the modules developed effectively increase students' understanding of the principles of developing play and educational toys for early childhood.

**Table 3 Gain-score achieved by student in practicality and effectiveness test of module prior to expert evaluation**

Respondent	Gain-score
1	0.89
2	0.87
3	0.89
4	0.90
5	0.89
6	0.88
7	0.87
8	0.87
9	0.88
10	0.87
Mean score	0.88

**Table 4 Gain-score achieved by student in practicality and effectiveness test of module after evaluation by experts**

Respondent	Gain-score
1	0.88
2	0.88
3	1.00
4	1.00
5	0.99
6	0.90
7	1.00
8	1.00
9	0.90
10	1.00
11	1.00
12	0.89
13	1.00
14	0.98
15	1.00
16	1.00
17	0.92
18	1.00
19	1.00
20	1.00

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21	1.00
22	0.93
23	0.94
24	0.96
25	0.92
26	0.96
27	0.93
28	0.98
29	0.91
30	0.92
Mean score	0.96

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Furthermore, based on the meaning criteria of the gain-score in Formula 2, a teaching material can be called effective if it can help at least 75% of the test participants achieve a gain-score of  $\geq 0.3$ . As can also be seen in Tables 3 and 4, all (100%) students obtained a gain-score above 0.7. Thus the "Development of Early Childhood Educational Toys" module can be categorized as practical and effective teaching materials.

## DISCUSSION

The two experts we asked to evaluate the module we developed both gave the impression that the content and design of the teaching materials were reliable for use in teaching. The positive impression given by the two experts is something reasonable because in providing their judgments the assessors must have applied the principle of integrated evaluative assessment based on empirical evidence and theoretical reasons that support the adequacy and appropriateness of their conclusions. It is true that reliability is only one aspect of validity, but the reliability score is very useful as a basis for assessing the usefulness of the product being developed (Thompson, 2013).

From the point of view of its content, the module that we have developed is based on standard principles recommended in many literatures such as Butcher et al. (2006). According to authors, a good written teaching material should incorporate different learning stimuli, not only text but also visual images (diagrams and photographs). The text should be written in a clear and jargon-free manner and have terminology defined.

Other principles that we have adopted and applied in the development of this teaching material include: title, statement of purpose, desirable prerequisite skills, implementers of the modules instructional objectives, instructions to the learners, instructional activities, and evaluative test (Yazon, 2018).

The linguistic aspect is also important to consider in the preparation of written teaching materials. The language aspects include: controlled vocabulary, clear sentence structure, logical and clear development of main ideas, paragraph development, and contextual clues. Furthermore, regarding

visual design, in compiling this module we also consider images, photos, to clarify the main idea of graphics. Lay out design principles were also considered, such as all images are placed close to the relevant text, the visual images displayed are varies (PEI Department of Education, 2008).

The data in Table 3 clearly shows that the developed module deserves to be categorized as practical and effective teaching materials. The effectiveness has increased markedly (Table 4) after improvements were made to the module content and graphic design according to expert advice. The factor that is thought to contribute to the practicality and effectiveness of this module is that its content has not only fulfilled the requirements as suggested by Thompson (2013), Butcher et al. (2006), or Yazon (2018), but it has also met the student needs. The student needs of the early childhood teacher education study program, in the context of Indonesia, according Prayitno and Ahmad (2016) are:

1. Mastering early childhood education material creatively, innovatively and contextual support for professional duties.
2. Mastering actively the use of various learning resources, especially science and technology-based learning media.

## CONCLUSION

Given that all of the test respondents involved in this study all gave very high scores, it can be concluded that the "Early childhood educational toy development module" deserves to be called valid, reliable, practical, and effective.

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## Disclosure of conflict of interest

Authors declare no conflict of interest

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