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# The Development of Learning Package Based on Metacognitive Strategies to Build the Students Character

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**Abstract.** This study used research and development approach. It focus on metacognition strategies to build the students character. It aims to produce a valid learning device. The main products of learning device consisted of : (1) RPS, and (2) lesson book. The model 4D of research and development was applied, it consisted of 4 phases namely defined, design, development, and disseminate. This article explain the profile of learning device based on metacognition for character building of Introduction to Basic Mathematic. Validity of learning device was measured by the experts. The result of learnig device consisted of RPS and lesson book had been valid.

## 1. Introduction

Character education has appeared since the Indonesia independence was proclaimed by Bung Karno. He stated the importance and the necessity of character education as a part which can't be separated with Indonesian development movement because the success and the progress of a nation is determined by the character of the nation itself. Nevertheless, the implementation of character building in Indonesia is still very low. The rise of the phenomena of immoral behavior by students such as sex before marriage, pornographic videos, rape and obscenity, drugs and alcohol, brawl and violence. Even the cases of corruption, collusion and manipulation involve many educated people. This becomes a hard slap for every element of the nation, especially for higher education, which ideally produces an educated and ethical generations. Various policies in overcoming the failure of character building in higher education are ruled in Law Number 12 Year 2012 which states that the curriculum in university must contain the subjects of Religion, Pancasila, Civic Education, and Indonesian Language for bachelor and diploma program. This policy is implemented in all study programs including mathematics education study program resulting a bachelor education graduate [1].

However, the policies are not sufficient to determine the character of students, especially mathematics education students as prospective teachers since the character formation and development need to be set continuously and consistently. Therefore, character education should be integrated in every course. But what happened nowadays is that lecturers focus more on cognitive assessment only. The content of textbooks used in university is simply for the improvement of cognitive intelligence. Therefore, it is important to develop learning tools, including textbooks which not only improve cognitive intelligence but also develop student character.

The approach that can be used in developing student character is metacognitive approach. Learning by the metacognition approach is a learning that instills awareness on how to design, monitor, and



control things someone knows; what it takes to do something; focusing on learning activities; assisting and guiding students who have difficulties; and assisting students in developing their self-concept in learning mathematics [2]. Metacognitive learning is able to make students realize the importance of knowing the mathematical ability, train them to learn independently, and enable students to realize their shortcomings and strengths to gauge their knowledge [3].

According to Collins, metacognitive skills can be obtained slowly through a learning process. Lecturers can help students learn from reading (understand textbooks), lecturers also can encourage students to play an active role in reading, so they can become an independent learner. Integrating metacognitive skills through the application of cognitive strategies in classroom can improve the cognitive skills and develop student character [4].

However, the references we saw the urgencies of character building and how metacognitive strategy can be solution to it, we have not been able to find a learning device that supports it. Therefore, the present research is conducted aimed to develop a learning package "Introduction to Basic Mathematics-based metacognition" to develop student character.

## 2. Literature

### 2.1 Metacognitive Approach

The metacognitive approach can develop students' thinking skills. In addition, the approach can hone the skills required in mathematical reflective thinking skills. In addition, learning with metacognitive approach can improve students' self-reliance and students' critical mathematical thinking skills [5].

A learning process with metacognitive strategies can encourage students to be actively involved in learning. The students' participation is not merely about physical activity, however, it should be also about the awareness of their knowledge as well as the awareness which should be set to learn and solve the problem and to learn [6].

Cognitive strategies in understanding mathematics include: (1) rehearsal strategy, which is underlining and making marginal notes; (2) elaboration strategy, i.e. creating a summary; and (3) organizational strategy, namely forming concept maps.

Based on the previously stated theories, it can be suggested that the metacognitive strategy refers to a way to enhance the awareness about the thinking process and the prevailing learning so that when this consciousness manifests, one can guard his mind by designing, monitoring and gauging what he learned.

### 2.2 Character Education

Character education is a system which inculcates the values of character to the citizens of the school, which includes the components of knowledge, consciousness, and the act of applying the values of the God Almighty, self-values, fellow, environment, and nationality. Furthermore, character education is important to implement at all levels of education, from elementary school to university aiming to form a high quality human being. Besides that, to create the maximum character education implementation, it should be set in a curriculum, applied in education methods, and practiced in a learning [7].

The values of the nation character education which can be integrated in the learning process based on the guidance book of character education implementation by the national education ministry, particularly the board of research and development of the centers of curriculum include: 1) religious; 2) honest; 3) tolerant; 4) discipline; 5) hard work; 6) thinking and doing something to produce a new way or result from the available resource; 7) independent; 8) democratic; 9) curiosity; 10) the spirit of nationality; 11) loving the homeland [8].

Therefore, it can be concluded that character education is an attempt to form the human personality into a good, polite, disciplined, noble character, and become a soul-spirited nationalism person. It is very important in the implementation of all activities.

## 3. Research Methodology

### 3.1. Research Method

This research is a developmental research. The development model used in this study refers to the 4-D models which includes 1) the defining stage, 2) the design stage, 3) the development stage, and 4) the dissemination stage. In its first year, the research has been done until the development stage which is the interpretation of experts. The activities that have been done at each stage are described as follows [9]:

#### *The defining stage.*

The aims of the defining stage is to set learning conditions which includes learning objectives and restrictions on learning subjects. The activities in this stage are: (1) curriculum analysis, (2) Student Analysis, (3) Concept Analysis, (4) Task Analysis, and (5) Specification of learning objectives.

#### *The design stage.*

The purpose of this stage is to produce prototypes of learning devices; RPS and textbooks. Furthermore, the learning device and the research instrument produced at this stage is called as prototype-1.

#### *The developing stage.*

The aims of this stage is to produce the final form of learning device. At this stage, the expert's interpretation is the content validity. Validity is obtained by calculating the average value of all validators, then the value is confirmed with the validity category determination interval of instructional devices, ie: (1) Very Valid:  $3,5 \leq M \leq 4$ ; (2) Valid:  $2,5 \leq M < 3,5$ ; (3) Quite Valid:  $1,5 \leq M < 2,5$ ; (4) Not Valid:  $M < 1,5$ .

The criteria used to declare whether the learning device has a sufficient degree of validity is the average value of validity. For the whole aspect is minimal in the quite valid category, and the validity value for each aspect is minimal in valid category. If it does not satisfy the criteria, then it needs to be revised based on the suggestion from the validator or by reviewing the aspects whose value is less [3].

### *3.2. Research Instrumen*

Besides designing learning tools. in the form of RPS and textbooks, the researcher also arrange the research instrument consist of: (1) the learning device validation sheets, (2) student activity observation sheets, (3) observation sheet of character development value, (4) student response questionnaire, and (4) ) The student's mastery test of the subject.

## **4. Result and Discussion**

In this section, researchers will describe the results of research in the form of learning device products in accordance with the research objectives that have been described previously. The results of the research at each stage are described as follows:

### *4.1 Defining Step Result*

Activities completed at this stage are curriculum analysis, student analysis, subject analysis, task analysis, and objectives specification of learning. This activity is set first as a base for stepping into the next development stages. The results of each activity in the defining stage are described as follows:

#### *Curriculum analysis result.*

The curriculum used in universities refers to the Indonesian National Qualification Framework. The qualification framework is the instrument to determine the qualification level based on the Description of the Learning Achievement. The description is a tool to map one's skills and career, as well as to develop an educational curriculum. Learning Achievement is a statement about what a person knows, understands, and can do, after completing the learning process. Learning Achievement formulation is organized into 4 elements, ie attitudes and values, work ability, knowledge mastery, and authority and responsibility. From this description it can be understood that the development of attitude or character

becomes an unseparable part of the curriculum in the university, which refers to Indonesian National Qualification Framework. The success of character building education is largely determined by the learning tools used by lecturers.

#### *Student Analysis Result.*

Students who become the subject of this research are students of Mathematics Education Study Program in the first semester of 2017/2018 academic year. In the student analysis, researchers hasn't got so much information about the student's character because the subject "Introduction to Basic Mathematics" is taught to new students of 2017/2018 academic year. Based on the data from the Student Welcoming Committee, students come from several districts, both inside and outside West Sulawesi. Although most of the students come from mandar's tribe with mandar's languages, not a few of them are from bugis, buton, and some tribes with different regional languages. However, by considering their latest educational background from secondary school, Indonesian language becomes the language that will be used in learning progress.

As a freshmen year student, they are in a state of adaptation to the world of university. This causes them to tend to be passive. The educational background of the freshmen student candidates for class of 2017/2018 varies from SMA and MAN (IPA and IPS) and SMK. Different educational backgrounds indicate that their background of knowledge, especially on the subject to be discussed in the course "Introduction to Basic Mathematics" in this case the subject of logic and set is different. Therefore, it is important to enable students in learning by directing them to use cognitive strategies in understanding the subject, while still emphasizing character building in the learning process.

#### *Concept Analysis Result.*

Activity completed at this stage is to identify, detail, and systematically organize the main subjects students studied, then the subject is arrange hierarchically. Teaching subject in this research is the subject of logic and set.

#### *Learning Goal Specification Analysis Result.*

The present step is conducted to convert the lesson analysis stated in the form of students behavior to become learning goals. It then becomes a basis of the learning package design. Based on the analysis, the goals of the lecture, namely: (1) Students have conceptual understanding and skills in mathematical logic by showing the attitude of Discipline, religious, respect, responsibility, and the spirit of independence; (2) Students have conceptual understanding and skills in proof by showing attitude Discipline, religious, respect, responsibility, and the spirit of independence; (3) Students have conceptual understanding and skill in set theory by showing attitude Discipline, religious, respect, responsibility, and the spirit of independence.

#### *4.2 Designing Stage Result*

This stage aims to design the prototype of learning device. The results of the designing stage are two sets of learning tools, which is RPS and textbooks. The results of each activity at the design stage are described as follows:

##### *The Format Selection.*

The selection of learning package format aims to select a format for designing learning tools, strategy selection, approaches, learning methods and learning resources. The content of the learning package is set based on the nature and the syntax of the learning based metacognition integrated in character education. The format includes (1) Lecture plan which refers to the rule of the Education and Culture Minister of Indonesia Republic Indonesia No. 49 Year 2014; (2) Logic and Set Textbook.

### *Preliminary Design Result.*

The preliminary design is the learning package draft consisting of lecture plan and textbook. The draft is called a prototype. The prototype is then developed by validation and revision, i.e.: (1) RPS is designed for sixteen meetings. Generally, the components contained in the RPS include Learning achievement, Expected capabilities, Subject of study, Learning methods, Learning experience, Assessment criteria; (2) Textbook. The logic and set topic is provided in the form of textbook which is the combination of lesson information and knowledge construction. Strategy application exercise, margin note, summary making, and mind-map creation are the characters of the book. It was integrated with character values targeted for students exposed in the margin note and in the problems provided. It is aimed to comprehend the values, to persuade students in applying the values, and to make them accustomed with the values since such a culture emerges stemming from simple things; (3) Research instrument. Beside the lecture plan and textbooks, researchers also developed instruments which will be used in the validation and trial stages. The instruments developed include the learning device validation sheets, student activity observation sheets, character values observation sheets, student response questionnaires, and student mastery tests on the subject.

### *4.3 Development Stage Result*

The instrument expert who performs the validation is from a lecturer majoring in mathematics at Makassar State University. Expert judgments on RPS and Textbooks are based on: the format, language, content, illustrations and benefits/uses that contained in the instrument validation learning's sheet instrument. During the validation process of the device that has been designed, there are several revisions until the instrument finally given the final assessment.

The summary of the validator's assessment of the learning tools is presented below:

**Table 1.** The description of expert assessment toward the learning package

<b>Learning Package</b>	<b>Indicator</b>	<b>Score</b>
Lecture Plan	1. Format	3,7
	2. Language	3,7
	3. Content	3,7
	<b>Average</b>	<b>3,7</b>
Textbook	1. Format	3,7
	2. Language	3,7
	3. Content	3,7
	4. Illustrationg	3,7
	<b>Average</b>	<b>3,7</b>

Based on the device's validity criteria, described above, it can be concluded that the device is in a "very valid" category. From the expert interpretation (validation) obtained correction, criticism, and suggestions which further becomes a consideration for revising the device. The revised results for each learning device are described as follows:

- The Revision of the Lecture Plan
  - (1) The students' achievements for each aspect of affective, general skills, particular skills, and knowledge have been included
  - (2) The cognitive and the character targeted for students have been specified in each meeting
  - (3) The learning method has been described for each meeting
  - (4) The learning experience targeted for students both in cognitive aspect and affective aspect has been described
- The Revision of the Textbook
  - (1) The section of the textbook is completed with the space of margin note
  - (2) The book is completed with students activity for knowledge construction
  - (3) Every topic is integrated to the character values



## 5. Conclusions

Based on the results obtained, it can be concluded that: 1) Character building becomes an unseparable part of the implementation of education in universities. Character building needs to be integrated in every course include Introduction to Basic Mathematics course, so it will be able to build student's character. In order to make the character buildings done optimally then the character values need to be integrated into the learning devices that the lecturer used, so it can become a habit for students. The most important things is the lecturer can become a role model in learning. Approach that can be used in character building is the metacognition approach. Character of discipline, responsibility, honesty, and student independence can be familiarized through the use of cognitive strategies, ie, making marginal notes, underlining, making summary and concept maps; 2) Learning tools developed consist of RPS and textbook. The interpretation of the expert's result show that the learning tool "Introduction to Basic Mathematics based on metacognition to develop student character" is in the "very valid" category of validity criteria.

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