The Effectiveness of The Scientific Approach to Improve Student Learning Outcomes

Firman✉, Baedhowi, Wiedy Murtini

Faculty of Teacher Training and Educational Sciences, University Sebelas Maret, Indonesia

Info Articles

Abstract

The purpose of this research is to analyze the effectiveness of the scientific approach of Economics with modules that have been developed to improve the learning results of high school students. This research is the development of research based on the model of the Borg with Gall & i.e. stage introduction, development, and testing phase. The subject in this study is the SMA Negeri Mandailing Natal. Data collection techniques are used namely observation, interview, questionnaire, documentation, and test the results of the study. Data processing is carried out using SPSS. Operational field test using the design of one group pretest – posttest design. Analysis of student learning test results in analysis using t-test test (independent samples test). The results showed that: the effectiveness of the economic lesson module with scientific approach showed that the average results of experimental classes after using the learning modules developed of 85.00 from earlier amounted to 65.00, and the control classes scored an average of 78.00 from previous 66.00. These values indicate that the developed modules can improve student learning result effectively.

How to Cite

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✉ Address correspondence:
Email: firmanseroja@gmail.com

INTRODUCTION

The quality of human resources are certainly not escape the quality of education, because education is a major factor in improving the quality of human resources (Hapsari, Hariyadi & Prihastuty 2014; Marjan & Arnyana Setiawan, 2014; Dirgatama, Siswandari, Indrawati 2017; Khaerunisak, Kartono, Hidayah, & Fahmi 2017). Curriculum change curriculum into 2013 KBK is a Government effort to improve the quality of education, with the hope of being able to produce graduates who have the competitiveness to face the competition of globalization. The 2013 start curriculum applied in 2013 have reserved in the learning process that is more learning-centered isswa (student center) as well as using the scientific approach in the process of his education, the goal for improve the attitude, knowledge, skill graduates as found on Permendikbut No 81a of the year 2013.

Scientific approach to learning are basically the same with the scientific method or scientific models commonly used in the process of learning science-science (Longbotham & Longbotham 2006; Windschitl, 2007 Braaten & Thompson; Schwarz, Acher, Reiser, Fortus, Davis, Schwartz, Hug, Kenyon, Krajcik, 2009; Keyes 2010). Scientific approach to learning is directly on the facts and the reality that exists around the student learning resulting in actually using observation and analysis in practice (Utanto et al., 2017; Gunawan et al., 2017; In'am & Hajar 2017). A more scientific approach engaging students in activities directly and help them associate academic learning with real-life contexts they face. By hooking the lessons with real life expected of students more creative, innovative, and capable of issuing cemerlangnya ideas in solving problems encountered (Parmin et al., 2016; Timeless, Assaat & Pujiastuti 2017; Nagl, Obadovic & Segedinac 2012). Steps of learning with a scientific approach is generally known by 5 m. namely, observe, ask yourself, try, analyzing, communicating (Utanto et al., 2017; Gunawan et al., 2017).

Learning by using scientific method or scientific approach is capable of creating an atmosphere of active learning, and can make students more creative and innovative thinking in the face of the material being taught (Setiawan & Wilujeng 2016; WATI, Bharati & Hartono 2014). Nagl, Obadovic & Segedinac (2012), Susilo, Siswandari & Bandi. (2016) and Sodik & Wijaya (2017) also revealed the learning scientific methods can make the atmosphere becomes monotonous learning atmosphere that is very interesting, because the student is presented with the material reality and the facts that exist around the them so that it is able to increase the motivation of students to find out more.

Application of the 2013 curriculum has its own character that is more student-centered learning (student center) and use the scientific approach in the process of the lesson, it may not necessarily be easily applied to teachers in all schools. In fact, on the practice field are still many teachers using conventional methods such as lecture that goes one direction, learning is more dominated by the teacher (teacher center) it is expressed by (Sudarwati 2013; Marjan & Arnyana Setiawan, 2014; Sutadji & Sugandi said, 2016; Dirgatama, Siswandari, Indrawati 2017; Gerald Crawford, Usodo & Subanti 2017; Sodik & Wijaya 2017). Based on the results of observation and obseervasi done SMA Negeri mandailing Natal, the same thing also found that teachers who teach in schools the average still use methods lecture that goes one way, still learning centered on the teacher (teacher center). While the results of the interviews from several teachers in SMA Negeri Mandailing Natal, obtained the data that there are teachers in all schools the difficulty to apply scientific approach in the learning process because it requires more time long while the time each subject is limited, making it difficult to apply a scientific approach on the curriculum of 2013. Therefore, in this study aims to test the effectiveness of student learning media in the form of modules that it already comes with a step-by-step scientific approach in the delivery of the subject matter. So expect a teacher could use the time available to convey the subject matter according to the curriculum already applied and results and can improve student learning.

METHOD

This research includes the development of research that aims to produce a product in the form of an economic lesson module is ready to be used in the learning process in schools. The design of the development model that is used in this research is the design model the Borg modified Gall & Sugiyono (2015) which consists of 10 steps, i.e., Research Information Collection, Planning, Development of & a Preliminary Form Of Product, Preliminary Field Testing, Main Product Revision, Main Field Operational Testing, Product Revision, Operating the Final Product Testing, Revision, Dissemination and Implementation. This research was conducted in May – November 2017. The subject of research is the grade X SMA Negeri 1 Natal, Mandailing Natal Regency of 58 students. This research begins with the preliminary study stage, namely the study of the literature to find theories supporting data research and fieldwork to gain deeper information for the research base. To get valid data also conducted interviews, now spread to teachers and students. Data collection techniques used in the study include observation, interview, Questionnaire, and validation team of experts, test the results of the study, and documentation.

Technique of data analysis in this study there are two namely for data observation, interviews, and documentation analyzed by qualitative descriptive techniques, whereas the data validation team of experts and Questionnaire as well as test results of student's study analyzed with descriptive quantitative. The design of the test of the effectiveness of the experimental design used i.e. pretest-posttest control group design. Data obtained from several stages performed will then be processed by using the help of Excel and SPSS Programs.

RESULTS AND DISCUSSION

Drafts of the finished modules are compiled based on data obtained from observation, interview, then drafts the module design validation will be performed (preliminary testing) and a test that aims to obtain assessment, feedback and suggestions viability the economic lesson modules already developed. After a module is developed through several stages of validation and testing as already mentioned earlier, scientific-based economic lesson modules already viable use. The results of the validation material experts acquire an average of 93.81%, an average linguist 92.5%, average media expert 90.2%. After the modules already developed got validation expert, then the module is tested on a group limited to 10 students. From the limited trial results get a positive response of the students, this can we see from the appraisal question form obtained from the students with the average percentage of 88.42% criteria very well. so it can be said that the use of the modules with a scientific approach to economics lesson gets a positive response from learners. Through scientific approaches designed in modules, students not only fixated on the material is there, but the students are invited to consider the surrounding environment as a medium for learning, in addition with a scientific approach contained in the module, not only do students learn in the classroom, but more varied because the students are invited to direct field observation in accordance with the material to be learned.

The results of the test the effectiveness of scientific approach based economy module to enhance the learning outcomes of students use pretest-posttest control group design. To find out the difference a significant learning outcome, it will do a test of the t-test (independent samples test). Test results for a test by using SPSS can be seen in the following table:

Independent Samples Test (pretest)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
							Mean Differ-ence	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	T	df	Sig. (2-tailed)			Lower	Upper
Pretest	Equal variances assumed	,744	,392	1,159	56	,251	2,821	2,434	-2,054	7,697
	Equal variances assumed not			1,163	55,994	,250	2,821	2,427	-2,040	7,683

Based on the table above we can see the results of the t-test test pretest class experiments and classroom control retrieved the value of the $t_{statistic}$ of t_{table} namely of 1.159 < 1.701, this indicates there is no significant difference from the average of the results of the study class experiment and control at the time of pretest is conducted. While the value significance of 0.251 meaning greater than 0.05, this means H0 is not rejected. Data obtained after the next pretest results class experimentation and control classes were given a different treatment, namely class wants a given treatment by the use of scientific-based economic lesson modules that have been developed, while the control class is not given preferential treatment in economic scientific-based lesson modules or use only books provided the school.

Independent Samples Test (pretest)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
							Mean Differ-ence	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	Df	Sig. (2-tailed)			Lower	Upper
Postest	Equal variances assumed	,531	,469	8,368	56	,000	6,829	,816	5,194	8,463
	Equal variances not assumed			8,322	53,280	,000	6,829	,821	5,183	8,474

Test result of t-test (independent samples test) posttest control and wants a class in table 4.19 "showed that the value of the significance test-t IE of 0.000. The smaller value of 0.05 means that H1 is not rejected. While the value of the $t_{statistic}$ gain value of 8.368 meaning greater than t_{table} 8.368 > 1.701. From those results indicate there is a significant difference from the average value of the experimental class and

class posttest control. So it can be said that the results of the study class wants better than the class of the control.

During the learning process takes place, it will be done the assessment of several aspects, namely the aspects of the knowledge, attitude (attitude), and skill (skill). The results of the use of scientific-based economic lesson module obtained average value assessment to knowledge of 83.33, attitude (attitude) of 87.20, and skills of 85.50, which are then compared with the results of the value of learning towards posttest. Based on the results of an assessment for a class experiment posttest obtained average value of 85.40 and average value posttest control class of 78.57. That value indicates the value of experimental class is greater than the value of the control class. Based on the foregoing it can be said that the use of scientific-based economic lesson module is capable to improve the learning results of learners and can make more active participants in the learning process. This is in line with the results of research conducted by Said, Sutadji, and Sugandi (2016) that says that the scientific approach in the learning process can be made more active learners easily directed.

The results of the t-test assessment test (Independent samples test) posttest control experiments and class grades earned value $t_{statistic}$ of 8.368 whereas t_{table} of 1.701. The results showed that the value of $t_{statistic} >$ t_{table} i.e. 8.368 > 1.701. From those results indicate there is a significant difference from the average value of the experimental class and class posttest control. So it can be said that the results of the study class wants better than the class of the control. So it can be said that the use of scientific-based economic lesson module result development can increase the learning results of learners.

CONCLUSION

Development of scientific based economic lesson modules are successfully developed and viable for use in the learning process. It is based on the results of the validation material experts, linguists, media experts, practitioners, as well as small group trials that have been done. Scientific-based economic lesson module is also getting a good response from learners. Based on these results we can conclude that economic lesson module-based scientific approach is effective for increasing student learning outcomes.

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