
Effectiveness of Using Interactive Media Based on *Lectora Inspire* to Improving the Quality of Chemistry Science Learning in Second Grade at Junior High School/Madrasah Tsanawiyah

Herdini, Roza Linda, Abdullah, Ahmad Khairu Ramadhan

Chemistry Study Program, FKIP, Universitas Riau,

Pekanbaru, 28293, Indonesia

Email: herdinimunir@yahoo.co.id

Abstract: This research is implementation of the results of development research in previous year. The aim is to investigate the effectiveness (impact) of using the valid and practical interactive media based on *Lectora Inspire* to the quality of Chemistry Science Learning in Junior High Schools/Madrasah Tsanawiyah (especially students's activities and learning outcomes). The research is an experiment with randomized control group pretest-posttest design. To know the students's learning outcomes by using right-hand t-test and to know their learning activities by using observation sheet. The samples were determined randomly after normality and homogeneity test. VIII-A-3 was experiment class and VIII-A-4 was control class in this research at MTs Dar El Hikmah Pekanbaru. The experimental class was treated by using of *Lectora Inspire* media while the control class was not. Based on data analysis's results, obtained $t_{ct} = 8,14$ and $t_{table} = 1,67$ with $\alpha = 0,05$, $dk = 72$. $t_{ct} > t_{table}$ which is $8,14 > 1,67$ means the using of *Lectora Inspire* media can improved the students's learning outcomes. Beside that, the students's learning activities in experimental class is in a very good range while in control class is in a good range.

Keywords: Effectiveness, Interactive Media, *Lectora Inspire*, Chemistry Science Learning, Junior High School

1. Introduction

Science is one of the important subjects taught in schools starting from the Elementary School level. The principle of sciences is a combination of physics, biology and chemistry, but chemistry is a part of the science that was introduced at the Junior High school level since the enactment of the KTSP/2006 Curriculum and continued with the 2013 Curriculum, before of this, chemistry was taught in schools at the Senior High School level. Chemistry studies which have an abstract character and needed a high-level reasoning to understand them often cause chemistry to be less attractive in Junior High School students, and continued to Senior High School students. This is inseparable from chemical science learning methods by science teachers in Junior High Schools which are generally verbal and tend to only use blackboards, lack of effort to conduct demonstrations/experiments and other media. (Firman, 2000)

Teachers as people who are directly involved in learning, should be able to seek many things to improve learning activities of students so that better learning outcomes can be obtained. A teacher should use the right learning methods and media, and be easily understood by students.

Muhammad Ali (2009) confirmed that learning media play an important role in the learning process. The using of learning media in the learning process can generate knowledge, motivation and stimulation in learning and bring psychological influence on students (Arsyad, 2011), for that, the use of learning media must be effective in accordance with the subjects to be taught.

The effectiveness of learning media should also be supported through technology-based learning design which is then used as a reference in developing computer-based learning media (Rusman, 2012). Computer-based interactive media is a combination of several media, such as text, images, animation, audio and video which are accompanied by user control, so that users can control what and when the elements in the media will be displayed. Interactive media that can be used when learning must meet three criteria i.e. valid, practical and effective. One of the computer-based interactive learning media that can be used is *Lectora Inspire*.

The development of an interactive media based on *Lectora Inspire* for the science subjects of Junior High School based on the 2013 Curriculum has been carried out based on several things that have been stated by Herdini et.al. (2017). The results showed that the interactive media based on *Lectora Inspire* developed in the science subjects in Junior High School had met the valid criteria in terms of content and construction. In addition, this interactive media based on *Lectora Inspire* also fulfills practical criteria, in other words the teacher and students can use it in the learning of chemistry in Junior High School. The research that has been done has only reached the expert validation phase and limited trials, and has not yet reached the implementation phase, therefore to find out the effectiveness of the interactive media based on *Lectora Inspire* that has been developed, it is necessary to continue at the implementation phase.

The focus of this research is to investigate the effectiveness of interactive media based on *Lectora Inspire* on improving the quality of learning chemistry sciences which includes the improving of student's activity and learning outcomes, problem solving skills and reasoning. The results of the study are expected to help students and teachers to overcome the difficulties in carrying out classroom learning and to prepare the creative and innovative students.

2. Methodology

This research is using a research and development (R & D) approach with the Plomp model, which consists of the beginning investigation phase; design phase; realization/construction phase; validation, trial and revision phase and implementation phase. This research is a first-year research continuation that has produced a final prototype i.e interactive media based on *Lectora Inspire* for Junior High School (JHS)/MTs on chemistyscience learning subject which is valid and practical according to the expert's point of view, empirical and practical data. In this research, the prototype get into the implementation phase in the R & D approach with the Plomp model.

The implementation is carried out at MTs Dar El Hikmah Pekanbaru in odd semester of 2018/2019 school year. The data was collected from July to September 2018. The population in this research were students of VIII-A class at MTs Dar El Hikmah Pekanbaru in the odd semester of the 2018/2019 school year. The sample is determined by normality and homogeneity test of the prerequisite material. Two classes of samples were taken that were normally distributed and homogeneous to be drawn as the control class and experimental class. Class VIII-A-3 was obtained as an experimental class and class VIII-A-4 as a control class.

The research was designed with randomized control group pretest-posttest design which can be seen in Table 1.

Table 1. Research Design

Class	Pretest Result	Treatment	Posttest Result
Experiment	T ₁	X	T ₂
Control	T ₁	-	T ₂

(Moh Nazir, 2014)

Data collection techniques in the research are observation and tests. To find out the improving of student's learning outcomes, the data collected in the form of pretest and posttest scores in the experimental and control classes, and also to find out their learning activities, the data collected in the form of observer assessment by observation sheet. The data collected is then analyzed by certain analytical techniques. To find out the differences in the significance of learning outcomes between two sample classes is used data analysis techniques with t-test statistics. The t-test is done after the data is normally distributed using the Liliefors test. Data is normally distributed if $L_{\max} \leq L_{table}$ with criteria ($\alpha = 0,05$). L_{table} are obtained by the formula:

$$L_{table} = \frac{0,886}{\sqrt{n}}$$

(Agus Irianto, 2010)

The variance homogeneity test is using the F test with the formula:

$$F = \frac{\text{Biggest Variance}}{\text{Smallest Variance}}$$

Both samples are mentioned to have the same variance or homogeneous if $F_{ct} < F_{table}$, where F_{table} is obtained from the list of distributions F with probability α , where ($\alpha = 0,05$) and $dk = (n_1 - 1, n_2 - 2)$. Hypothesis test is done by using the right-part t-test with the following formula:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_g \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

The combined standard deviation (S_g) can be calculated using the following formula:

$$S_g^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$$

The hypothesis is accepted if $t_{ct} > t_{table}$ with probability criteria $1 - \alpha$ ($\alpha = 0,05$ and $dk = n_1 + n_2 - 2$), for the other price of t, the hypothesis is rejected.

(Sudjana, 2015)

While to find out the student's learning activities was used data analysis techniques by the average calculation equation which is:

$$\bar{x} = \frac{\sum x_i}{n}$$

(Andi Supangat, 2014)

The average score obtained is then converted into qualitative values with the criteria of learning activities in Table 2. This criteria then was analyzed the relation's with number of the active students based on the observer's assessment.

Table 2. Student's Learning Activity Criteria

Average Score	Criteria
3,35-4,00	Very Good
2,50-3,34	Good
1,75-2,49	Not Good
1,00-1,74	Very Bad

(Eko Putro Widoyoko, 2017)

3. Result and Discussion

Data processing of research results is carried out with certain analytical techniques.

3.1. Improving Learning Outcomes

To find out the differences in learning outcomes between two sample classes used data analysis techniques with statistical methods which include:

3.1.1. Prerequisite Analysis (Prerequisite Material Test)

3.1.1.1. Normality Test

The normality test results of the prerequisite material test are presented in Table 3. shows that the samples VIII-A-3 and VIII-A-4 are normally distributed.

Table3.Results Of The Normality Test For The Prerequisite Material Test

Sample	N	\bar{x}	S_g	L_{max}	L_{table}	Explanation
VIII-A-1	33	55,7576	11,7448	0,2316	0,1542	Abnormal
VIII-A-2	35	57,7143	15,4093	0,1586	0,1498	Abnormal
VIII-A-3	34	69,4117	14,5350	0,1506	0,1519	Normally Distributed
VIII-A-4	33	68,9697	15,3958	0,1129	0,1542	Normally Distributed

3.1.1.2. Homogeneity Test

To determine the homogeneity of the sample, variance test was carried out. Variance testing is carried out as a condition of homogeneity test because the data tested must have the same variance. The results of the variance test analysis of the prerequisite material test are presented in Table 4. shows that the samples VIII-A-3 and VIII-A-4 are homogeneous. The two homogeneous samples were then randomly selected as experimental class and control class. The experimental class is VIII-A-3 class and the control class is VIII-A-4 class.

Table4.Results Of The Homogeneity Test For The Prerequisite Material Test

Class	N	$\sum X$	\bar{x}	F_{table}	F_{ct}	t_{table}	t_{ct}	Explanation
VIII-A-3	34	2360	69,4117	1,80	1,2188	1,67	-0,1209	Homogeneous
VIII-A-4	33	2276	68,9697					

3.1.2.Pretest-Posttest Normality Test Results

The results of the normality test of the pretest and posttest scores of the experimental class and control class were normally distributed as presented in Table 5.

Table 5. Results Of The Normality Test For The Pretest And Posttest Data

Data	Class	N	\bar{x}	S_g	L_{max}	L_{table}	Explanation
Pretest	Experiment	34	35,8576	14,3203	0,0853	0,1519	Normally Disrtibuted
	Control	33	32,6321	13,6032	0,0798	0,1542	
Posttest	Experiment	34	88,2338	7,6895	0,1221	0,1519	
	Control	33	77,5051	8,4989	0,1124	0,1542	

3.1.3. Hypothesis Test Results

The data that used to test the hypothesis is the difference between the posttest and pretest scores to show the measurement of the improving in learning outcomes of students before and after learning the additive and addictive learning subject with and without using interactive media based on *Lectora Inspire* as presented in Table 6.

Table 6. Results Of The Hypothesis Test

Class	N	$\sum X$	\bar{x}	S_g	t_{ct}	t_{table}	Explanation
Experiment	34	1780,79	52,3762	13,5052	8,1392	1,67	The hypothesis is accepted
Control	33	1480,81	44,8730				

Table 6. shows obtained $t_{ct} = 8,1392$, t_{table} obtained from the real level of 5% and $dk = 34 + 33 - 2 = 65$ is 1,67, so that $t_{ct} > t_{table}$ is $8,1392 > 1,67$. The data shows that the using of interactive media based on *Lectora Inspire* can improve student's learning outcomes.

3.2. Improving Learning Activities

To find out the learning activities of students used data analysis techniques by the average calculation equation to obtain the percentage diagram of the observer's assessment through observation sheets on the student's learning activities of the experimental and control class as presented in Figure 1.

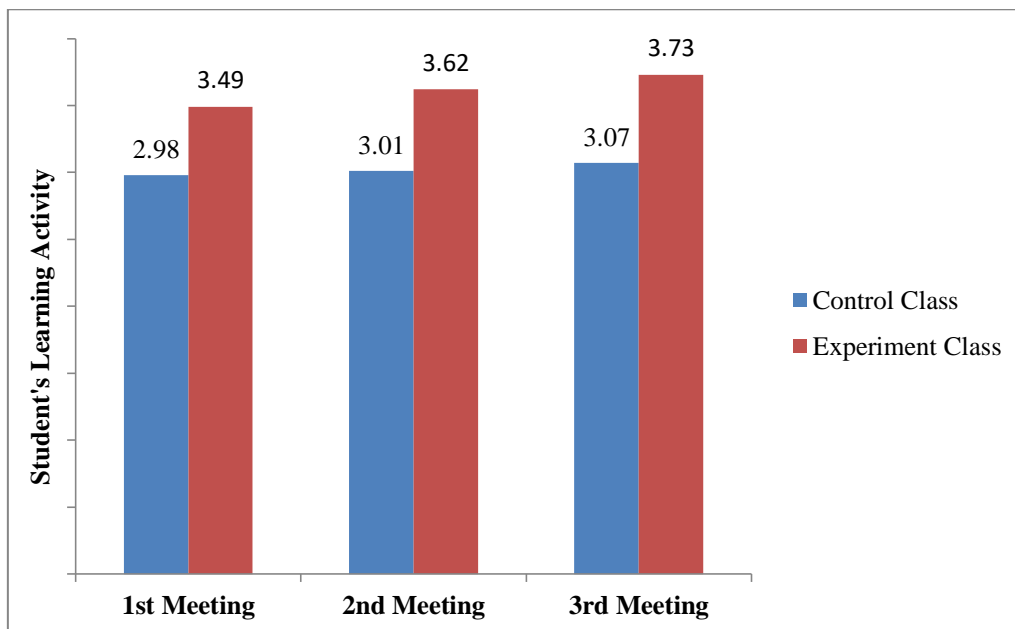


Figure 1. Percentage Chart of Student's Learning Activities

The criteria of student's learning activities in Figure 1. was analyzed the relationship with the number of students based on observer's assessment, i.e the very good criteria in the experimental class obtained 20 students, while the good criteria in the control class were 18 students. So it can be seen that there is a difference in learning activities between students who using interactive media based on *Lectora Inspire* on the learning process and not. Indirectly it also implies that the using of interactive media based on *Lectora Inspire* in the learning process can improve the student's learning activities to be very good.

Morris (2006) states that the creativity of a teacher in the learning becomes the main thing that must be considered because this creativity will be able to raises high motivation, high expectations, and the ability to communicate and listen well for students. In addition, the creativity of teachers in the learning is also able to make learning more interesting and inspiring. (Hayyun Lathifaty Yasri dan Endang Mulyani, 2016) mentions that teacher's creativity in the learning can be realized by presenting learning experiences for students.

Based on 11 kinds of learning experiences according to Edgar Dale, one of which can be obtained through the use of media, students will tend to understand more about things that are interpreted in the media than in textbooks. It was also stated that the media was able to provide learning experiences that students did not get in the classroom because of the limited space and time they had. This can also improving skills analytical students towards the media displayed based on the theories and concepts they learned. Thus it can be stated that the media is able to reach the cognitive and affective domains of students simultaneously, as well as efforts to improve it. (Hayyun Lathifaty Yasri and Endang Mulyani, 2016)

The improvement of student's learning outcomes and activities by the using of interactive media based on *Lectora Inspire* is the consequence of an attractive design visualization that can display images, flash animations, videos and also there are several questions about additive and addictive learning subject that can stimulate students directly to provide response, so that students easily understand the learning subject presented. Besides that, there are also learning materials and simulation exercises that are given in various forms of tests such as true/false, multiple choice, matching, drag and drop and hotspot locations which are accompanied by feedback of the evaluation at the end of learning with scoring. The variation of this simulation exercises getting students have feedback to find out the answers of the questions until they find the right answer without time duress. So the information from materials learning will be embedded in the minds of students until find out the correct answer.

Another effectiveness of using interactive media based on *Lectora Inspire* in the teaching and learning process is in line with Arsyad's (2011) statement, namely; 1) can overcome the limitations of the senses, time and space, 2) can give students the same experience, 3) clarify the presentation of the message to be not too verbalistic, 4) bring motivation and activity in the learning and 5) allow students to have the same experience and perceptions.

4. Conclusion

The effectiveness (impact) of using the valid and practical interactive media based on *Lectora Inspire* can improve the quality of chemistry science learning which is indicated by an improved of students' learning outcomes and activities on additive and addictive learning subject in class VIII-A MTs Dar El Hikmah Pekanbaru.

References

- Andi Supangat. 2014. *Statistika: Dalam Kajian Deskriptif, Inferensi dan Nonparametrik*. Prenadamedia Group. Jakarta
- Agus Irianto. 2010. *Statistika Konsep Dasar dan Aplikasi*. Kencana Ahsanuddin. Jakarta.
- Arsyad. 2011. *Media Pembelajaran*. PT Raja Grafindo Persada. Jakarta.
- Eko Putro Widoyoko. 2017. *Teknik Penyusunan Instrumen Penilaian*. Pustaka Belajar. Yogyakarta.
- Firman. 2000. *Beberapa Pokok Pikiran Tentang Pembelajaran Kimiadi SLTA*. Makalah pada diskusi Guru Kimia Aliyah Jawa Barat. Bandung.
- Hayyun Lathifaty Yasri and Endang Mulyani. 2016. Efektivitas Penggunaan Media Film Untuk Meningkatkan Minat dan Hasil Belajar Ekonomi Siswa Kelas X. *Harmoni Sosial: Jurnal Pendidikan IPS* 3 (1): 138-149.
- Moh Nazir. 2014. *Metode Penelitian*. Ghalia Indonesia. Jakarta.
- Morris, Wayne. 2006. *Creativity: Its Place In Education*. Jpb.Com. New Zealand.
- Muhammad Ali. 2009. Pengembangan Media Pembelajaran Interaktif Mata Kuliah Medah Elektromagnetik. *Jurnal Edukasi@ Elektro* 5(1):11-18.
- Rusman. 2012. *Belajar dan Pembelajaran Berbasis Komputer: Mengembangkan Profesionalitas Guru Abad 21*. Alfabeta. Bandung.
- Sudjana. 2015. *Metoda Statistika*. Tarsito. Bandung.