ATLANTIS PRESS

*Advances in Social Science, Education and Humanities Research, volume 381*

4th International Conference on Education and Management (CoEMA 2019)

# Development Electronic Teaching Material with Metacognitive Skill Oriented: Main Material for Blended Learning

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**Abstract**: The learning process in the digital era prerequisites of the need for and importance of the role of electronic teaching materials in blended learning. This study attempts to answer these needs with the aim of developing electronic teaching materials oriented by metacognitive skills. The development of electronic teaching materials is carried out with seven stages of development research ranging from needs analysis to trials and product revisions. The research data were collected using questionnaire techniques and field notes which were analyzed with descriptively qualitatively and quantitatively descriptively to determine the qualifications of the feasibility of the product from the experts and users. The product trial results show that electronic teaching materials are realized in electronic modules, mobile applications, and interactive flash achieve decent qualifications in terms of content, operational standards, and applicability. Students as users feel that learning with electronic teaching materials oriented by metacognitive are more directed and comfortable in online or offline learning. This result shows that electronic teaching materials can optimize the implementation of blended learning.

**Keywords**: electronic teaching materials, blended learning, metacognitive skill

## I. INTRODUCTION

In this 4.0 era, digitization of various fields of life became an inevitable phenomenon, especially in the education system. This phenomenon leads to the transformation of learning which was initially oriented towards learning in the classroom, then oriented towards e-learning, until now oriented to m-learning [1]. This shows how dynamic technology has a big influence on the education that bridges the protection of the digital age with human resources in the future [2].

This learning transformation can be observed from the implementation of learning that is packaged in the form of a learning management system (LMS) such as Google classes, Edmodo, and others that facilitate synchronous and asynchronous online learning. This LMS becomes a potential container to overcome the limitations of space and time in the learning process, especially at the level of higher education which demands the independence of students and limitations in accepting lecturers in the classroom [3], [4]. Students can study anytime and anywhere in a directed manner in the supervision of lecturers.

This phenomenon raises new needs from devices and materials used for the learning process. The availability of this LMS raises the need for teaching materials that can be accessed electronically both via PC or mobile devices. This electronic teaching material becomes the main material for the implementation of blended learning in the form of e-books, e-modules, videos, and other electronic material. Electronic teaching materials make prerequisites for the using of technology on the learning process that tend to be interested in the current generation that presents a positive effect on student learning outcomes and motivation [5]. The need for electronic teaching materials in the learning process has not been fully met. Even though learning has been carried out in LMS, the course teaching materials are still based on the type of print.

The preliminary study was carried out at the primary education study program, Universitas Negeri Malang, Indonesia related to the need for electronic teaching materials by observation and interviews. In the basic concept of Indonesian language courses, it is known that there is no electronic teaching material used in the learning process. The types of electronic teaching materials used are limited to powerpoints and printed books.

Related to this preliminary study a needs analysis was conducted through a questionnaire for the development of teaching materials. The results show 72.2% of respondents use electronic teaching materials more often than printed teaching materials for learning. Some types of electronic teaching materials used are videos, e-book, web, android applications, and others. The devices that are often used to access electronic teaching materials for PCs and cellular (72.2%). Respondent stated that more comfortable to learning with electronic teaching materials because it is more effective and efficient for learning anywhere and anytime. This materials provides new and more interesting information because it is available in a variety of formats and hone support for using technology.

Based on this, this study aims to develop more varied electronic teaching materials. Product development is carried out in the basic Indonesian language course as a compulsory subject in Indonesian tertiary studies according to the results of preliminary studies. By the concept of blended learning where students can learn wherever and whenever products are innovated with metacognitive skills that can be caused to emerge e students' learning awareness. This awareness has

previously resulted in thinking about metacognitive work on creativity in the form of associative thinking strategies [6]. Besides, metacognitive can also arrange students' self-regulation skills for a complete learning process [7].

## II. METHODS

This study uses a development research model design from Dick & Carey [8] which has comprehensive steps that can be completed in stages for the development of teaching materials. The procedure for developing teaching materials implemented by: (a) the intended purpose, (b) analyzing the material, (c) formulating performance goals, (d) developing product specifications, (f) developing products, (g) discussing and developing formative and summative through validation and testing, and (h) revision of the products development results. The subjects of this study are a student of the primary education study program, Universitas Negeri Malang, Indonesia as product users, as well as expert validators in education and linguistic materials. Research subjects were involved in the study of the feasibility, practicality, and effectiveness of the developing product.

Research data uses the types of qualitative and quantitative data collected through questionnaires and field notes. The research data were analyzed with quantitative and qualitative descriptive analysis techniques using a mixed-method. Quantitative descriptive analysis is used to process the questionnaire data from the results of expert validation and user trials in the form of percentages for easy data description. Qualitative descriptive analysis is used to process field notes data from the results of product trials as well as criticisms and suggestions from the results of expert validation.

## III. RESULTS

### *A. Product Description*

In this study produced the electronic teaching materials for Indonesian Basic Concepts courses. In this electronic teaching material, the material is prepared by integrating metacognitive skills for the formation of learning awareness, self-efficacy, critical thinking, and creative students. The contents of the product are divided into three main presentation material translated by some sub-material here. Product specifications are developed based on the results of the need analysis. This product selection is tailored to the needs analysis of users who are supported and use PC and mobile devices for the learning process. The following is a description of the contents of the products developed in this research development (Table 1).

**Table 1**
**Product Details**

| Specification | Details | | |
|---|---|---|---|
| Product | Electronic Module | Mobile Application | Interactive Flash |
| Content | Handout 1: The nature, function and the process of language acquisition | Handout 2: Language component, language skills, text and structure | Handout 3: Literacy concepts, application of school literacy movements, and reading comprehension |
| Metacognitive Skill | **Awareness of learning**<br>• Students actively identify information independently<br>• Students actively collect various references<br><br>**Critical and creative thinking**<br>• Students actively doing problem-solving<br>• Students actively elaborate on knowledge from various sources<br><br>**Self Efficacy**<br>• Students actively regulate the process and learning outcomes<br>• Students actively carry out independent **assessments** | | |
| Product Presentation | ✓ Presented guide for independent learning<br>✓ Presented exercises for the deepening of the material and exploration of references<br>✓ Presented analysis for problem-solving skills<br>✓ Presented sheets for self-assessment of initial knowledge and final knowledge after learning through teaching materials | | |

### *B. Product Trial Results*

Electronic teaching material products were tested on experts and users. The first trial was carried out with product validation to the material expert to determine the feasibility of the content and to the technology, expert to determine the feasibility of the product presentation in electronic form. From the results of this validation obtained a percentage of the level of product viability and product improvement suggestions as material for product revision. After revision, the product is tested on users to find out the product's feasibility in terms of its use (Table 2).

**Table 2**
**Material Validation Results**

| Criteria | N | F | P | Qualification |
|---|---|---|---|---|
| Accuracy of Product Achievement | 24 | 20 | 83% | Feasible |
| Accuracy of Material Description | 24 | 19 | 79% | Plenty |
| Accuracy of Reference | 20 | 16 | 80% | Plenty |
| Product Readability | 24 | 19 | 87,5% | Feasible |
| **Mean** | | | **82%** | **Feasible** |

From the results of this expert validation, suggestions for product improvement are obtained by adding references that are used in the preparation of basic concepts in Indonesian courses. The revision was made by adding references to the presentation of material that was specified according to the user's needs in mastering the basic concepts of Indonesian for elementary school teacher education (Table 3).

**Table 3 Operational Validation Results**

| Criteria | N | F | P | Qualification |
|---|---|---|---|---|
| Product Display | 20 | 17 | 85% | Feasible |
| Product Navigation | 20 | 16 | 80% | Feasible |
| Product Practicality | 16 | 13 | 81% | Feasible |
| Product Applicability | 20 | 19 | 95% | Highly |
| **Mean** | | | **85,2%** | **Feasible** |

From the results of this expert validation, suggestions for product improvement are obtained by the presentation of mobile applications that previously can be downloaded by users in the form of zipping. files that more practical if directly formatted in the form of an apk. file to facilitate downloading. The presentation of QR-Code tends to be used in printed teaching materials so it is necessary to consider the ease of users in accessing files when using a

PC or mobile device. The revision was made by revising the operational standard of the product which is also presented in the manual book so that it is more practical and efficient to use.

After revision according to expert advice, the product user test was conducted on 39 students participating in the Indonesian Basic Concepts courses of 2019. The user downloaded the electronic teaching material that had been previously uploaded into the LMS. Electronic teaching materials are used during two online meetings and one offline meeting to confirm learning outcomes.

From the results of this implementation trial, it is known that students can learn well as indicated by the accuracy of the assignment according to the deadlines and instructions are given. From the results of self-assessment, it is known that 5% of students stated that they can study very well, 35% of students can study well, 46% of students can study well enough, and 5% of students learn poorly through this electronic teaching material.

Students who stated to be able to study well state that learning with electronic teaching materials is more tumble, especially if the lecturer is unable to attend class. Besides, an attractive, concise, compact, and clear product display is easier to read and understand.

The availability of supporting teaching materials such as apk. mobile and interactive flash. also adds enthusiasm for learning because it is not centered on one type of electronic teaching material. Meanwhile, students who stated they could not study well stated this teaching material contained too many assignments and were not interested in using electronic teaching materials. From the results of this application, a user assessment of electronic teaching materials was carried out with the following results (Table 4).

**Table 4**
**User Test Results**

| Criteria | N | F | P | Qualification |
|---|---|---|---|---|
| Appropriately | 624 | 534 | 85,6% | Feasible |
| Practicality | 624 | 496 | 79,5% | Plenty |
| Readability | 624 | 519 | 83% | Feasible |
| Legibility | 624 | 511 | 82% | Feasible |
| | | **Mean** | **82,5%** | **Feasible** |

From the product trial results, it is known that the product can be accessed properly with several product operational constraints. Product operational constraints that arise are the need for supporting programs so that these electronic teaching materials can be accessed and used properly such as flash readers, scanners, and others. Besides, there are also operational product constraints on the limitations of student skills in using electronic devices, especially when problems arise and the addition of supporting devices to access electronic teaching materials.

From the results of this expert validation, suggestions for product improvement are obtained by adding references that are used in the preparation of basic concepts in Indonesian courses. The revision was made by adding references to the presentation of material that was specified according to the user's needs in mastering the basic concepts of Indonesian for elementary school teacher education.

## IV. DISCUSSIONS

The products that successfully developed in this study are electronic teaching materials in the form of electronic modules, application mobile, and interactive flash. The development of these three teaching materials is aimed at making teaching materials accessible through PC and mobile devices to facilitate user mobility [9], [10]. Content features are made varied which can have an impact on an innovative learning climate to increase student learning satisfaction in blended learning [11], [12]. This is considered to be appropriate for the processing of competencies in the 21st century, specifically the specific role of technology in the learning process [13].

Products are validated and tested in terms of content and operational standards to achieve product eligibility qualifications as teaching material. Contents and operational standards become criteria in the preparation of digital teaching materials as critical success factors, including design, interactivity, efficiency, and effectiveness for developers and users [14], [5]. This criterion will have an impact on the motivation and interest of students as consumers who use teaching materials [15]. These criteria are formulated by product specifications, in the development of electronic teaching materials. The criteria are divided according to the subject of research, namely to validate material experts, validate technology experts, and test for users.

Following the concept of blended learning, products are designed for independent learning, especially those presented in the form of electronic modules and manual books. In electronic teaching materials presented study guides ranging from the reflection of initial knowledge to learning bills. Students feel more clear when learning and skilled in the use of technology in the learning process [16], [17]. This should be considered in the implementation of blended learning, where electronic teaching materials become the digital media of professional learning that determines the achievement of controlled instructional goals [18], [19].

In line with blended learning that prerequisites independent learning, metacognitive skills encourage the formation of student learning awareness. At the time of learning, students can be actively involved to monitor and regulate cognitive performance by the steps and learning bills [20]. The teaching material also presented self-assessment and case analysis as a strategy to facilitate critical thinking and reflective practice [21], [22]. The majority of students said that they could study well, but several students also expressed difficulty learning through electronic teaching materials independently. This is the challenge of learning in the future, especially in blended terms for high achieving students [23].

## V. CONCLUSION

Electronic teaching material products that are oriented on metacognitive skills in this research development achieve a proper qualification based on the results of expert validation and product user tests. Electronic teaching materials developed can be implemented well after going through a series of product revisions in terms of content and operations. In terms of content, this electronic teaching material can be applied well in learning for the formation of metacognitive skills. Students can

study independently directed by self-reflection and self-assessment activities for the formation of learning awareness, deepening material for self-efficacy, case analysis for the formation of creative and critical thinking. From an operational perspective, the average user can access and use electronic teaching materials properly. Some operational obstacles arise because of the limitations of students' mastery technology skills in the use of PC and mobile devices for the learning process. Based on the results of this study it is recommended that more electronic teaching materials be developed in other courses for overcoming the limited classroom learning time through blended learning. The development of electronic teaching materials must also be balanced with the improvement of students' mastery technology skills for the needs and success of learning in the digital era now and in the future.

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