

# Formative Test of Cognitive Development Method Modules for ECE Students

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## ABSTRACT

The Cognitive Development Methods is a course that is quite difficult for students of the ECE study program at Universitas Terbuka who are required to be able to learn independently. Therefore, improvements are needed to learning materials to make it easier for students to achieve the expected competencies. The purpose of this research is to develop learning materials and cognitive development methods that are following the conditions and developments of the latest science. This development was carried out on a multi-year basis using the Borg & Gall model, and this study is the 9th step of the model, namely the formative test, which is using one-to-one evaluation with experts and users. The results of one-to-one evaluation generally state that the learning materials Cognitive Development Method is good in terms of the map of competence, the accuracy of technical concepts and terms of the field of science, the conformity of the material with the characteristics of Universitas Terbuka's students, clarity of summary, description of small tasks, and the accuracy of key test answers. However, this learning material still requires improvements in terms of accuracy of competency formulation, conformity of concepts and theories with standards for the course (ECE program standards in Indonesia), clarity of problem training, and lack of illustrations and images. So it can be concluded that this cognitive development method still requires further refinement before use.

**Keywords:** *learning materials; cognitive development*

## 1. INTRODUCTION

One of the courses given to early childhood education (ECE) of Open University (Universitas Terbuka /UT) students is the Cognitive Development Method (CDM). This course has the main competence, namely being able to develop early childhood cognitive skills based on theories, stages, and characteristics of cognitive development. Open University or Universitas Terbuka is a university that implements an open and distance learning (ODL) system. This ODL system implies that ECE of Open University students are required to be able to learn independently through the learning materials and learning assistance services provided [1]. Learning materials for students in the ODL system must be arranged interestingly, easy to learn, and self-learning [2]. In addition, the shift in culture and the way students learn today is also much different from the previous generation [3]. Therefore, this CDM learning material needs to be revised continuously according to the demands of the times. The development of new versions of learning materials for this CDM course has been started in previous research. This research is focused on a formative test for the draft

of CDM printed learning materials as a result of the research.

Learning materials can be classified based on the required modalities, namely (1) printed materials including handbooks, worksheets, modules, brochures, leaflets, wall charts; (2) listening learning materials (audio) such as mp3, podcast, and audio CDs; (3) learning materials for watching & listening (audiovisual) such as video CDs, films, streaming; and (4) interactive learning materials such as interactive videos or CAI [4]. Printed learning materials at UT are modular and are arranged according to the credits in the course. The CDM course contains 4 credits so that it consists of 12 modules [5]. The topics of the draft CDM learning materials from previous research are the nature of cognitive development, Piaget's theory of cognitive development, neo-Piagetian cognitive development theory: information processing, Vygotsky's theory of cognitive development, multiple intelligences in children aged 0-6 years, characteristics of cognitive development of children aged 0-6 years. 0 s. 6 years, the development of creativity for children aged 0-6 years, language as a cognitive development tool, math and science games for children aged 0 to 6 years, the nature

of cognitive development methods, the nature of media in cognitive development, implementation of methods, media, and evaluation in cognitive development.

## 2. RESEARCH METHODS

This research is a research and development as part of the Borg & Gall model [6], modified by Suparman [7]. The focus of this research is to continue the research that has been done previously from steps 9 and 11. These steps are preliminary field tests and preliminary product revisions, as shown in the following chart.

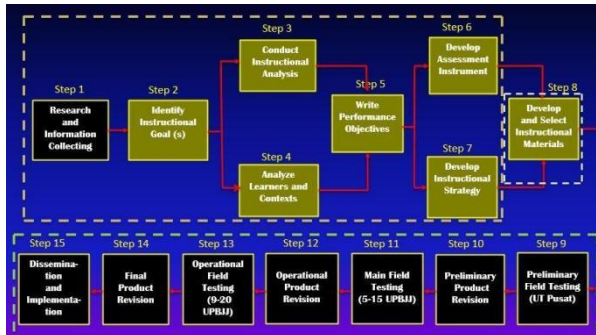


Figure 1. The R & D cycle for the development of UT learning materials, modified by Suparman (2018)

The formative test in this study is focused on one-on-one evaluation, which includes validation by experts and evaluation by users. The experts who were asked to test these learning materials were drawn from 3 fields, namely material experts, instructional design experts, and language experts. Meanwhile, the evaluation from users involved 3 ECE students of Open University (UT) who had already taken CDM courses, consisting of students with high, moderate, and low scores.

## 3. RESULT AND DISCUSSION

Input from experts in general for the revision of CDM learning materials includes several things, namely: (1) consider developing higher-order thinking skills (HOTS), with operational words C4 and above, (2) general competency formulation should be adjusted to the audience-behavior-condition-degree (ABCD), (3) need to add more interesting pictures, tables, photos, infographics, (4) some references are not up to date because they are more than 10 years old, (5) bibliography needs to be written consistently, add references from the recent journals, (6) some of the exercises provided are not linked with specific competencies and materials, (7) the presentation of the material is not well structured and there are still many typos that make the material not good in terms of validity, and (8) the presentation of the material is less coherent and still there are sentences that are too long. In addition, the sentence structure also needs to be reviewed.

The main thing that becomes the suggestion is that as far as possible the learning materials will develop higher-order thinking competencies [8]. This is following the characteristics of the undergraduate level who should be trained to think at a higher level, not just explain or give examples. Moreover, UT ECE students are teachers who already have teaching experience in PAUD institutions. Students need to be invited to think about analyzing, synthesizing, and evaluating the practice of their teaching experience combined with the theories and concepts they find in the learning materials [9].

While specifically viewed from the content of the material, expert and user input are as follows.

Table 1. The Results of the Validation of the Materials Content

No.	Aspects	Shoes
1.	Validity of content (material) in the module	3,75
7378	The truth of concepts in module material (no misconceptions)	4,5
7378	The breadth of the material according to competence	4
7378	The breadth of material is suitable for the S1 level of the ECE study program	4
7378	Depth of material according to competence	4
7378	Depth of material according to undergraduate degree ECE study program	4
7378	Content Update	3,75
7378	The suitability of the material with the standards for CDM courses in ECE programs in Indonesia	3,25
7378	The suitability of material with the characteristics of UT students	4,75
4567	Material harmony with values in society	4
4567	Concepts and theories that are fully described, according to the field of science	4
4567	Coherent, systematic, and logical presentation of material	4,25
4567	The truth of the technical terms of science	4,5

Based on Table 1, it can be seen that in terms of material, CDM learning materials have advantages in terms of the suitability of the material with the characteristics of UT ECE students, who work as ECE teachers with an average age that is not young anymore. The description of the material is not too difficult to learn, but it can still meet the competencies of this CDM course [10]. However, according to experts, this CDM learning material also still needs improvement, especially in terms of the suitability of the material with the standards for CDM courses in the ECE department

in other universities [11]. The suitability of the material for each subject in various ECE study programs in Indonesia has been attempted through the Association of ECE lecturers in Indonesia who are members of APGPAUD. However, UT has a characteristic that is open learning, where students who are accepted do not go through a special admission selection as a student and do not see the age or year of graduation in high school [12]. Therefore, the preparation of learning materials also needs to be adjusted to the characteristics of these students.

When viewed from the side of instructional design, input from experts and users is as follows.

Table 2. Validation results of Instructional Design Aspects

No.	Aspects	Shoes
1.	Clarity of learning strategy concepts	4,5
4567	Relevance of learning strategies with specific learning objectives	3,75
4567	There is guidance and invitation in the learning process.	4,25
4567	Small assignments are easy to understand	4,75
4567	Technical quality of learning material production	4,25

Based on Table 2, it can be seen that the CDM learning materials have excelled in terms of small assignments to better understand the description of the material. Learning materials or CDM modules are designed to be self-learning as if they were substitutes for lecturers for students [13]. Therefore, modules are different from textbooks [14]. In this CDM module, in addition to material descriptions, various small activities must also be inserted as reinforcement to understand the material, as a lecturer usually does to his students [15]. These small assignments, for example, are analyzing children's cognitive development in classrooms where students teach [16], designing and modifying science or math educational games based on traditional games or games that are already known to children [17], observing the intelligence of children in their class to see trends dominant type of intelligence [18], and so on.

Meanwhile, the aspect of instructional design that still needs improvement is the relevance of learning strategies to the specific learning objectives of CDM. This is indeed one of the limitations of this CDM learning material because not all learning strategies commonly used in face-to-face learning can be included in learning materials [19]. However, with current technological advances, more and more learning strategies can be integrated with learning materials, especially printed learning materials. For example, by providing links from other learning resources, either text, audio, or audiovisual so that students get more diverse insights about CDM [20].

From a language perspective, input from experts and users is as follows.

Table 3. Results of Linguistic Aspect Validation

No.	Aspects	Shoes
1.	Sentence structure	4
4567	Paragraph arrangement	4
4567	Sentence transition between paragraphs	4
4567	Sentence succinctness	4
4567	Sentence communicativeness	4,25

Based on Table 3, it can be seen that in general, in terms of language, CDM learning materials are good with a minimum score of 4. However, the learning module needs to have good sentences and grammar, especially for students who have to study independently [21]. This is also consistent with expert input in general at the beginning that some several paragraphs or sentences are too long [22] and the sentence structure is not appropriate [23]. So far, the procedure for writing printed learning materials at UT has been a fairly long process, based on standard procedures according to the Standard Operating Procedure (SOPs) set by UT. The writing of printed learning materials at UT starts from the process of writing materials by a team of writers, reviewing materials and instructional designs by experts according to the field of science, language editing processes, and the final layout process in the publishing section [24].

#### 4. CONCLUSION

As one of the efforts to improve academic quality, it is necessary to make continuous improvements to both printed and non-printed learning materials used by ECE UT students, including CDM printed learning materials. The improvement process needs to be based on research results so that it can be justified scientifically. This study provides results in the form of input from experts and users about the draft of CDM printed learning materials. In general, it is stated that the CDM learning materials have excelled in terms of the description of the competency map, the accuracy of concepts and technical terms in the field of science, the suitability of the material with the characteristics of UT students, the clarity of the summary, the description of small tasks, and the accuracy of the test answer keys. However, CDM learning materials still need to be improved, especially in the accuracy of the competency formulation, the suitability of the material with the standard courses in the ECE study program in universities in Indonesia, the clarity of practice questions, and the lack of illustrations and pictures.

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