

Validation of Lectora based interactive module to improve the ability of junior high school students spatial in learning Geometry

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ABSTRACT

Rapid technological developments provide opportunities for educators to develop learning media through interactive modules integrated into lectora software. The development of an interactive module based on lectora can motivate students to learn independently, to be creative, and to enjoy what they are doing. Research into the development of an interactive module based on lectora geometry flat side material aimed to develop an interactive module based on lectora geometry flat side material, with the research design consisting of analysis, design, development, implementation, and evaluation of the module. The result obtained from the use of an interactive module based on lectora geometry flat side material that had been designed and validated and later revised showed an average value of the feasibility of content to be 3.75, the average value of the aspects of presentation was 2.94, the average value aspects of language was 3.06, and the average value of the aspects of graph was 2.86. This research enabled us to conclude that an interactive module based on lectora geometry flat side material could be categorized as valid.

Keywords: *Interactive, Module, Lectora, Geometry, Flat, Side.*

INTRODUCTION

Mathematics is the science consists of several sub fields of study such as geometry and measurement. Geometry flat-side space is part of the geometry and measurement. According to Grace (2007: 3) "Geometry is the study of the set of points in space". Based on the definition, It can be said "geometry is science to constitute the subjects learn everything has the form Sobel and friends (2002:153) stated "the geometry is a subject which is rich in material that can be used to motivate and attract the attention and imagination of the disciples ". Subject of geometry in the form of an abstract should ideally be able to motivate and attract the attention of students in learning. But this abstract Nature can lead to difficultness of students to understand the material. One of the reasons is a weak understanding of spatial. Students associated with the image of three dimensional objects are presented in a two-dimensional medium. It makes the students feel less interested and bored. According to Rabab'h and Veloo (2000: 7) "A mediating effect of spatial visualization was also found between motivation and mathematics achievement. It was possible that having high spatial visualization ability encourages students and motivates them to enhance academic achievement ". Therefore, it is required a medium of learning that are able to increase the appeal for students so they can increase motivation and understanding on spatial material.

The use of instruction media can help student's learning process can turn to improve the results of the study. One of the learning media is an interactive module. Learning to use the interactive module is expected to motivate students to learn independently, creative, effective and efficient. The learning process is done by teachers during face to face methods (lectures) that cause students to become saturated and tired. It can make the motivation of students decreased. The use of the interactive module is expected to reduce the saturation of students in learning. As expressed by Yılmaz (2014:614) "If technology is to be integrated with the classes, it is particularly significant to firstly

determine of the teachers who have relation in technology and to ensure they are given learning experiences, which enable them to change these believes in a positive way".

Interactive modules can be made through Web applications Blog, Macromedia flash, Lectora, and Inspire others who belong into edutainment i.e. blend of education (education) and entertainment (Entertainment). A software focused on the world of education is Lectora Inspire. This software is designed to Trivantis artificial creation of learning content (Learning Content Creator). Lectora Inspire Program has a complete feature because it is equipped with video, audio, animation and images, students can learn more fun. Advantages of using Lectora teaching system is learning can be more interesting, capable of linking between texts, audio, music, animated images or video. It can increase student's motivation and being able to visualize the difficult material.

Santayasa (2009:12) stated that development of a module should follow these steps: 1) The objectives analysis and characterizing the content field of study, 2) Learning resources analysis, 3) Characterizing students, 4) Learning goals, 5) Organizing learning content, 6) Seting out the content of learning, and 7) Seting out the learning management strategies. Preparation of a module includes (1) General description of the modules, (2) General objectives of learning, and (3) Specific learning goals; The section contains learning activities (a) the description of the learning contents, (b) Summary of tests, (c) answer keys,(d) feedback; and will becoming with a Bibliography (Santayasa, 2010-10:16). This research aims to produce an interactive module based on Lectora for material geometry flat-Space.

METHODOLOGY

Research procedure of using ADDIE model (Analyze, Design, Develop, Implement and Evaluation). Step-by-step design model ADDIE i.e. analysis, design, development, implementation, evaluation (Maribe, 2009:11). Analysis stage is performed in order to see the image of the conditions in the field related to the teaching and learning process. The process analyzed the syllabus, text books, and interviews with teachers and students. Data analysis results were evaluated to do further development. The stage design was done in order to design the interactive module based Lectora. Evaluation of the interactive module - based Lectora to approve the draft modules. At this stage, develop actions taken was the creation and validation of interactive modules based upon the design of Lectora was created. The evaluation was conducted in order to get the module-based interactive valid lectora. Aspects that validated is the aspect of material, presentation, and linguistic. Instruments used to be measure the degree of validity is sheet validation using the Likert scale.

RESULTS AND DISCUSSION

Results showed that students tended to recite the formula used on geometry flat-sided material, such as the formula to calculate the length of the diagonal spaces, surface area and space volume. The use of a textbook is still lacking. Students only receive information from teachers. According to Sobel and friends (2002:153) geometry is a great subject that can be used to motivate, attract the attention and imagination of students. The methods used in teaching. Teachers still limited to face-to-face activities by way of explaining the matter, provide examples, and exercises so that students are less motivated and not trained in imagined geometrical space. Teachers also had never written materials that can assist students in visualizing the elements of geometrical spaces and its properties.

Development of interactive modules designed to facilitate limitations in the learning process. The use of Lectora as media in the presentation of the material can give you the look of spatial animation interesting and can motivate students in learning. So that spatial ability students has also increased. According to the teachers and students, the interactive module based Lectora is very interesting. It can be used by students for independent study. Syllabus analysis conducted to see the suitability between the competencies of learning material achieved by students. The basic competency geometry flat-side

spaces material is to understand the elements and forms of nets-nets of the cube, beams, Prism, and pyramid as well as determine the surface area and the volume of the cube, beams, Prism, and pyramid.

The results analysis of the syllabus and the material presented in the syllabus is in compliance with the competence to be achieved by the students. The order of the material is also suitable as material begins with an introduction to the elements, net, then proceeded by calculating the surface area and volume. Analysis of several text books geometry flat-side spaces available aims to look at the suitability of the content of the book, the way of presentation, examples, and exercises with the syllabus of courses. The reference book used is some textbook 8th grade math. The material exists on the books already includes the competencies to be achieved by the students. The presentation of geometrical material accordance with the syllabus. However, there is a difference in the sequence of presentation on some of the book. In this case, the books show logic presentation of the material. The order of presentation of the material in the module also adapted the syllabus and textbooks.

Manufacture of prototype interactive modules based on Lectora starts with designing a flowchart and storyboard interactive modules. Based on the flowchart designed, developed the interactive storyboards module-based Lectora. The order of presentation of the material, starting from the material thoroughly discussing the cube, the elements, net, the surface area and volume. Any form of geometrical thoroughly discussed new space continued with the shape of other spaces namely beams waking, Prism, and pyramid. Initial display module presents home, usage instructions, and a menu that lists a selection of material that would like to be studied by students. The beginning of each subsection starts with the presentation of the subject matter competency and learning product indicators. After the presentation of the contents there are exercises. At the end of a module, there are evaluation for students that contains a collection of problems such as the exercise subjects all of Deuteronomy.

Prototype interactive modules based lectora organized in the storyboard that has been designed. An early appearance in the form of an interactive module title slide. From the slide beginning students are led to begin studying the module by clicking on the "start" button on the slide. Initial display can be seen in Figure 1 (below).



Figure 1. Openers Slide Interactive Module

The button "starts" connecting students with the next slide that contains the main menu as shown in Figure 2.

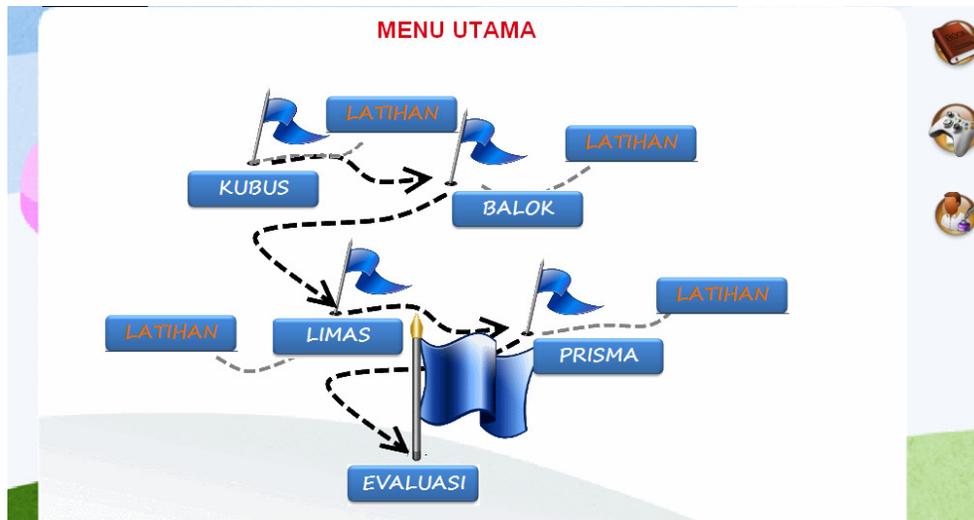


Figure 2. The main menu

Display main menu created is not mutually bound between sub subject. Students can just open the menu of Prism or exercise without having to follow the road map that was created. However this map aims to inform and direct the students sequence the material to be studied. Starting from the cube button, students can improve understanding of concepts with practice working on problems on the exercise. Lastly, students were given an evaluation form of exercise all subjects.

Early design prototypes underwent several times the improvement of content and display. One of the improvements made on some of the slides have not been connected with a hyperlink so that the slide keep changing even though you click next or previous buttons instead. After the prototype module revised based on the evaluation carried out by the research team, followed a review by experts. Expert conducted to evaluate the revised module in accordance with the results of the self-evaluation. This expert review aims to look at the validity of the module so that the interactive module based on Lectora acquired a valid Lectora. Expert review of data collected through sheets of validation and suggestions submitted oral or writing. There are two types of data at this stage of the review of these experts, namely data advice from experts to repair the module and data validity of the modules based on the assessment of the experts. Analysis of prototype revision done and until obtained a valid module according to experts. Some suggestions and revisions undertaken is presented as follows.

Each slide contains competencies or learning product and always accompanied by indicators. According to experts, the displayed indicators must be tailored to the subject matter of the sub. For example on the matter of pyramid, one charge indicators will is "identify elements of limas". Because the indicators are just a repeat of the competency it is advisable to replace it with learning experiences so that students get to know the experience of what they can get from studying the limas. Revision undertaken was presented in Figure 3.

LIMAS

KOMPETENSI

Setelah mempelajari materi ini kalian dapat :

- Siswa dapat mengidentifikasi unsur-unsur limas
- Siswa dapat membuat jaring-jaring limas
- Siswa dapat menghitung luas permukaan limas
- Siswa dapat menghitung volum limas

Indikator

- a. Mengklasifikasikan suatu bangun ruang sisi datar.
- b. Mengidentifikasi unsur-unsur bangun ruang sisi datar.
- c. Membuat jaring-jaring bangun ruang sisi datar.
- d. Mengidentifikasi suatu jaring-jaring sebagai jaring-jaring bangun ruang sisi datar.
- e. Menghitung luas permukaan bangun ruang sisi datar
- f. Menghitung volume bangun ruang sisi datar.

Figure 3. The revised presentation of indicators

Input and suggestions are also much given in the presentation of the material, examples, and exercises. One of the suggestions related to the content can be seen in Figure 4.

KUBUS

UNSUR-UNSUR

5. DIAGONAL RUANG

Diagonal ruang sebuah kubus adalah ruas garis yang menghubungkan dua titik sudut berhadapan dalam kubus.
 Diagonal ruang kubus berpotongan di tengah-tengah kubus.
 Perhatikan gambar berikut, terdapat 4 buah diagonal ruang pada sebuah kubus dengan panjang sama.
 Panjang diagonal ruang $AG = BH = CE = DF$

Figure 4. The Presentation of the material of the diagonal spaces

Definition of diagonal space provided is incomplete. Should the definition of the space diagonal is a line segment that connects two vertices that are dealing lies not in one field in the cube. Experts also suggested to give the phrase "look at the pictures ..." on each image displayed to direct students in seeing the interconnectedness of the contents of the image. The next advice is given on material net of beams such as in Figure 5.

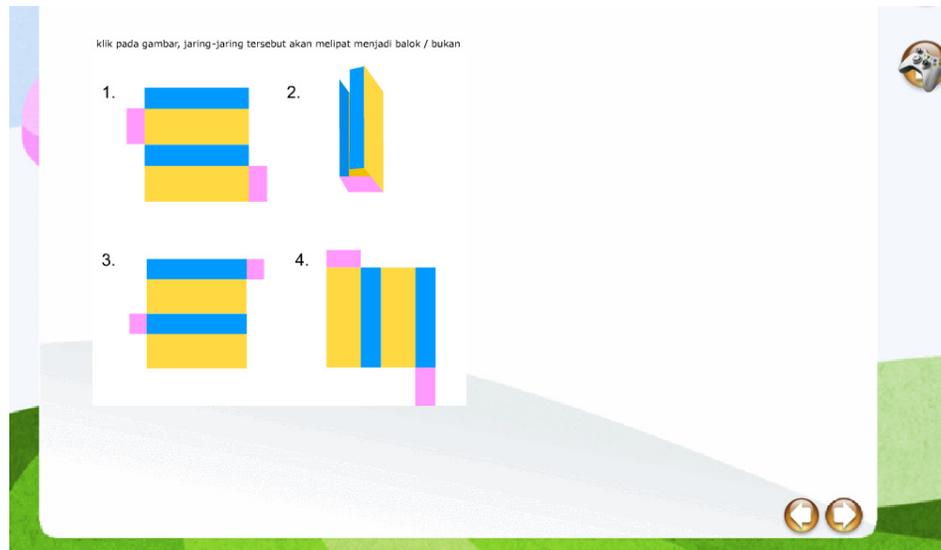


Figure 5. Presentation material of nets beams prior to revision

The material on the net, the students can see the animation of the nets-nets which turns into the form of geometrical the requested space, e.g. beams. When the picture changed form, there is no description or information that appears on the changes that have occurred. According to experts, should be given information on the bottom of the image when the animation is executed. In Figure 6 can be seen more clearly the advice given.

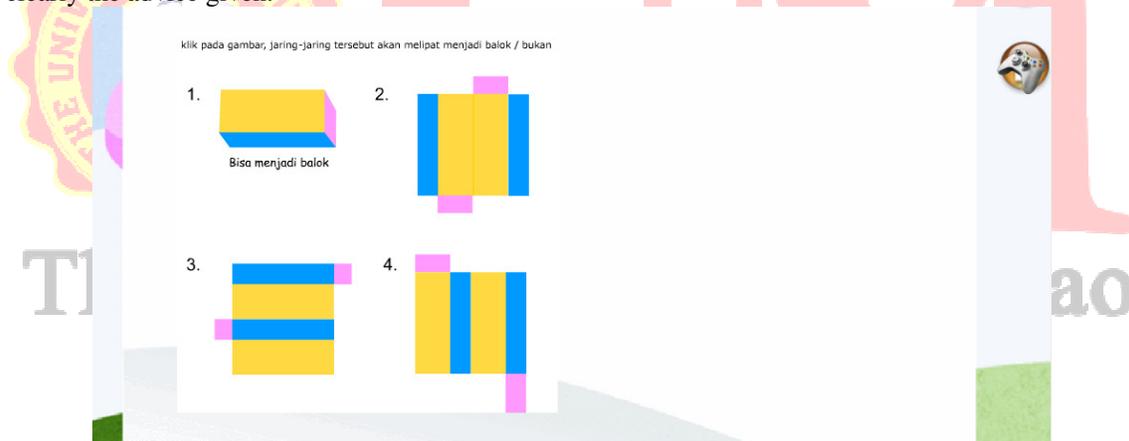


Figure 6. The revised presentation of material nets of beams

Advice was given in making sentence reserved. According to Experts of the geometry, the editor reserved the essay with a question of objective (multiple choice) is not the same. In General, the phrase used is a matter of sentence questions for essay-shaped as in Figure 7.

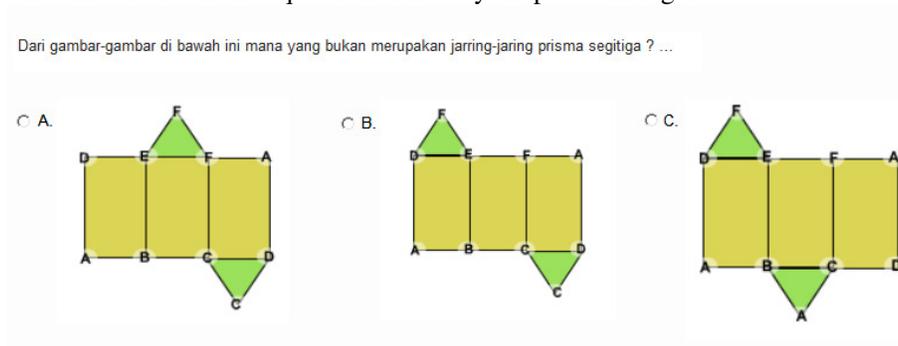


Figure 7. Reserved material exercises on prism

Based on Figure 10, sentences reserved modified and adapted to the shape of the matter objectively. Revision problem will be replacing the phrase the question becomes "From the pictures below, which is not a net-net triangle prism is. ..". In addition to the advice provided, the validator is also assessing the revised product based on these suggestions. Data assessment results (validity) module sheet is obtained through validation. The given assessment includes four aspects, namely the presentation of the material, the appropriateness of content, linguistic, and aspects of the graph. The validity of each of these aspects can be seen in Table 1.

Table 1. Validity of interactive modules

Aspects that are Assessed	Validator			
	I	Criteria	II	Criteria
Eligibility of contents	3,63	valid	3,88	valid
Presentation of the material	3,56	valid	3,89	valid
Linguistic	4,00	valid	3,80	valid
Graphic	3,89	valid	3,89	valid
Average	3,77	valid	3,86	valid

Feasibility aspect of indicators content, suitability of the content to the curriculum, basic competence, relevance to the material 8th grade Junior High School students, as well as conformity with face-to-face learning and distance. Based on the results of validation experts can be seen that the appropriateness of the content of the textbook developed already valid in terms of contents and invalid constructs. Thus, content, examples, exercises, and evaluation are already worthy of being used as learning geometry flat-side materials.

The presentation of the material includes techniques in presenting the material, systematics, and clarity. The presentation of the material in the module is already compiled in a systematic, clear and complete way. The presentation of the material in the module has been appropriate (relevant) with the textbook theory i.e. the instructions of learning, competencies that will be achieved, supporting information, training, and evaluation (Majid, 2008:174). Thus, the presentation of materials textbook is already valid in terms of contents (relevance). Linguistic aspect of indicators include the readability of conformity with the Indonesian Language rule is good and right, and the logic of language. According to the experts, the linguistic aspects of the module that was developed already valid in the contents and invalid constructs. The interactive module is already using the language and terms that are easily understood. Sentences and grammar used is in compliance with the rules of Indonesian Language.

Graphic aspects of indicators includes media display quality and appeal. Display module based on lectora accompanied the attractive animation and assist students in visualizing the material. The results of the validation of the module-based interactive lectora already has a validity of invalid constructs in terms of content and appropriateness of content, presentation material, language and graphic. This means the modules are qualified to be used as learning materials for students on the geometry flat side. Interactive modules based on lectora developed already contains a lesson learned, competencies will be achieved, training, and evaluation. In accordance with the opinion of the Majid (2008:174) stating that a textbook covers, among others, lesson learned, competencies will be achieved, supporting information, exercises, work instructions can be a work sheet, and evaluation. Thus, the presentation of textbook materials developed is already valid in terms of contents (relevance). The module is developed already and is compiled systematically so that it will create an atmosphere that lets students learn well.

Interactive modules organized in special organization that facilitates the teaching-learning process and advancements in contrast to organizing the books in print. Organizing textbook has three main characteristics, namely 1) lessons are organized and structured in subjects subcategories; 2) content learning (information, description, comments, exercises, and evaluation) is served on a regular basis; and 3) there is a systematic learning progress that leads to new knowledge acquisition and learning of

new concepts based on the knowledge that items have been known (Seguin 1990:18). The results of the validation of the module as seen from the contents and validity of invalid constructs four aspects that are assessed, obtained valid categories. That is, in content, the material presented in the module is in compliance with the material to be learned students to acquire the learning product. Invalid constructs, the material presented in the module can direct students in attaining the expected competency.

CONCLUSION

Interactive modules based on Lectora developed intended as alternative learning resource for students in understanding the geometry flat-side material so that it can improve the ability of spatial. Based on the results of data analysis and discussion has been done, the conclusion that the interactive module based on Lectora already has content validity (relevance) and invalid constructs (consistency). Based on the results of the development is done, this part is presented some suggestions are: 1) the interactive module based on Lectora can serve as an alternative source of learning in learning activities at school, 2) module was developed only on geometry flat side material, teachers or researchers can use Lectora as media in developing learning materials with a range of material that is wider or different disciplines, 3) this module can be used by teachers as a learning materials in a learning process that uses model blended learning.

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