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The Effectiveness of Ict Media to Improve Students' Activities and Science Learning Achievement at Fourth Grade

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Abstract

This study aims to determine the effectiveness of ICT learning media The Heroes on students' activities and learning achievement of fourth grade in SDN Tingkir Lor 02 Salatiga. The method was used Quasi Experimental Design with Control Group Pretest-Posttest type. Samples in this study were IVA and IVB class as a control class and an experiment class, respectively. Collecting data was used test to measure learning achievement and observation sheets for student activities during learning process. Data analysis was used independent t-test analysis, one-sample t-test, N-gain test, and simple linear regression using SPSS program. The observation sheets was analyzed using the checklist formula. Based on the analysis data shows the ICT media on the learning process is effective in the improving student activities and learning achievement. According to t-test analysis, experiment class has higher t_{value} compare to the control class 0.41. Then, for the simple regression analysis has t_{value} 0.848. The last, N-gain score of the experiment and control class was obtained 0.4 and 0.2, respectively, there are including low and medium criteria. Furthermore, due to the observation result, the observation sheet score on student's activities was 20.4 with good criteria. The use of ICT media The Heroes has a significant effect on students' activities as well as improving the learning achievement. The results of this study can be used to train students to find new knowledge, to improve their learning achievement, as well as to improve the quality of learning.

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INTRODUCTION

Education is an important element in establishing and developing our country, Indonesia. It can't be separated from the government's role in designing the implementation of education in this country. Education planning and implementation needs to be done by evaluating the results of previous implementation. The curriculum in Indonesia continued to be improved and refined over time. Until now, education in Indonesia has known and used the 2013 curriculum in elementary school level and the secondary school level. The 2013 curriculum is a new curriculum that emphasizes scientific and thematic approaches. The 2013 curriculum orientation is the improvement and the balance between competencies of attitude, skills, and knowledge. They are strongly supported by the teacher's strategy in organizing learning both inside and outside the classroom. The learning process trains students in observing, questioning, trying, reasoning, and communicating (Nafi'ah, 2015).

Permendikbud no. 22 of 2016 states that the 2013 curriculum requires teachers to use various methods and strategies in learning activities to achieve learning purpose. In addition, teachers also use various learning instruments as a support in teaching such as learning media. The use of media should be part of the teacher's attention as a facilitator in every learning activities. Therefore, every teacher needs to learn how to determine learning media in order to effectively achieve the learning purpose in the teaching and learning process.

One of the strategies used by the teacher is to design learning media to facilitate students in understanding the material and values of life included in each theme, sub-theme, and learning material. Sudjana (2005: 15) stated that media is needed in the learning process because it has abilities or competencies that can be used. Effective media means the media is able to communicate something that the messanger wants to convey to the recipient. The development of science and technology offers more and more convenience in the world of education, one of them is in terms of delivering subject matter to the students.

ICT (Information and Communication Technology), also known as computer-based multimedia creates an atmosphere of delivery and understanding of learning material that is more exciting and fun, as well as creating good interactions between student and teacher, student and student, and student with learning media used to achieve learning purpose (interactive learning). There are many kind of ICT learning media. One of them is Powerpoint. Although Powerpoint is essentially classified as one of the learning media that encourages student to actively participating, there are not many teachers use it in learning.

The results of observation in class IV A and class IV B of SDN Tingkir Lor 02 Salatiga showed that the teachers still used conventional learning that makes students less active. Based on the observation, the elementary school has LCD facilities that are rarely used in the learning process because the teachers assumed that learning takes more time. As a result, the teaching and learning activity tends to run passively. This kind of situation made students felt bored because they were not actively involved in learning. Students were lazy to listen about the subject, unfocused eyes, talk to their friends, draw cartoons, and worked on other assignments. Based on the observation of the subject test about Environmental Changes, 63% of students in class A and 60% of students in class B whose scores were less than the minimum criteria of mastery learning (70).

Studies to analyze the effectiveness of powerpoint media has been done in the past years. Result of the study conducted by Sartika et al. (2015) showed an improvement in students' learning achievement because the learning activity was used PowerPoint media. Result of the study from Ziden & Rahman (2013) indicated virtual simulations embedded in Microsoft PowerPoint helped students to improve students' achievement in a pilgrimage topic.

Study conducted by Susskind (2010) and El Khoury (2012) showed that students who

were taught with PowerPoint media had more positive attitudes and good marks than students who used conventional methods. Students were more motivated by the PowerPoint media. While study by Wanner (2015) revealed that the use of powerpoint as a learning method can improve students' participation and activeness in studying. While Garner (2013) conducted a study regarding the use of PowerPoint and the results showed that PowerPoint was more effective in improving understanding and reducing misunderstanding over the materials.

ICT PowerPoint has many benefits including a more interesting presentation, stimulating students to learn the information, easy to understand, the teacher does not need to explain much about the materials, easy to carry everywhere, can be reproduced and used repeatedly. Therefore a study conducted about the effectiveness of ICT-based learning media to improve the students' science cognitive learning achievement and activities. This study aims to analyze the effectiveness of ICT learning media, improvement in student learning achievement, the effects of students' activities and responses.

METHOD

This study was used a Quasi Experimental Design with Control Group Pre-test-Post-test type. In this design, beside experimental class, there is a control or comparison class that gets the observations. Both groups pre-tested before being treated so that the treatment results could be more accurate because they could compare with the post-test after being given a treatment. The design chart according to Arikunto (2010: 125) is as follows.

E	0_1	X	0_2
K	0_3	X	0_4

Where E is experimental group (ICT), K is control group (conventional), 01 and 03 were the pre-test for experimental and control class, 02 and 04 were post-test for experimental and control class.

The population in this study was students at an elementary school in Tingkir Lor Salatiga. There are 2 elementary schools in the area namely SDN Tingkir Lor 01 and 02 Salatiga. In this study, the selected sample was students of class IV A as the control class and class IV B SDN Tingkir Lor 02 as the experimental class. Both classes have similarities in terms of teachers' education background, total of students, cognitive learning achievement taken from daily tests, the parents' occupation background were mostly laborers, as well as the reputation of the two classes was almost the same.

The independent variable in this study was ICT media *The Heroes*. The dependent variable is students' learning achievement and activities. The control variables in this study were the educational background of the students' parents, the parents' occupation, the ability of the teacher, class conditions, subject material, facilities and infrastructure, and the time lesson.Collecting data was used test, questionnaire, documentation, and interview.

Analysis data of students' cognitive learning achievement was calculated with the SPSS16 program using analysis t one-sample t-test. The effects of *The Heroes* ICT media on students' activities were measured by observation sheets in the form of a checklist. The effects of activities and learning achievement were calculated using simple linear regression formula. Improvement of learning achievements after applying the ICT media *The Heroes* were analyzed based on the comparison of normalized gain values (N-gain) between the experimental class and the control class. Positive responses of the students were measured with a questionnaire instrument sheets using the PR formula (Positive Response).

RESULTS AND DISCUSSION

Analysis of One-Sample Test revealed that t_{value} was 6.284. If df 63 and the significance level is 0.05, then the t_{table} was 1.671. Because $t_{value} > t_{table}$ then H_0 was rejected and Ha was

accepted. That means the average of experiment class scores were higher than the control class scores. Classical passing score from posttest with minimum criteria of mastery learning (70) were obtained 71% for control class students and 97% of experimental class students (Figure 1).

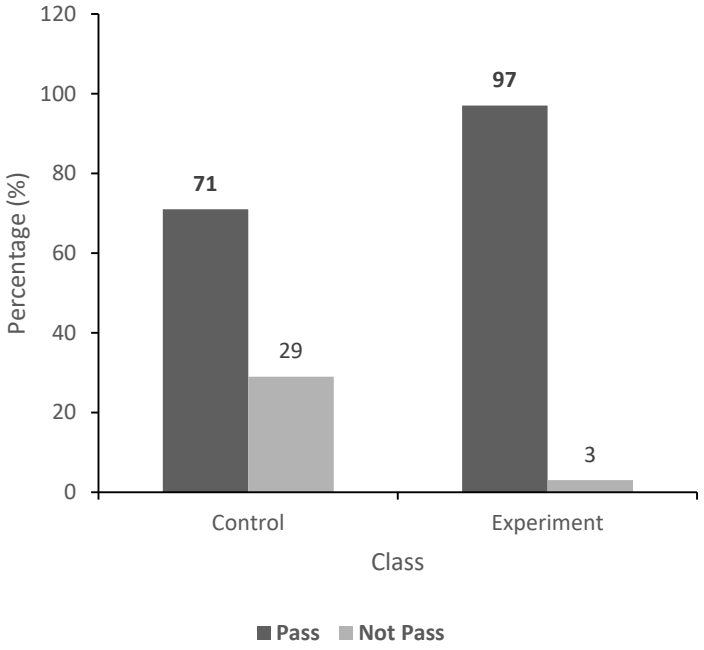

Figure 1. Classical Average Posttest Score Percentage

There were a difference between pre-test scores and post-test scores. Pre-test has been done before teacher giving materials. Post-test has given to students after the treatment. The comparison of the pre-test and posttest scores of the control class and the experimental class is presented in Figure 2.

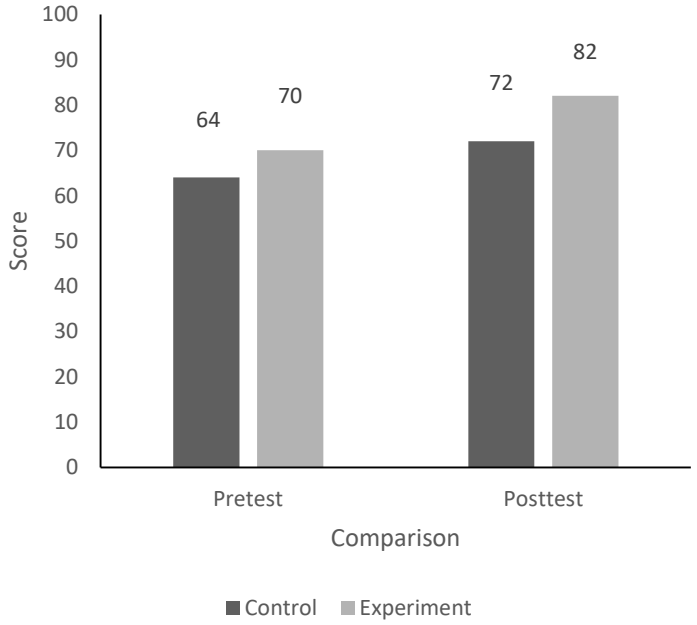

Figure 2. Pre-test and Post-test Scores of Control and Experiment Classes

The improvement of students' learning achievement was calculated based on the comparison of normalized gain values (N-gain) (Hake, 1999) between the experimental class and the control class. The results of calculation using the N-Gain formula are shown in Table 1.

Table 1. Summary of N-Gain Result of Control and Experiment Classes

Class	n	Average Score N-Gain (Between: 0.00-1.00)	Criteria
Control	30	0.2291	Low
Experiment	33	0.4056	Medium

The criteria of control class is low although the scores of the pre-test to post-test increased but not too significant. This is because teacher-centered learning caused students to be less active, less interested in studying, students' comprehension was lacking and students felt bored when studying. The criteria of the experimental class is medium, which means the majority of students in the class experienced a significant increase of the pre-test to post-test scores. This was due to the increase of students' activities, enjoyable learning, innovative media that attracted and made students better at understanding the materials.

Learning by applying ICT media *The Heroes* gives better result than conventional methods because in the classroom, students were required to be more active when studying. Like when the teacher showed powerpoint to the studets, there are videos, pictures and games that made them more interested. So students understood the material. This affects students' works on post-test evaluation because they understood the material better than during the pre-test. This result is in accordance with Elpira (2015) which stated that powerpoint media has the potential to make students excited to learn and keep students focused on the lessons until the end of lesson. Powerpoint is very effective in helping students understand the contents and concepts of the material better (Fuad, 2019). Study conducted by Puspayanti et al (2013), also Muharoma & Wulandari (2014) stated that the use of PowerPoint media makes the presentation of subject look interesting so that it stimulates students to find out more information about the subject. The pictures and videos on powerpoint can explain the subject also making it more interesting.

In learning activity, there was also group activity to train students in problem solving, develop social and communication skills, increase self-confidence in students' abilities. In addition, the group also aims to respect the opinions of others. This is in accordance with the theory of constructivism by Vygotsky & Piaget (1926) which states that learning by self-discovery is a form of learning that is meaningful for students to seek their own knowledge and not from others'.

In the control class that used conventional method the learning achievement were lower than experiment class as seen at Figure 2. This is due to the teacher used discourse method and directly giving assignments, so that the learning is more teacher-centered. In teaching and learning activities, the teacher's role is giving subject material in the form of discourse, while students only listen, take notes, and do assignments. According to Nuraisah et al. (2016), the conventional learning is teacher-centered so it makes students less enthusiastic about participating in learning. The main focus of students on conventional method is getting answers from the teacher. The teacher still guided students how to do assignments. Students relying on the teacher to determine whether the answer was right or wrong. As a result students were kept away from sources of knowledge that were important to them.

In this study, observation of students' activities only applied on experimental class that using ICT media. Students' activities was

analyzed using observation sheets which can be seen in Table 2.

Table 2. Summary of Analysis Result of Students' Observation Sheets

Observation Sheet	Average Score	Percentage (%)	Criteria
Students' Activities	20.4	75 %	Good

In the experimental class the results of students' activities showed good criteria with a percentage of 75%. There are 6 indicators to measure students' activities including the readiness of students to take lessons, responds to apperception in accordance with the materials, paying attention to teacher explanations, actively asked questions, enthusiastic in learning and reflecting the learning achievement. The percentage of students' activities achievement results can be seen in Table 3.

Table 3. Achievement in The Aspects of Students' Activities

Students' Activities	Total Score	Percentage
Readiness of students to follow the lesson	130	98
Responding apperception in accordance with the materials	119	90
Paying attention to the teacher's explanation	111	84
Actively asking questions	90	68
Enthusiastic in learning	107	81
Reflecting on learning achievement	117	89

Students' activities refers to behavioristic theory by Skinner, a learning theory that emphasizes behavioral change and as a result of interactions between stimulus and response. Stimulus is whatever the teacher gives to students. The stimulus in this study was the use of ICT media *The Heroes*. Response is the reaction or students' response to the stimulus given by the teacher. The response in this case were enthusiasm of students in asking and answering questions, discussing and giving opinions. According to Agus (2016) and Prasetya (2018) stated that by using behavioristic theory, students are expected to have new behaviors that are formed through the conditioning process, the loss of symptoms and able to respond to the stimulus without causing new problems. Giving stimulus must be done repeatedly to lead the learning habits. This habituation must not exceed the limit, must be done step by step, requires a long time and a long process, and can't be forced upon each individual. This process needs a sense of interest to learn without any forced act (Ledang, 2015).

The relation of activities to students' learning achievement was measured using simple linear regression analysis. The results of a simple regression analysis with SPSS 16 showed t_{value} 0.848. If the significance difference is 0.05 or 5% and df (n-k-1) is 30, then the t_{table} is 2.042. Because $t_{value} < t_{table}$, H_0 is rejected and H_a is accepted. So there is a significant effect between students' activities and learning achievement. The calculation results of simple regression can be seen in Table 4.

Table 4. Calculation Results of Simple Regression

N	T_{value}	t_{table}	Result	Conclusion
33	0.848	2.042	$t_{value} < t_{table}$	H_a accepted (there is an effect)

From Table 4 shows that the students' activity has a positive effect on their learning achievement. This can be seen from students' activities during learning the materials. Students actively asked questions, expressed their opinions, did assignments from the teacher, worked in groups, presented the results of group works and were enthusiastic in concluding the material they had learned. So that when students worked on post-test, the results were better than during the pretest. Research on students' activities has been done by Wahyudin & Fityan (2018) that behavioral change can include active attitudes in learning with questions and answers activity and group discussions. Wulandari (2012) also Ardianto & Rubini (2016) stated that a discussion would create educational interactions, could increase students' participation and activities because each team was motivated to learn. It goes along with the research of Wiyanto et al. (2018) which stated that in the 2013 curriculum, question and answer activity is one of scientific approach's aspects.

The implementation of ICT media *The Heroes* gave a positive response. This shown by the questionnaire analysis result of student responses which showed an average of 3.7 with very high criteria because the media presented interesting things such as pictures, videos and games that made students responses very high.

In the statement of 'learning by using the ICT media *The Heroes* makes me more interested in learning' there are 30 students who strongly agreed and three students agreed on it so the criteria is very high. There are 31 students who strongly agreed and two students agreed with the statement of 'learning by using ICT media *The Heroes* makes me enthusiastic about doing the assignment given by the teacher' so the criteria is very high. The statement of 'I prefer learning by using the ICT media *The Heroes* than the previous learning method', there are 31 students strongly agreed and two students agreed so the criteria is very high. The statement of 'learning by using the ICT media *The Heroes* makes me understand more about the material', there are 30 students who strongly agreed and three students agreed, so the criteria is very high.

In the statement of 'It is easier to solve problems with the help of ICT media *The Heroes'*, there are 30 students strongly agreed and three students agreed, including very high criteria. The statement of 'I am happy to give an opinion at the time of discussion / presentation', there are 28 students strongly agreed, four students agreed and one student disagreed but it still included very high criteria. In the statement of 'I can respect the opinions of friends when discussing in groups', there are 29 strongly agreed, three agreed and one student disagree so the criteria is very high. The statement of 'I was excited to work on group assignments', there are four students strongly agreed, 28 agreed and one student disagreed, included in very high criteria. In the statement of 'I am satisfied with the results of my group work', there are ten students strongly agreed, 20 students agreed and three students disagree, included in very high criteria. In the statement of 'I did the evaluation tests seriously', there are 26 students strongly agreed and seven students agreed, included in very high criteria. From these data the use of ICT media *The Heroes* received a positive response.

The result of this study are the improvement of students' activies and learning achievements. This is because ICT media *The Heroes* has different features from the others. These features include animated/moving images, interesting backgrounds, videos, games and quizzes. So it can be used as a media by teachers when doing learning activity.

CONCLUSION

The conclusion of this study is that the implementation of ICT learning media *The Heroes* is more effective compared to conventional learning on cognitive learning achievements. Students' learning achievement improved after the implementation of ICT media *The Heroes.* Indicators achievement in students' activities observation sheets showed good criteria as students enthusiast about responding to the materials, actively asking questions, giving opinions and inputs during group activities and can respect the opinions of others.

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