Development of Electronic Module Using Kvisoft Flipbook Maker Application on the Chemical Equilibirium

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Abstract: The general purpose of this research is to develop e-modules using the Kvisoft Flipbook Maker application on the subject of chemical equilibrium. Specifically this research is aimed at describing the validity of using e-modules on the subject of chemical equilibrium.The method used in this study is the research and development method, with reference to the Plomp model, which consists of three phases, namely the preliminary investigation phase, the prototyping phase and the assessment phase. The results of the analysis showed that the e-module developed using the Kvisoft Flipbook Maker application on the subject of chemical equilibrium was declared valid and feasible to be used in learning activities with the percentage of media experts 94.8%; material expert 88.46%; and practicality test with a teacher response of 95.29%.

Keywords: E-Module, Kvisoft Flipbook Maker Aplication, Chemical Equilibirium

1. Introduction

UU No. 20 of 2003 states that the curriculum is a set of plans and arrangements regarding the objectives, content, and learning materials and the methods used as guidelines for the implementation of learning activities to achieve certain educational goals. At present the curriculum in Indonesia is the 2013 curriculum. Based on the 2013 curriculum, chemistry subjects are one of the subjects of specialization in high schools/MA (Madrasah Aliyah). Chemistry is one of the branches of natural science (IPA) which has an equal role with other science branches, such as physics, biology, geology, and astronomy. The Ministry of Education and Culture (2013) stated that the purpose of chemistry learning is that students are expected to be able to apply chemical concepts in solving problems of daily life and technology. Chemistry is the science that seeks answers to what, why, and how natural symptoms are related to composition, structure and properties, changes, dynamics, and energies of substances. Therefore, chemistry subjects in SMA / MA learn everything about substances which include composition, structure and properties, changes, dynamics, and energies of substances that involve skills and reasoning. There are two things related to chemistry that cannot be separated, namely chemistry as a product (chemical knowledge in the form of facts, concepts, principles, laws, and theories) and chemistry as a process that is scientific work (E. Mulyasa, 2006).
However, some of the results of previous studies stated that chemistry subjects were subjects that were considered difficult (Cardellini, 2012), not fun and not interesting for students to learn (Chun Wu & Jordan, 2010). Chemical characteristics that are generally abstract are one of the

factors that students think that chemistry is difficult to understand (Marsita et al, 2011). Negative assumptions about chemistry learning tend to cause learning difficulties and have implications for poor learning outcomes.

Based on the results of interviews with one of the teachers in SMA Negeri 5 Pekanbaru, student learning outcomes, especially in the chemical equilibrium material for the 2016/2017 school year are still relatively low, which is only around 30-40% of the total number of students 40 people who are able to achieve classical completeness. Then to find out what are the factors causing the low learning outcomes of students chemistry, researchers try to observe directly how the learning process is in the classroom. It turns out that in the learning activities the teacher still uses the lecture method. The lecture method is a learning method where the teacher is the only source of information and the student is the recipient of information in the sense of teacher-centered learning activities. Teacher-centered learning activities are very contrary to the 2013 curriculum learning characteristics, namely learning activities centered on students (student centers) where in learning activities students are given active freedom in learning in the sense that students are the directors of their own learning processes while teachers are only facilitators and mentors learning.

The teacher is one of the important factors and most influential on the success of learning. Based on the 2013 curriculum the teacher as a facilitator has the responsibility to be able to prepare learning conditions and teaching materials that are effective and innovative in learning and in accordance with the needs and characteristics of students in accordance with the times. The ability of teachers to choose learning models/methods and innovate teaching materials can influence students' learning interest, effectiveness and learning success (JordiPamies-Rovira et al, 2016). However, based on observations of the ability of chemistry teachers in SMA Negeri 2 pekanbaru, it turns out to be The success of the teacher's learning goals only uses books and print modules.The use of books and print modules is not in accordance with the abstract chemical equilibrium material, because some students consisting of low level of understanding ability will find difficulties in understanding the concept and if it reaches the saturation point students will feeling bored and lazy to learn, and based on the 2013 curriculum the use of printed teaching materials is no longer the only mainstay teaching material that can be provided by teachers, but teachers are also required to be able to integrate and maximize learning activities by utilizing technology.

The form of learning that is influenced by the development of information technology is called e-learning. E-learning is a development of learning technology, namely by utilizing computer capabilities and other information devices such as multimedia and the internet. The application of e-learning in learning activities is very in accordance with the characteristics and needs of 21st century students. In the 21st century technology is no longer a common thing among the community both at high, medium and low economic levels. Likewise, students of technology products such as television, cellphones, computers and laptops have become part of their lives. The use of technology products is one of the skills in the 21st century that requires generations of nations to deal with the turmoil of global competition. The 21st century skills include information and communication technology literacy skills (critical information skills & literacy skills), critical thinking skills, problem solving skills, effective communication skills and skills. collaborate. Mac Kinnon (in Muderawan, 2011) states that technology in learning will help develop all types of thinking skills from the most basic level to the level of critical thinking skills. The benefits that can be gained from the implementation of e-learning in learning activities include increasing effectiveness, flexibilities of learning (Gozali and Billian, 2011),

learning activities and students' problem solving abilities (Chanok Park, Mihye Kim, and Kwan-heeYoo (2012).

One type of e-learning is electronic modules (e-modules). E-Module is a part of electronic-based e-learning that uses information and communication technology, especially electronic devices (Munir, 2009). In terms of indicators and structure, the e-module has the same characteristics as the print module. However, the difference between e-modules and print modules lies in the format and flexibility of the presentation components. E-module is a concept of module teaching materials delivered through electronic media or in digital format. The advantage of the e-module presentation is that the file size is relatively small, easy to carry just using USB or flashdisk, e-module can be used off-line or on-line. Students can study e-modules anywhere and anytime as long as there is a computer. Students can also know the completeness of each study by following the evaluation provided in the program. Darmawan (2013) states that computer devices can be used as a medium that allows students to learn independently in understanding a concept. Robert, Molenda and James D. Russel (in Danny and Harun2014) stated that computer systems can convey learning individually and directly to students by interacting with subjects programmed into computer systems, this is what is called computer-based learning

One application that can be used to create e-modules is Kvisoft Flipbook Maker. Kvisoft flipbook maker is a reliable software and designed to convert PDF files to digital publications. This software can change the appearance of PDF files to be more attractive like a book (Neneng and Dandan, 2017) with the file format in the form .swf, .exe, and .html (Wijayanto, 2011). Research on e-modules developed using has been carried out by several researchers including, namely, Wijayanto and Zuhri (2014) where their research results show that e-module is an effective teaching material in achieving learning goals and able to develop students' mathematical problem solving skills as well as according to the characteristics of the 2013 curriculum. Then I Dewa et al (2015), in his research showed that the use of teaching materials developed using the application Kvisoft Flipbook Maker can improve students' understanding of physics concepts in understanding abstract physical material, because the use of Kvisoft guides students in understanding a material concept.

Based on the background description above, the general purpose of this study is to develop e-modules using the Kevisoft Flipbook Maker application on chemical equilibrium material. Specifically this research is aimed at describing the validity of using e-modules in chemical equilibrium learning materials.

2. Methodology

This development research was carried out in the Postgraduate Program in Chemical Education FKIP University of Riau. Based on the description of the problems and objectives that have been discussed earlier, this study uses research and development (R & D) method. Research and development is a type of research that is descriptive analysis with gradual work procedures to produce or test an educational product. Research and development is a process or steps to develop a product or perfect an existing product that can be accounted for (Nana SyaodihSukmadinata, 2006). The steps used in this study refer to the Plomp (2010) development model, which consists of 3 phases, namely the preliminary investigation phase, the prototyping phase and the assessment phase.

EdhySutanta (2004) states that data is information about real events or facts that are formulated in a particular symbol form that is not random and shows the number, action, or thing. The type of data collected in this study is e-module validation data and teacher response data on the practicality of using e-modules. Technically, the chemical equilibrium e-module validation data was obtained from 3 validators of media experts, 3 validators of material experts, 2 practitioners (teachers). To obtain the data needed in this study, research instruments were used. The instrument used is a chemical equilibrium e-module validation sheet for media experts, material experts and teacher response sheets on the practicality of chemical equilibrium e-modules. Validation sheets for media experts and material experts in this study were modified from the guidelines for developing ICT-based teaching materials by Depdiknas (2008). While the response sheet for practitioners (teachers) was adopted from HarisZulvianda et al (2016).

The expert validation process serves to obtain suggestions and input from the validators regarding whether e-module chemical equilibrium is suitable for use or not used as teaching material in learning activities. Validators in this case are competent expert lecturers and practitioners or users of interactive e-modules (teachers). Assessment of the validity of the chemical equilibrium e-module consists of 4 assessment points, namely with 4 (Very Good), 3 (Good), (2) Not Good, (1) Very Bad. Furthermore the responses of the validators were analyzed descriptively by averaging scores for each component and aspects of all validators. While the assessment of the practicality of the chemical equilibrium e-module of 4 assessment points is with 4 (Strongly Agree), 3 (Agree), 2 (Disagree), 1 (Strongly Disagree). The formula used to analyze validation data is as follows.

$$P = \frac{x1}{\sum x1} \text{ x } 100\%$$

Where :

P	: Proportion $\Sigma x/\Sigma x1$
Σx	: Number of respondent answers in one item
$\Sigma x1$	: The number of ideal values in one item
100%	: Constants

Interactive e-module is said to be valid, if the minimum level of validity achieved is a good category. If the level of achievement of validity is under the good category, it is necessary to revise it until a good / valid interactive e-module is obtained.

3. Result and Discussion

3.1. Result

The result of this research and development product is an interactive e-module developed using the Kvisoft Flipbook Maker application on the topic of chemical equilibrium for the XI MIA SMA / MA class and its validity and practicality have been tested. The following is described the procedure for developing e-modules based on the Plomp model:

1) Initial Investigation Phase
   At this stage researchers collect, identify and analyze the data or information held in the field. Based on the results of interviews and in SMA N 5 Pekanbaru, it is known that in learning activities is the material used by the ineffectiveness of the use of books and learning modules as teaching materials that can improve students' understanding and learning outcomes of chemistry. This is also based on the properties of abstract chemical

equilibrium concepts, thus enabling innovative materials that are able to socialize the concept directly and students can observe it directly. To overcome these learning problems, the researcher takes action by developing electronic materials using e-modules using the Kvisoft flipbook maker on the subject of chemical equilibrium.

2) Prototype Making Phase

The initial stage of designing the e-module is called prototype 1. The prototype 1 designation starts with using the Microsoft Publisher application workspace. In the workspace, Microsoft Publisher researchers compile learning material in accordance with the material requirements, the needs of students and teachers and in accordance with the KI and KD set in the 2013 curriculum. After the drafting is complete, the prototype 1 is published in PDF format. Prototype 1, which has a PDF format, is then converted into e-module using the Kvisoft Flipbook Maker application. In the workspace application of Kvisoft Flipbook maker researchers began to include various supporting media for the effectiveness of learning such as, voice, animation, video, interactive questions and images. After all the components of the idea have been designed and integrated into one, a teaching material is produced in the form of e-modules in the chemical equilibrium subject matter.

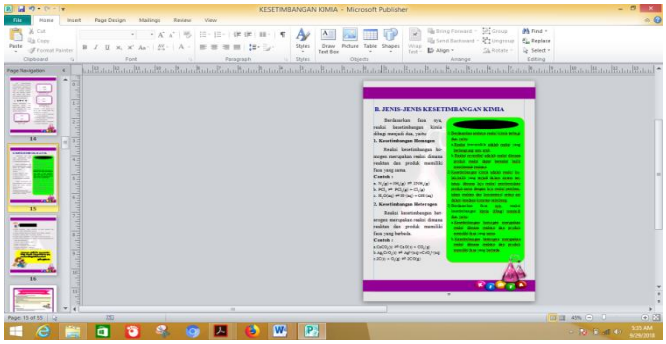

Figure.1 Prototype 1 Making Using Ms. Publisher

Figure.2 Front Cover Prototype 1 Interactive E-module

Figure.3 Fill in the Prototype 1 Interactive E-module

3) Assessment Phase.

Products that have been realized in the form of interactive e-modules are then assessed. In this phase two assessment activities were carried out, namely:
(1) Validation of teaching materials
(2) Prototype Trial

But due to time constraints researchers only arrived at the validation phase. The activities carried out during validation are as follows;

a) Consultation and Considerations by Validators.

Table.2 Criticism and Suggestions for Improvement by Media Experts

Validator	Comments And Suggestions
1. Dr. Alex wenda, M.Eng	➢ The font size needs to be enlarged ➢ The use of animation is refined ➢ Adjust the type of music with the e-module user target
2.Dr. AlwisNazir, M.Kom	➢ The type and design of writing identity need to be
3. Dr. Elfizar	➢ ound / music needs to be replaced ➢ Use a random system of questions on interactive evaluation questions

Data from the media expert validation results were obtained from three media experts with professions as lecturers, namely 2 lecturers from state Islamic universities, eunuch sultan syarif and 1 lecturer from Riau University. The data obtained in the form of descriptive data, in the form of criticism and suggestions regarding the interactive chemical equilibrium e-module consisting of two aspects, namely the aspect of visual communication display and aspects of software utilization.

Table.3 Criticism And Suggestions for Improvement by Material Experts

Validator	Criticism And Suggestions
1. Dr. DediFutra	➢ Improve the design and consistency of the use and location of letters ➢ Fix the formulas using the equation ➢ The question of evaluation needs to be reduced according to the allocation of work time
2. Dr. Rasmiwetti	➢ Video animations1 and Video.2 are explained to explain what material is specified

	➢ It is necessary to note the suitability of KD ➢ The photo of the author's identity on the cover needs to be fixed
3. Dr. R. UsmanRery, M.Pd	➢ Material collections from one sub-subject to another sub-subject need to be corrected ➢ Examples of questions for each sub-material are added and adjusted to the learning objectives ➢ Fix evaluation questions

Data from expert material validation results is descriptive data in the form of criticism and suggestions, namely on two aspects, namely the material aspects of the material and learning design. Material experts are 3 lecturers from the University of Riau

b. Analysis of Validation Results from Validator

Table.4 Interactive E-Module Validation Results Data by Media Specialists

No.	Statement	Validator Answer (X)			∑Xi	%
A	**Visual Communication Display**	**1**	**2**	**3**		
1	Ease of accessing each slide in the chemical equilibrium e-module	4	4	4	4	100%
2	Use of letters in the chemical equilibrium e-module	4	4	4	4	100%
3	Use of media in chemical equilibrium e-modules	3	4	3	3,33	83,25 %
4	Color composition in the chemical equilibrium e-module	3	3	4	3,33	83,25 %
5	The animation shown on the chemical equilibrium e-module	4	4	4	4	100%
6	Chemical balance e-module display design	4	4	4	4	100%
B	**Software Utilization**					
7	Interactivity in chemical equilibrium e-modules	3	4	4	3,66	91,5 %
8	Use of supporting software in the chemical equilibrium e-module	3	4	4	3,66	91,5 %
9	Authenticity in designing E-module chemical equilibrium	4	4	4	4	100%
Total Value		32	35	35	33,98	94,38 %

Based on the results of the interactive e-module validation, chemical equilibrium material by 3 validator media experts obtained an average value of 33.98 with a percentage of 94.38% so that the interactive e-module of chemical equilibrium can be interpreted in the valid category and feasible to be used in learning activities.

Table.5 Interactive E-Module Validation Results Data by Material Experts

No.	Statemant	Validator Answer (X)			∑Xi	%
A	**MATERIAL SUBSTANCE**	**1**	**2**	**3**		
1	The accuracy of the concept in the chemical equilibrium e-module	4	4	3	3,66	91,5 %
2	Contents / descriptions of chemical equilibrium e-module material	3	4	4	3,66	91,5 %
3	Suitability of material content with the development of the science of chemical equilibrium e-modules	3	4	3	3,33	83,25 %
4	Appropriateness of the use of compilation language sentences used in the chemical equilibrium e-module	4	4	3	3,66	91,5 %
B	**LEARNING DESIGN**					
5	Conformity of the title of the chemical equilibrium e-module with the content / description of the material described	4	4	4	4	100%
6	Core Competencies (KI)	4	4	4	4	100%
7	Basic Competencies (KD)	4	4	4	4	100%
8	Material presentation	4	3	3	3,33	83,25 %
9	Suitability of proportion of sample questions with learning indicators	4	4	3	3,66	91,5 %
10	Availability of exercises in the chemical equilibrium e-module	4	4	4	4	100%
11	Availability of evaluation in chemical equilibrium e-modules	4	4	3	3,66	91,5 %
12	Identity of the chemical equilibrium e-module compiler	4	4	4	4	100%
13	References	4	4	3	3,66	91,5 %
Total value		50	51	37	46	88,46 %

The results of the analysis of the interactive e-module validation sheet of chemical equilibrium material for 3 validators of material experts obtained an average value of 46 with a percentage of 88.46% so, the interactive e-module of chemical equilibrium was stated in the valid category and feasible to be used in learning activities. To strengthen the results of research on the validity of the interactive e-module of chemical equilibrium, the taking of the response of the teacher's response as a user in the field was also carried out. Questionnaire sheet assessing the practicality of the chemical equilibrium e-module was given to two chemistry teachers, namely YuliAndriati, S.Pd and Vicky Wahyudi S.Pd.

Table.6 Results of Teacher Responses To Interactive E-Modules

No	Questionnaire Statement	Practitioner Answer		∑Xi	%
		Practitioner 1	**Practitioner 2**		
1	E-module chemical equilibrium material plays a role in increasing student learning interest	4	4	4	100%
2	E-module using the Kvisoft Flipbook Maker application is easy to use	4	4	4	100%

3	The material in the chemical equilibrium e-module is easy to teach students	4	4	4	100%
4	the material in the chemical equilibrium e-module is in accordance with the objectives of the learning indicator	4	4	4	100%
5	The presentation of chemical equilibrium material in e-modules is explained systematically	3	4	3,5	87,5%
6	The presentation of equilibrium material in the chemical equilibrium e-module is complete	4	4	4	100%
7	Presentation of chemical equilibrium material in e-modules can be easily understood by students	4	4	4	100%
8	The instructions for using chemical equilibrium e-module are complete	3	4	3,5	87,5%
9	The instructions for using chemical equilibrium e-module are complete	4	4	4	100%
10	The appearance of chemical equilibrium e-module developed using the Kvisoft Flipbook Maker application is interesting	4	4	4	100%
11	Images and simulations in the chemical equilibrium e-module are in accordance with the material	4	4	4	100%
12	E-module chemical equilibrium can be used as an alternative teaching material	4	4	4	100%
13	The questions contained in the chemical equilibrium e-module can already be used to measure students' level of understanding	4	4	4	100%
14	The questions contained in the chemical equilibrium e-module are in accordance with students' level of thinking.	4	4	4	100%
15	Practical procedures contained in the chemical equilibrium e-module can be applied in schools	4	4	4	100%
16	Practical procedure steps contained in the chemical equilibrium e-module are easily understood and carried out	4	4	4	100%
17	The practicum tools and materials contained in the chemical equilibrium e-modules are easily available in school and environmental laboratories	4	3	3,5	87,5%
Total Value		63	66	64,5	95,29%

Based on the analysis of the practical e-module questionnaire that was developed using the Kvisoft Flipbook Maker application the average response results of both teachers were 64.5

with a percentage of 95.29% in the category of strongly agree and practically used in learning activities

3.2. Discussion

The development of e-modules using the Kvisoft Flipbook Maker application on chemical equilibrium material aims to determine the validity and practicality of e-modules as alternative teaching materials in learning activities in class XI MIA SMA / MA. E-module is a set of digital teaching media that is arranged systematically for the needs of independent learning (Fausih et al, 2015) which is equipped with animations and interactive simulations so that it can facilitate students to solve problems in elaborating and increasing interaction activities in learning (Dimas et al, 2013) The selection of chemical equilibrium e-modules as the focus of research is motivated by the results of preliminary research conducted at SMA Negeri 5 Pekanbaru, Riau. The results of this study indicate that the reandah of activities, understanding and student learning outcomes are due to several factors, one of which is the unavailability of effective and efficient teaching materials for students to help solve learning problems, especially in understanding abstract concepts in chemical equilibrium material.

E-module is one of the concepts of e-learning learning. DFES (2003) states that the use of e-learning has the potential to improve the quality and flexibility of learning. Because, the level of e-learning learning is at an innovative and creative level (Hannan and Silver (2002). Krishna and Jaya (2013) state that e-learning is a viable and popular medium for use in education, and further research is needed so can implement e-learning learning method maximally in learning activities.In accordance with the exposure of the research results, e-modules that have been developed with the Kvisoft Flipbook Maker application on the subject of chemical equilibrium are declared valid and feasible to use with the percentage of analytic results on the data collected media expert percentage 94.8%, material expert 88.46%, and practicality test with teacher response 95.29%. In line with the results of research obtained by Farid et al (2015) in his research also said that e-module is one of various sources learning that supports the implementation of an effective, efficient learning environment and can manage as the delivery of material. E-module developed using the Kvisoft Flipbook Maker application on chemical equilibrium material is an offline teaching material or without an internet connection that can be used with the help of a laptop or computer. To open the e-module, the GOM Player application or the Internet explorer is needed.

4. Conclusion

Based on the results of the study and discussion it can be concluded that the development of interactive e-modules uses the Kvisoft flipbook maker application on chemical equilibrium material for class XI MIA SMA / MA by referring to the plomp development model that has been successfully designed. In the development process, interactive e-module products developed using Kvisoft Flipbook Maker in chemical equilibrium materials have been validated by 3 media experts, 3 material experts and 2 practitioners (teachers), where the results of validation analysis and activism have been declared valid and feasible. used in learning activities with the percentage of media experts 94.8%; material expert 88.46%; and practicality test with a teacher response of 95.29%. This chemical equilibrium e-module has also undergone

several revision stages with guidelines based on criticism, suggestions and input from validators and mentors such as display design, color compilation, use of font types and sizes, backsound use, material clumping, consistency in writing formulas, adding examples questions that are adjusted for the purpose of learning and improvement of the number of proportions of evaluation questions.

Some suggestions that can be conveyed in this regard are; (1) In the development of e-modules using the Kvisoft Flipbook Maker application, it takes focus and seriousness in the workmanship so that the products produced are really useful and worthy of use. (2) For further research preparing and adjusting images, animations, videos and simulations that are in accordance with the ability of students' understanding and learning material is expected to be the focus of attention to support the success of classroom learning, especially in chemical materials with abstract concepts. (3) This research is expected to be further developed such as practicalisation test with student respondents, (4) can be disseminated as an alternative teaching material to support the demands of integrated learning activities with technology in accordance with the demands of the 2013 curriculum.

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