

## Algebraic experience material with lectors inspire

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**Abstract.** The purpose of this research is to know the development of multimedia learning Algebra with Lectora Inspire. This research is a Research and Development research with ADDIE development model which has five stages: analysis, design, development, implementation, and evaluation (ADDIE). The subject of this research is the students of Bandung State Junior High School class VIII. The research instrument uses a motivation questionnaire, a material, and media expert validation sheet, a test of learning outcomes. Based on the results of research and development through the ADDIE stage obtained the conclusion that multimedia Lectora in learning algebra on the study of the application of algebraic experience material (AEM) is feasible for use in learning mathematics; the validation results state that multimedia learning is ready to be implemented to the students, based on the observations obtained the result that the positive response in the aspect of learning motivation is in good category and the average of mathematics learning outcomes in both classes in the category enough. Multimedia Lectora inspire in applying AEM worthy of use in learning mathematics as the effort to overcome student's difficulty in understanding algebra concept.

### 1. Introduction

The transformation of learning media to digital-based in this era of industrial revolution 4.0 encourages all elements of education to respond to faster digital developments. In the world of education affect the way of view and how the process of teaching activities tailored to the development of technology so that there is no gap between teacher expectations with students, so teachers of this century should be sensitive and the response to technology. The ability of students to understand learning materials is influenced by various components, including environmental factors [1] use of learning media [2][3] availability of learning resources, teaching methods that facilitate students to think [4] and include techniques and procedures evaluation assessment. One innovation in education is to combine elements of multimedia as a learning tool. Multimedia can bring a number of advantages to education can help learners come to a deeper understanding through, facilitate learning without limited space and time wherever and whenever can be used [5][6]. Interactive multimedia influencing the effectiveness of learning process the use of multimedia elements is to make learning more interactive and interesting [7][8][9]. Design principles for media selection and presentation at the interests of redundancy effects using multiple representations [7]. Research studies have shown that



students encounter difficulties in transitioning from arithmetic to algebra [10]. This problem needs to get a quick response so that student difficulties are resolved soon.

Algebra examines the symbols, symbol structures, and variable blessings, often the students are poorly understood by the multiplication of algebra and factoring, Difficulties experienced by students especially in understanding the concept of algebra [11]. Algebra is hard to teach and uses algebraic methods over arithmetic methods have many aspects [10] the level of achievement of student's mathematical communication using conventional learning is still low [12]. Multimedia application has a significant impact on increasing children's understanding [9]. Utilization of technology is needed to facilitate the development of students' thinking through the utilization of Lectora inspire in mathematics learning.

The purpose of this research is to develop algebraic ability on the subject of multiplication of Algebra tribes using Algebra Experience Material (AEM) concept by using Lectora Inspire. AEM is a mathematical tool used to determine algebraic factors or tribes or vice versa and helps students to understand algebraic concepts [13]. The focus of this research applies the AEM concept using Lectora inspire so that students do not practice the concept of algebra using Dienes AEM blocks. There is a significant influence on the students' concepts of ability by using Dienes AEM learning as an alternative to instil the concept of algebra compared to the students taught by conventional learning [11].

## **2. Method**

This study applies the development model of ADDIE, before doing the research with ADDIE step there are two stages done that is collecting data about the material being studied and the level of learning media needs, while the literature study to collect algebra material and sample problem. In the ADDIE stage begins with the Analysis consists of objectives and materials analysis. Design in the form of material preparation, the arrangement of the flowchart, media storyboarding, and collection of materials needed in media development) Development of media creation by using Lectora inspire software) Implementation of assessment by media experts, material experts, and field practitioners as well as the implementation of trials limited and Evaluation. assessment of media developed, carried out during the previous four stages).

The subjects of this study were students of class VIII SMPN 46 Bandung in the even semester of the 2016/2017 school year selected class A as an expression class by applying AEM with Lectora inspire while class B as control class with AEM learning with square paper. Instruments used consisted of test instrument and non-test in the form of product validity sheet and a sheet of attitude scale and observation format.

## **3. Results and discussion**

### *3.1. Analysis phase*

At this stage, the researcher conducted a study on goal analysis, the suitability of the material being studied and other things needed in the study including the analysis of the conformity of the research time with the material being studied.

### *3.2. Design phase*

At this stage, the researcher performs Lectora and AEM display designs of dienes beams drawn like rectangles so that the designs are made in accordance with the algebraic material and attractive background images.

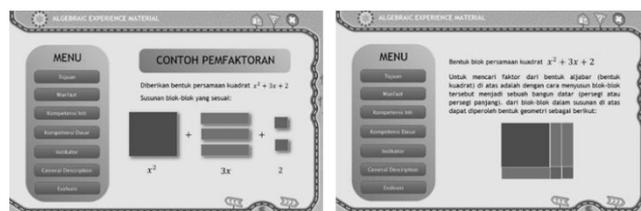


**Figure 1.** AEM starting view with lectora inspire.

In Figure 1 it appears that the initial display shows interesting menus and animations accompanied by a general description of the material so that users can use this application clearly without any explanation from the teacher.

### 3.3. Development phase

At this stage, the researchers began to develop the application of Lectora inspire on algebra material of the subject of multiplication of algebra tribes and factoring using the concept of AEM. It starts with making menus and substances from the menu. Figure 2 AEM material with Lectora Inspire.



**Figure 2.** Menu of AEM material with lectora inspire.

In Figure 2 we present the AEM sample with Lectora inspire along with an explanation of how the AEM concept is used to solve algebraic and algebraic multiplication. Furthermore, researchers submitted a validation form to media experts and material experts to be tested about the feasibility of this application. The results of the validation of material experts and media experts are presented in table 1.

**Table 1.** The results of the validation of material experts and media experts.

No	Expert	Number of items	Ideal Score	Score
1	Material experts	10	50	40
2	Media Experts 1	10	50	30
3	Media Experts 2	10	50	35
<b>Sum</b>		<b>30</b>	<b>150</b>	<b>105</b>
$P = \frac{\sum \text{Score}}{\text{Ideal Score}} \times 100\% = 70\%$				

Table 1 shows a 70% percentage of product validity that is sufficiently categorized, so AEM applications with Lectora are feasible to be used. The validation results in the form of suggestions and comments about design, appearance, and feasibility are presented in table 2 below.

**Table 2.** Comments and suggestions by expert media and material experts.

Validator	Comments or Suggestions
Media Experts	Comment and Feedback Validator Comment or Suggestion Validator Media Experts Should not show too many animations Add a practice menu of questions
Material experts	Add material menu per chapter The start menu button and back to connect properly

Table 2 explains that the media expert gives his or her suggestions and comments regarding the application being created, this is so that the display is more communicative and easy to use. The material expert focuses on the substance of this application in order to keep the focus that the application is expected to better understand algebra material rather than otherwise.

### 3.4. Implementation phase

Implementation stage is done to students as Lectora Inspire user. This trial was conducted to 28 students of class VIII A and 26 students of class VIII B SMP Negeri 46 Bandung 3 times meeting. At this stage, students are very enthusiastic and they are happy to learn the multiplication of algebra tribes and factoring. Before first implemented it was tested limited to 5 semesters four semester mathematics students who were studying multimedia learning with limited test validation result presented in table 3

**Table 3.** Limited test validity results.

No.	Statement	Score
1	Material presented in full	10
2	Image / animation is clear / not blurred	10
3	The blend of colors is presented appropriately	12
4	This multimedia helps understand algebra material	10
5	Captions help clarify images / messages	14
6	Instructions for communicative media use	15
7	The material is very concise and easy to read	14
8	Exercise questions in accordance with the contents of the material on multimedia	14
Total Score		99
Percentage		82,5 %

Table 3 shows that the percentage of AEM validity using Lectora Inspire is 82.5% which is categorized well. This indicates that the media is eligible for use.

### 3.5. Evaluation phase

To evaluate the learning model in VIII A and Grade VIII B which showed an increase in algebra understanding ability and positive response, in class VIII A, the grade averages of 62.25 were achieved with sufficient category. While in class VIII B, obtained an average value of 60.55 which means enough categorized. Data on student learning outcomes are presented in table 4 and the student attitude scoring distribution data on mathematics learning using Lectora Inspire can be seen in Table 5

**Table 4.** Test result data tests.

Category	Total/ Percentage	
	Class A	Class B
Complete	18/ 64,28%	14/ 53,84 %
Uncomplete	10/35,72 %	12/46,16 %
Total	28	26

Table 4 shows the differences of learning completeness of algebra in both learning models of mastery class A of 64.28% better than class B of 53.84% of this difference because in learning with Lectora inspire students are more interested because of the animation and can be studied anytime and anywhere because of unlimited space and time, in addition, there are other factors that influence one example of the problem on Lectora inspire that can be learned.

**Table 5.** Student attitude score distribution of AEM application with lectora inspire.

No	Indicator	Average score of attitudes per Indicator
1.	Show algebra learning pleasure through Lectora Inspire	3,32
2.	Showing algebraic learning interest using Lectora Inspire application	3,31
3.	Shows the understanding of Algebra material by using Lectora Inspire	3,26
4.	Showing the ease of learning algebra by using Lectora Inspire	3,24
Average		3,28

Table 5 describes students' attitude scores for AEMs with Lectora inspire with the average of each indicator in both categories indicating that students respond positively to learning with Lectora.

#### 4. Conclusion

AEM model with Lectora inspire gives its own charm this is because the technology is able to provide an interesting animation and can be studied indefinitely space and time in addition to the exercise questions that are easy to learn. The AEM model with Lectora inspire and with square paper helps students to learn the concept of algebra with good differences on square paper students must first understand the AEM concept described by the teacher. Media and material validation results show that AEM applications with Lectora meet the quality of the validity, effectiveness, and practical aspects and are able to motivate learning in both categories

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