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The effectiveness of using flipbook maker to improve the chemistry learning outcomes of senior high school students

Nova Irawati Simatupang [1,*] and Elferida Sormin[1]

[1]Department of Chemistry Education, Faculty of Teacher Training and Education, Universitas Kristen Indonesia, Jakarta 13630, Indonesia
*Corresponding author: NIS, nova@uki.ac.id

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Abstract

This research was conducted by applying a flipbook maker to improve student chemistry learning outcomes on the subject of hydrocarbons. The aims of this study was to determine the effectiveness of the use of flipbook maker to improving student chemistry learning outcomes. The use of this flipbook can increase students interest in learning chemistry which also affects the increase in students chemistry learning outcomes. The population in this research were all students of XI senior high school (SHS) Darussalam Tangerang. The sample of the study was students of XI MIA 1 consisting of 32 students. The sample was selected by the purposive sampling techniqe. The instrument used was multiple choice questions consisting of 20 items. Based on the pre requisite test, the data obtained were normally distributed with sig = 0.094 > 0.05 and homogeneous with sig = 0.014 > 0.05. Hypothesis testing is done using one sample t-test with significance level of 0.05 using the SPSS. From the research results obatined t_{count} (15.346) > t_{table} (1.670) and significant value of 0.000 < 0.05. Based on this, it can be concluded that use flipbook makers is effective to improving student chemistry learning outcomes.

Keywords: Chemistry; flipbook-maker; hydrocarbon; learning outcomes

1. Introduction

A teacher can be said to be successful in teaching viewed from generally assessed from the learning outcomes obtained by students through the teaching and learning process carried out. Suyono and Hariyanto (2011) say that learning objectives are formulated to achieve an ideal learning process.

Learning is defined as the process, method, act of making people or living things learn. Learning outcomes are interpreted Slameto (2015) as the ability achieved by students after going through the teaching and learning process. Learning outcomes

can also be expressed as changes in behavior in students observed in the form of changes in knowledge, attitudes and skills. In KBBI (1995) the notion of effectiveness is its effect, influence and impression, effective, and can bring results. So it can be concluded that the effectiveness of learning is a process or a way to make someone can learn successfully. According to Trianto (2010) the effectiveness of teaching in a good learning process is the teacher's effort to help students to learn well.

Piaget's theory argues that the way of thinking of children is different from adults, therefore teachers must be able to teach according to the way of thinking and needs of children (Suyanti, 2010). Teachers are required to be more creative in carrying out the teaching and learning process so that the learning process can run well and students' perceptions about the fearful chemistry can be overcome (Simatupang, 2018). Both teachers and students must have two-way interactions and pleasant communication so that the learning process can run effectively.

According to Sulaiman (2012) whether or not learning objectives are achieved can determine effectiveness in learning process. Criteria for effectiveness in learning refers to (a) mastery learning, learning can be said to be complete if it has reached at least 75% of the number of students; (b) student learning outcomes show significant differences between initial understanding and understanding after learning; (c) increased student interest and motivation, that is if after learning students become more motivated to study harder and get better learning outcomes.

Mardhiah (2018) said that the high or low learning outcomes depend on several things, one of which is the support of the use of learning media. Therefore, it becomes a demand for educators to always develop and improve the ability to provide a learning process that suits the needs and character of students.One of the creative efforts that can be done by teachers is to maximize leaning facilities and media. Currently teacher must be creative juxtaposing between models and strategies as well as between models and media in the learning process (Anggereni and Khairurradzikin, 2016).

Learning media used can be in the form of print media, electronic media or using environment-based media. Someone will learn better from text and image media than text media alone, so that students can get better learning outcomes, then students must first have an interest in the material learned. According to Lee et al. (2010) the book is one of the media and is an important access to education in the delivery of national education. In addition, how teachers can be facilitate students reading needs is an issue that also needs attention for us (Sukmawati, 2016). In connection with that, using a flipbook maker is expected to facilitate the needs of students to use books in the form of a flipbook so that it is also easier to read using a smartphone.

Flipbook Maker is an application that is used to make e-books, e-modules, and e-paper which in its creation can insert images, graphics, sound, links, and videos. According to one teknokids in Ramdania (2013); Rasiman (2014) flipbook is one type

of classic animation made from a stack of paper resembling a thick book, on each page a process is described about something that later the process looks moving or animated. Meanwhile, according to Wibowo and Pratiwi (2018) kvisoft flipbook maker application is a form of multimedia that supports as a learning medium that will help in the learning process because this application is not fixed only on the writings but can be included an animated motion, video, and audio that can making an interactive learning media interesting.

This media has the advantage that in its presentation can be made in the form of pdfs, image clips, videos, animations, and has a template design such as background, control buttons, navigation bar, hyperlink and backsound that makes the flipbook display more attractive (Maf'Ula, 2017). According to Hidayatullah and Rakhmawati (2016), this flipbook maker makes students able to read by feeling like opening a book physically because there is an animation effect where when moving pages will look like opening a book physically, even though they are reading using a computer, notebook or smartphone. Innovation in books through the use of technology needs to be done especially for millennials who are accustomed to using smartphones in various activities including learning.

From the results of research Mulyadi et al. (2016) about the development of flash flipbook media to improve students 'creative thinking skills in science learning in junior high schools proved to be effective in increasing students' critical thinking skills. In addition, Rasiman's (2014) research on the effectiveness of resource-based learning assisted by flip book makers in high school mathematics learning also showed a significant increase in learning outcomes. In the end, the use of flip book maker media is expected to increase students 'learning interest and can also affect students' achievement or learning outcomes.

2. Methods

This research will be conducted at the Ciputat, Darusaalam SHS. The sample is taken by 32 treatment students, where the determination of the research unit and this sample uses a purposive sampling technique because the researchers determined by it self. The research method used is a quasi experimental design with the reasons that do not allow the use of the control class in research with the following design:

$$M1 \longrightarrow X \longrightarrow M2$$

Information:
M1 = pre-test ability
M2 = post-test ability
X = treatment by using a *flipbook maker* when teaching hydrocarbon subjects

The study population was all students of SMA Darussalam Tangerang, while the research sample was students of class XI MIA 1. The sample was selected by purposive sampling technique. The test instrument used is multiple choice questions consisting of 20 questions and has been validated with the help of an expert validator, Dr. Sumiyati, M.Pd. The instrument consists of several sub topics, namely:

1. The specificity of carbon atoms in hydrocarbon compounds:
   a. Distinguish primary C, secondary, tertiary and quaternary C atoms
   b. Classification of hydrocarbon compounds based on saturation of the bonds.
2. Nomenclature of alkane, alkenes and alkyne hydrocarbons.
3. Isomerism of hydrocarbon compounds (Chang, 2005)

Data analysis includes analysis prerequisite tests and continued with hypothesis testing using one sample t-test. Research data were analyzed using SPSS 21 and Microsoft Excel for windows (Silaban, 2017). The flowchart of this research is show at Fig 1.

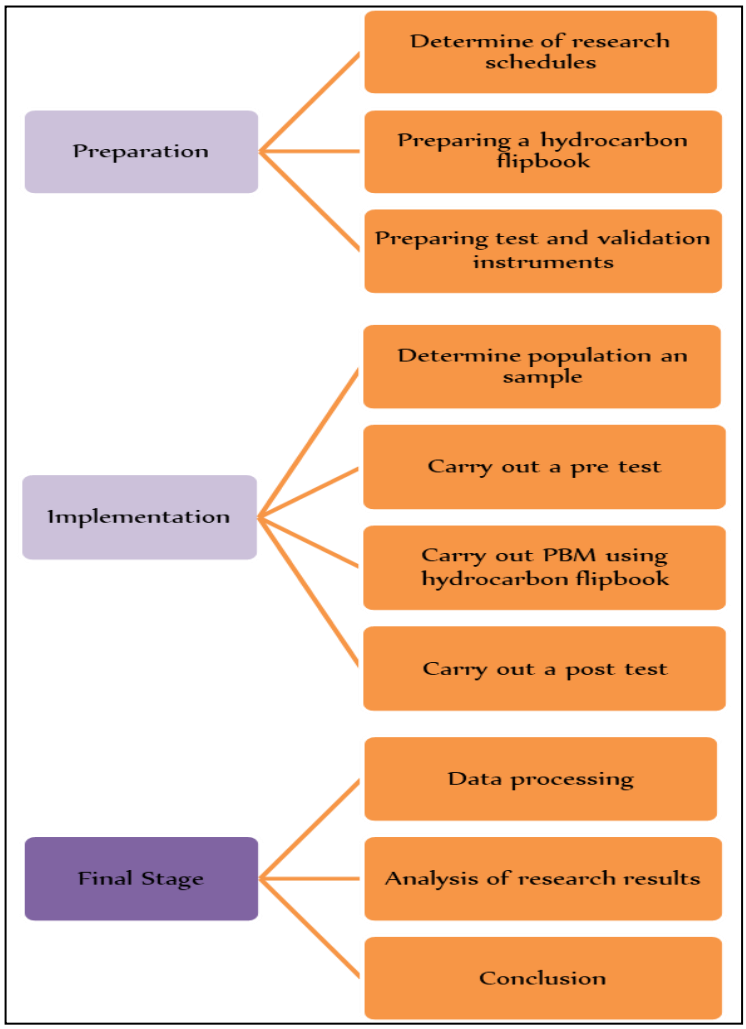

Fig 1. Research Flowchart

3. Results and Discussion

The research data obtained by first giving a pretest to students. Furthermore, the analysis prerequisite test consists of normality test and homogeneity test. The normality test is done using the Shapiro Wilk test because the number of samples is still smaller than 50, and a sig = 0.094 is obtained as shown in Table 1. Based on the sig value obtained is 0.094> 0.05 indicating that the data is normally distributed.

Table 1
Test of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Class	Statistic	df	Sig.	Statistic	df	Sig.
Learning outcomes	1	.154	32	.053	.943	32	.094

In addition to the normality test, a homogeneity test was also carried out using the levene test with results as in Table 2. Based on the sig value obtained, that is 0.184> 0.05, it indicates that the data is homogeneously distributed.

Table 2
Test of Homogenity of Variances

Levene Statistic	df1	df2	Sig.
1,805	1	32	.184

Because the analysis prerequisite test shows that the data is normally distributed and homogeneous, the hypothesis test is carried out using the parametric test by using one sample t-test with the results shown in Table 3.

Table 3
Analysis Result by one sample t-test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Pretest and Posttest result	15.346	63	.000	53.594	46.62	60.57

Using the one sample t-test, it was obtained that the t-count (15.346)> t-value (1.670) and a significant value of 0.000 <0.05. Based on data analysis and SPSS-assisted hypothesis testing it can be stated that Ha is accepted where there is an increase in student chemistry learning outcomes taught by using a flipbook maker.

Hidayatullah and Rakhmawati (2016) said that by using the learning media it was hoped that they could provide updates in the learning process in class. The use of flip

book maker media can increase students' learning motivation and can also affect student achievement or learning outcomes. The use of Flipbook can also increase understanding and increase learning achievement Student learning motivation is very important to be developed, because thus students have the desire to learn with their own awareness. It is this desire and awareness of learning that ultimately helps improve student learning achievement (Yanuarti and Rosmayanti, 2019; Lukman et al. 2019; Perangin-Angin et al. 2019; Munthe et al. 2019).

In accordance with the research aims, the use flipbook maker is known to be effective in improving student chemistry learning outcomes. Hydrocarbon flipbooks given to students in the manufacturing process are first arranged in pdf format before being converted into videos that can be played on students' smartphones. Flipbooks used on the subject of hydrocarbons that can be accesed and read using a smartphone make it easier for students to be able to repeat the lessons the teachers has explained in class.

Flipbook format with the topic of hydrocarbons used as in Fig. 2. The sub topics of the subject taught by using a flipbook maker consist of:

1. The specificity of carbon atoms in hydrocarbon compounds:
   a. Distinguish primary C, secondary, tertiary and quaternary C atoms
   b. Classification of hydrocarbon compounds based on saturation of the bonds.
2. Nomenclature of alkane, alkenes and alkyne hydrocarbons.
3. Isomerism of hydrocarbon compounds

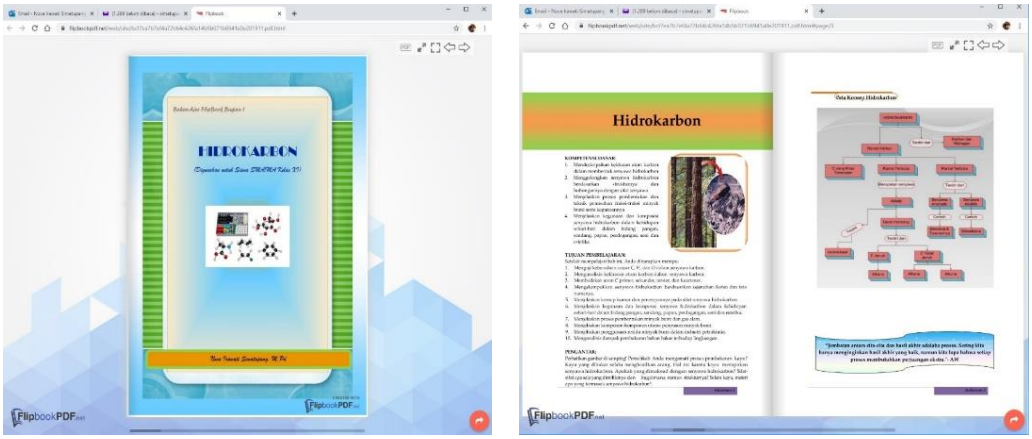

Fig 2. Flipbook Hydrocarbon

Learning using technology-based media is perfect for learning in the era of the industrial revolution 4.0 for students who are millennials. Based on the results of Harefa at al. (2019) also shows that technology-based learning is more effective in improving student learning outcomes than conventional learning.

The increase in student chemistry learning outcomes in this study starts from increasing student motivation in reading and learning. So this is directly proportional

to the increase in student chemistry learning outcomes. Of the 32 students who need to take improvements during the exam for hydrocarbon subjects there are only 2 people left. This shows that the use of flipbooks in chemistry learning is effective in improving student chemistry learning outcomes.

Based on the analysis of the research data shown in Table 3, it shows that there is an increase in student learning outcomes that are taught using the flipbook maker module on the topic of hydrocarbons. This is based on the results of the analysis using one sample t-test aided by SPSS 21 obtained drug tcount (15.346)> ttable (1.670) and significant value of 0.000 <0.05. Interpretation of research data shows that student learning outcomes taught using the flipbook maker have improved.

4. Conclusion

Based on the results of research and hypothesis testing conducted it can be concluded that the use of flipbook makers in chemistry learning especially on the subject of hydrocarbons is effective in improving student chemistry learning outcomes. This was proven by using the one sample t-test, it was obtained that the tcount (15.346)> ttable value (1.670) and a significant value of 0.000 <0.05.

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