# Development of interactive multimedia based on Lectora Inspire in chemistry subject in junior high school or madrasah tsanawiyah

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**Abstract.** The research aims to develop interactive multimedia based Lectora Inspire on science chemistry subjects for SMP/MTs. The research method using the design of research and development (Research and Development) with a model Plomp, which consists of four phases; initial investigation, design, realization and construction, and validation, test and revision. The research was conducted at the University of Riau FKIP. The object of research is interactive multimedia Lectora Inspire. Data collected by validating based interactive multimedia Lectora Inspire to 3 validator (media expert and subject matter experts) and limited trial by users that teachers and students in SMP 4 and SMP Babussalam Pekanbaru. The results showed an average score of validator 98.20% . Score of limited trial based on questionnaire responses of teachers and students each obtained an average score of 98.78% and 97.03%. From the result of the average score of the validation and limited trial of interactive multimedia based Lectora Inspire for chemistry subjects for SMP / MTs valid and can be used as a learning media.

**Keywords:** *Lectora Inspire, interactive multimedia, the science chemistry subjects.*

## 1    Introduction

The development of Knowledge and Technology in the era of globalization is growing rapidly. This has an impact on various aspects of human life, including in education. Education is a major milestone in increasing human resources. In the field of education, especially in the learning process should be encouraged the growth of positive attitudes in the students themselves (Amri, 2013). The implementation of the mandate of Law No. 20 of 2003 is the implementation of the learning process that takes place in formal institutions, such as Junior High School (JHS)/MTs. One of the subjects studied by junior high school/MTs students is science subjects. Learning of Science (IPA) at the junior high school / MTs in the

curriculum 2013 is implemented on the basis of integrity, ie as an integrative science subject or known as IPA Terpadu. Learning of IPA Terpadu is packed into one between chemistry, physics, and biology. The Subjects of Chemistry studied in JHS/MTs are their substances and their characteristics, environmental pollution, climate change, additives and addictive substances, and properties of materials. chemistry is very close to everyday life, but the study of chemistry is abstract, which includes the structure, dynamics, and transformation of material particles, such as atoms, ions, and molecules that make students tend to only imagine it, so it requires a deep understanding and demanding participants educate to be more focused in following the learning process.

In addition, most science teachers in Junior High School have problems in teaching chemistry concepts and processes. These constraints are caused by a incompatibility of their scientific backgrounds, lack of equipment and chemicals available in schools, and limited chemistry books to be taught in junior high schools. Science Teachers of JHS/MTs mostly have scientific background of Physics and Biology Education. Facts that occur in the field like this can be an obstacle in learning the subject of chemistry. Conditions that cause the ability of teachers in teaching the concepts of chemistry is inadequate (tend to memorize) and less able to do chemistry lab (I Wayan, 2010), so it takes a visualization tool in teaching of chemistry concepts. One of the efforts that can help teachers in conveying chemistry is by presenting a more innovative learning media. The use of learning media can overcome common obstacles that often occur in the learning process, such as limited hours in the classroom, saturation in the learning process, and the complexity of the convey of chemistry subjects which is abstract (Syaiful Bahri Djamarah, 2008).

Softwares that is often used in the development of interactive learning media is Adobe Flash, Course Builder, Visual Basic, Dream waver, but its use is quite complicated so that only controlled by computer programmers (Ena, 2001). One software that can be used to develop learning media is Lectora Inspire. Lectora Inspire can be used for learning needs both online (offline) and offline (system class) that can be made quickly and easily. Lectora Inspire can be used to combine flash shaped files, record videos, combine images, and screen capture.

Lectora Inspire is equipped with supporting applications, namely: flypaper that serves to add flash animation that makes the students more creative, camtasia that serves to capture video, video editing, adding audio, cutting flash animation or as a 3D design software; and snagit that comes with a callout that works to capture the desktop view to create an image. Lectora Inspire software also has additional products (Add ons) that is Lectora Integrator for Microsoft Powerpoint. The existence of a Lectora integrator can make the user directly convert the power point presentation into

Lectora Inspire. Lectora Inspire able to create interactive e-learning content and facilitate the making of learning media (Muhammad Mas'ud, 2012).

Development of interactive multimedia for science Biology SMP / MTs have done by Cicik Yunita with a study entitled Development of Multimedia Learning science Biology Web-Based Using Lectora Inspire Program in Human Digestive System for Eighth Grade Students of SMP / MTs in Yogyakarta. The results show that multimedia web-based for science Biology has a value of quality Very Good (SB) with a percentage of 89.3% ideals. Research development using Lectora Inspire also conducted by Elsa Yanti Mala (2014) with the title "Development of Multimedia-Based Learning Lectora Inspire In Reaction rate For Class XI student of SMAN 4 Kota Jambi". The results showed that the media Lectora Inspire feasible for use by teachers and students as a learning media with the percentage of media expert validation at 80% (excellent category), and matter expert at 89% (excellent category) and trials conducted in small groups to see the response teachers and students to the interactive multimedia Lectora Inspire gets a percentage of 83% (excellent category).

Research development of learning media with a computer using program Lectora Inspire is interesting and need to be developed at this time specially in education. Therefore, researchers will conduct research with the title "Development of Interactive Multimedia Based Lectora Inspire At Science Chemistry Subject Curriculum 2013 in Junior High School/ Madrasah Tsanawiyah"

## 2.      Methodology

This research was conducted at Study Program of Chemistry Education FKIP Riau University, for 8 months. The research method using the design of research and development with a model *Plomp*. Procedure chart of R & D research using Plomp models can be seen in Figure 1. Model Plomp (in Rochmad, 2012) consists of the initial investigation phase; the design phase; realization / construction phase; validation, testing and revision phase and implementation phase. The study only carried out until the phase of validation, testing and revision because the research objectives are limited to develop and produce a valid learning media to be implemented based on validator assessment. The object of research is based interactive multimedia *Lectora Inspire* at science chemistry subject curriculum 2013 at SMP / MTs. The instrument used in this study is the syllabus, validation sheet and questionnaire responses.
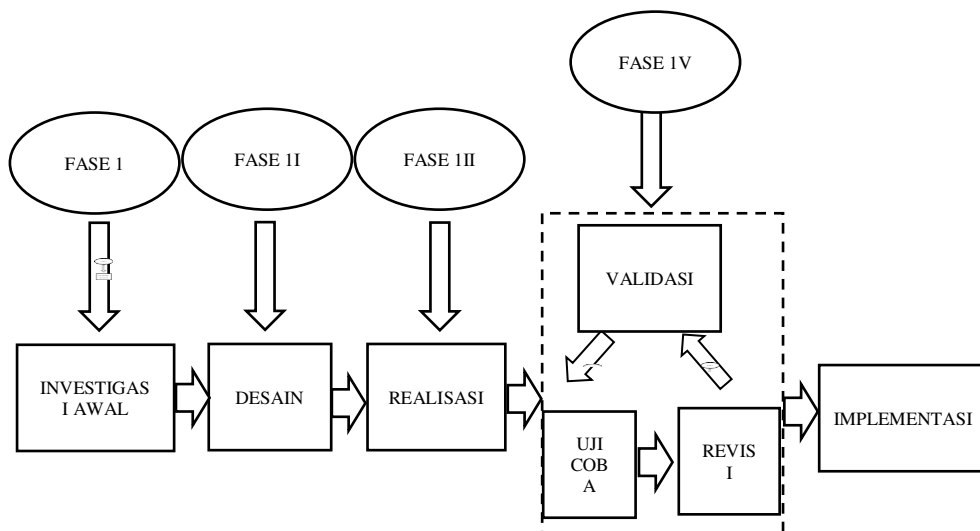
Figure 1. Flowchart of development phase of Plomp model

Data of research obtained by validation and limited trials to interactive multimedia *Lectora Inspire* by matter experts validator, media experts validator, teachers and students. This way purpose to collect data regarding of validity and user response to the Interactive Multimedia *Lectora Inspire*. Validator asked to provide an assessment and recommendation to the Interactive Multimedia *Lectora Inspire* developed. Having obtained the valid Interactive Multimedia *Lectora Inspire* then be tested by asking for assessments and advice to users. Validity analysis of Interactive Multimedia *Lectora Inspire* is based on design aspect, pedagogic aspect, content aspect (media and matter expert) aspects, and ease of use aspect (Mohd. Jasmy Abdul Rahman, *et*al.,2014). Techniques of data analysis used in this research is descriptive analysis percentage using the formula:

$$P = \frac{n}{N} \times 100\%$$

Source: Abdul Rohmad (2013)

Description :
P     : score percentage (%)
n     : number of obtained score
N     : number of maximum score
Criteria of scoring can be seen in Table 1 and Table 2.

Limited trial aims to determine whether the resulting product is easy to use by the user in this case is the teachers and students and to determine whether the desired situation as described in the initial phase of the investigation has been resolved. Limited trial performed using a sheet questionnaire responses of users (teachers and students) with indicators that have been categorized by experts as appropriate and good indicator. Indicators used in connection with the motivation of  learning, the ease of use of the media, the interest of the media, conformity media with learning and attention of the users.

Tabel 1. Criteria of validity analysis

| Interval | Criteria |
|---|---|
| 81 % – 100 % | Very Good |
| 61 % – 80 % | Good |
| 41 % – 60 % | Adequate |
| 21 % – 40 % | Less |
| 0 % – 20 % | Very Less |

Source: Cicik Yunita (2013)

Table 2. Criteria of user response

| Persentase | Keterangan |
|---|---|
| 85%≤ media Response ≤100% | Positive |
| 70%≤ media Response <85% | Quite Positive |
| 50%≤ media Response <70% | Less Positive |
| media Response <50% | No Positive |

Source: Modification from Yuni Yamasari (2010)

## 3.      Results and Discussion

Research of development interactive multimedia  produce a product in the form of interactive Multimedia *Lectora Inspire* for science teaching Chemistry SMP / MTs equal Curriculum 2013, which is packaged in a *Compact Disk* (CD). Interactive multimedia developed within eight months, from May to December 2017. The interactive multimedia have passed the stage of validation by matter experts and media experts. In addition to validation, interactive multimedia has also been tested limited with the aim of seeing the response of teachers and students as a user.

**Preliminary Investigation Phase**

**Front End Analysis**
Analysis of the front end is intended to determine the necessary basic problems in the development of learning media. At this stage of the analysis in the form of study materials science and interviews with science teachers of Babussalam junior high school about science chemistry learning and problems were found and learning media used in the process of learning science chemistry in the classroom in order to obtain a description of interactive learning media is considered ideal. The results obtained from the

study of materials science SMP / MTs, topics that are closely linked to chemical include, substance and characteristics, environmental pollution, and climate change, additives and addictive substances, as well as the characteristics of the material. After the interviews with science chemistry teachers in Babussalam Junior high school, it was concluded that the matter of science chemistry in SMP generally is abstract so it is difficult to be understood by the students. For example, the concepts related to the structure of atoms, ions, and molecules and their relationship to the material properties. Therefore, we need an interactive multimedia that can be used by teachers as a tool for visualizing abstract material. Interactive multimedia *Lectora Inspire* selected to be a solution to these problems, because has the advantage of being able to combine different types of animations, flash video, games, and quizzes interactive. It is also very helpful to further increase the interest of students to learn the subject.

**Students Analysis**
Analysis of students is a study of the characteristics of students in accordance with the design development of learning media. These characteristics include the ability of chemistry possessed, students' attitudes toward science chemistry, background knowledge, and level of cognitive development of students. Analysis of students is needed in the manufacture of learning media because learning process should be adapted with level of cognitive developmental through which students.

Students who acts as a research subject that the students of SMP / MTs are in the age of 12-16 years. According to Piaget's theory of cognitive development, children aged 12-18 years are at the formal operational stage where the child is capable of abstract thinking and logical. However, based on research and literature study further found that many students and even students have surpassed even beyond, yet can perform formal operational (Asri Budiningsih, 2005). This leads to learning must be done through conceptual approaches, where the students can learn abstract concepts when holding visualization.

**Matter Analysis**
Analysis of the matter is made to select and assign, detailing, and systematically compile relevant teaching material to be taught. The matter presented in this interactive multimedia, which is a substance and its characteristics, environmental pollution, climate change, additives and addictive substances, as well as the characteristics of the material.

**Competency Analysis**
At this stage we analyzed the competence in science chemistry SMP that must be achieved by students so that researchers can develop learning media in such a way in order to achieve competence specified. Core competencies and basic competencies and competency of indicators contained in the detailed syllabus and forth in the form of learning objectives.

**Design Phase**

Design phase, carried out with the drafting early media in the form of the main menu in interactive multimedia. After the initial draft is determined, design activities continued with the selection of themes and basic background of interactive multimedia suite, the search for media content such as topic, video, animation, flash, example questions, and music. Video obtained, edited using supporting applications *Lectora Inspire* that *Camtasia.* In addition to editing the video, Camtasia can also be used to add narration, music and text. Furthermore, the overall design of the media that will be developed is made into Historyboard. The use historyboard serve as guidelines for the manufacture of interactive multimedia. In this phase also be designed instruments of assessment are sheets validation and questionnaires user response to the test phase.

**Realization / Construction Phase**

Phase of realization is the creation of historyboard to a computer with software applications *Lectora Inspire.* This phase requires a relatively long time because a lot of content that should be made beginning of the video creation opener, splash pages, home page*,* instructions for using the media, competence, topic materials that include sub-sub material of science chemistry SMP/MTs, test material ( exercises, evaluations, and *games),* and reference. At this stage produced the first *prototype* of learning media *Lectora Inspire* Science Chemistry SMP / MTs, validation sheet subject experts and media experts as well as the questionnaire responses.

**Validation, Testing, and Revision Phase**

At validation activities validated the media developed by appealing to experts (validator) and users on the feasibility of learning media (the *prototype* 1) which has been realized. Instruments used sheet validation then analyzing the results of the validation from validator. Three validator has conducted validation of media that is designed. One person validator of media experts and two person validator of matter experts. For the test conducted small group trial is often called the limited trial. At this stage the media has been employed in class VII, VIII, and IX with 15 students of SMP Babussalam and 15 students of SMPN 4 Pekanbaru. Furthermore, the revision of the product. Revisions were made each their validation and testing of the *prototype* developed.

**Results of Validation Products**

Multimedia that have resulted in the realization phase and then validated by 3 validator which is composed of 1 media experts and 2 matter experts. Validation is a valid assessment / absence of the product. Types and aspects of validity were assessed at the Interactive Multimedia products, namely the validity of the content that includes pedagogic aspect and content aspect then validity of the construct that includes design aspects, and ease of use

aspects. Validation activities performed twice. The produce of validation can be seen in Figure 2.
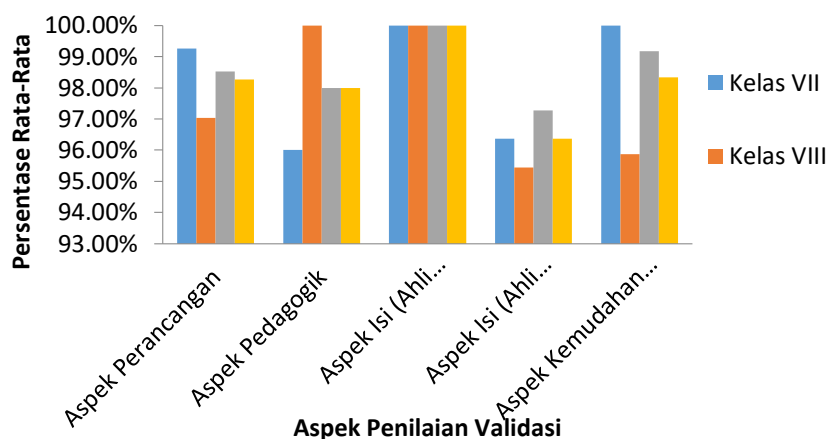


Figure 2. Result of Validity

The validation results of interactive multimedia based *Lectora Inspire* At Science Chemistry Subjects Curriculum 2013 in Junior High School / MTs obtained a score with the average score of validity for the class VII 98.31 %; VIII grade 97.78%; and 98.23% of class IX. The average percentage of fourth aspect for all grades is 98.10%. Referring to Table 1 the criterion of validity lies in the range of 81% -100% have been valid with very good category. Interactive Multimedia who had been valid subsequently tested to teachers and students. Limited trial conducted in SMP 4 and SMP Babussalam Pekanbaru. Limited trial done by giving the questionnaire responses to determine the response of teachers and students, the users of the interactive multimedia based *Lectora Inspire* on science chemistry subject. Questionnaire responses of teachers consists of 16 statements whereas students questionnaire consists of 10 statements, where each item is based on the legibility of the media that have been validated. Multimedia trials conducted by teachers of science SMP / MTs. The limited trial result is obtained in the form of a percentage and can be seen in Table 3. The average percentage obtained is 97.90%. Table 2. Criteria refers to a user response 97.90% value lies in the range of 85% -100% with a positive category.

Table 3. Score percentage of limited trial

| No | Type of Aspect | Percentage | Criterion of users response |
|---|---|---|---|
| 1 | Teacher | 98,78 | Positive |
| 2 | Students | 97,03 | Positive |
| | Average of Percentage | 97,90 | Positive |

## 4.        Conclusion

Based on the research and development of Interactive Multimedia *Lectora Inspire* at science chemistry subjects SMP / MTs that have been done, it could be concluded that: Interactive Multimedia Based *Lectora Inspire* At Science Chemistry Subjects Curriculum 2013 in SMP/ MTs is valid with an average score validity to a fourth aspect to all grades is 98.10%. Referring to Table 1 the criterion of validity lies in the range of 81% -100% have been valid with very good category. The limited trial based on questionnaire responses of teachers and students obtained an average percentage score responses of teachers and students is 97.90%. Criterion of user response to interactive multimedia is positive which indicates that the Interactive Multimedia Based *Lectora Inspire* At Science Chemistry Subjects Curriculum 2013 in SMP / MTs valid and can be used as a learning media.

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