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The Effect of a Contextual Approach Containing the Local Potential "Getuk" on Critical Thinking Skills

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Abstract. The research was conducted to analyze the effect of contextual approach learning with local potentials on critical thinking skills and influencing factors. This research used quasi-experimental. The design used is a nonequivalent control group design. This research was conducted at Junior High School 10 Magelang. The subjects were students of class VIIF as the control class and class VIII G as the experimental class. The experimental class was treated with a contextual approach containing "getuk" local potential, while the control class was treated with a scientific approach. The data were collected through non-test with the observation of learning implementation and test with pretest-posttest to measure critical thinking skills. Data analysis was conducted using the Independent Sample T-Test dan effect size. The results found that the contextual approach containing the local potential "getuk" affected the critical thinking skills of grade VIII students of Junior High School 10 Magelang. This is indicated by the results of the Independent Sample T-Test, the value of Sig (2-tailed = 0.016) <½ α (0.05) is obtained, so Ho is rejected. The influence of the contextual approach with local potential "getuk" has medium criteria with an effect size coefficient of 0.76. This big influence is caused by factors. First, the contextual approach plays a role in the learning process to link contextual material contained in local potentials with the knowledge being taught that can train critical thinking skills. Second, the local potential of getuk which is integrated into teaching materials in the form of videos and worksheets can be an object to facilitate critical thinking skills.

INTRODUCTION

Science is the knowledge that studies nature and its contents with all-natural phenomena in the form of facts, concepts, or principles that are systematically arranged [1][2]. However, science is not just a collection of knowledge but a process of discovery and development. Science learning is supposed to put more emphasis on finding concepts and providing direct experience to students. The concept is easier for students to understand than students having to memorize the concept. In addition, students can understand the surrounding environment, so that students can connect science learning materials with the surrounding environment and their benefits for the environment. Science learning demands a variety of activities that make students interact with the environment, real objects, and other concrete things related to science learning materials. Thus, learning science can develop competencies in the 21st century.

In "21st Century Partnership Learning Framework", there are several competencies and/or skills that must be possessed by 21st century of Human Resources, one of which is the ability to think critically and problem-solve (Critical-Thinking and Problem-Solving Skills) [3]. This critical thinking skill is expected for students to be able to think critically, laterally, and systematically in the context of solving problems that exist in everyday life based on the knowledge they already have.

Students' critical thinking skills are classified as low with the average pretest score of critical thinking skills in the experimental class being 54.83 and the control class being 54.33 [4]. In addition to being based on research, researchers also made observations in Class VIII 10 Junior High School Magelang, Indonesia. Based on observations made to class VIII students and interviews with science teachers at 10 Junior High School Magelang, the results were (1) the learning process was still teacher-centered, (2) students were passive if asked for opinions only 2-3 active

students, (3) students are given material directly by the teacher, they do not compile the concept of the material themselves, (4) students have difficulty connecting daily life problems with science learning materials, (5) students have difficulty in giving simple explanations of the problems or questions given teacher, (6) students find it difficult to conclude from the statement submitted by the teacher. This condition shows that students are still lacking in building critical thinking skills.

The regulation of curriculum 2013 in Indonesia is the competency framework in the 21st century. Changes in the learning paradigm following the needs of the 21st century, namely from teacher-centered to student-centered [3]. National Education Standards Board (BSNP) emphasizes that science learning is student-centered (student center) so that students can grow the abilities that are expected to connect science learning materials with the surrounding environment and their benefits for the environment. In practice, science learning is still teacher-centered and dominated by lectures so that only the transfer of knowledge occurs by teachers to students. Student-centered learning in the learning process can be used as an approach. One approach that can encourage student activity is the contextual approach.

The contextual approach according to the Ministry of National Education is a learning concept that helps teachers relate the material being taught to real-world situations and encourages students to make connections between their knowledge and planning in their daily lives. The contextual approach has seven main components; namely constructivism, questioning, inquiry, learning community, modeling, and authentic assessment [5]. Contextual can practice identification, analysis, critical thinking, and have a curious attitude to solve problems [6]. Learning using a contextual approach emphasizes the use of concepts and skills that have been possessed to analyze problems in the real world that are relevant to the intellectual, physical, and social conditions of students. One of the environmental contexts that can be used is local potential. However, Indonesia began to experience a cultural crisis that eliminated local values due to the influence of foreign cultures.

The rapid influence of foreign cultures that entered Indonesia became an obstacle in the formation of the noble character of students. This is one of the causes of teaching and learning activities that are less meaningful and the formation of students' character becomes difficult to do. The shift in the value of knowledge can forget the values of local wisdom, even in urban areas it has been degraded so that people no longer know local wisdom [7]. Therefore, it is necessary to have a bridge that connects local knowledge and potential and integrates the two. Local potential can be integrated with science learning because it can be used as a learning resource [8]. Science learning emphasizes the process and direct experience to develop the ability of students to be able to help and increase local potential scientifically [9]. Integrating local potential has indeed been done by several teachers in Indonesia but is still limited [7].

One of the local potentials that can be integrated with science learning is getuk, the typical food of Magelang. Getuk has become a symbol of Magelang, not just souvenirs typical of Magelang. Every year to commemorate the anniversary of Magelang held "Grebeg Getuk"[10]. In the process of making getuk, many additives are added, which can be in the form of natural additives or artificial additives. Examples of additives in the form of dyes and sweeteners. So that the local potential of this getuk can be integrated into science learning materials, namely additive material in class VIII.

Based on this description, the researcher examines the effect of a contextual approach containing the local potential of the local area on critical thinking skills. In this study, additive materials were chosen to be taught to students in class VIII in odd semesters. Additive material is one of the materials that can be linked to the local potential of the local area. The local potential used by researchers is getuk as a typical food of Magelang. Getuk made from cassava and can be created by making additions in terms of ingredients to add nutritional value, various flavors, colors, and shapes to add to the attraction of buyers [11]. Therefore, the researcher took the title "The Effect of a Contextual Approach Containing the Local Potential "Getuk" on Critical Thinking Skills".

METHOD

This research is a type of quasi-experimental research with the research design used is nonequivalent control group design.

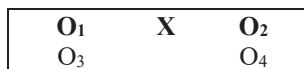| O_1	X	O_2
O_3		O_4

FIGURE 1. Nonequivalent control group design [12]

Note:
- O1 and O3 = measurement of students' initial abilities before there is treatment in the form of a contextual approach containing "getuk" local potential
- O2 = measurement of the final ability of students after being treated in the form of a contextual approach containing local potential "getuk"
- O4 = measurement of the final ability of students who were treated in the form of a scientific approach.

This research was conducted in the 2020/2021 academic year, in October 2020-June 2021 at 10 Junior High School Magelang, Magelang City, Central Java. The population in this research was class VIII of 10 Junior High School Magelang in the academic year 2020/2021. The sample in this study was class VIII G as the experimental class and class VIII F as the control class. The sample of this research was selected by using the cluster random sampling technique. The data collection technique used in this study is a non-test technique in the form of an observation sheet to measure the implementation of learning and a test in the form of pretest-posttest questions to measure critical thinking skills [13].

The validity used is content validity and empirical validity. Content validity is done by consulting the instrument with the supervisor. Empirical validity is done by testing instruments that have been validated by expert lecturers directly to students.

Reliability analysis was used with the SPSS version 22 application. The results of the reliability test based on the Cronbach's Alpha value in the Reliability Statistics table obtained a value of 0.798 where 0.798> from 0.60. Therefore, the reliability of this variable is considered to be good.

The data analysis technique used statistical tests and then the prerequisite tests were carried out, namely normality tests and homogeneity tests. Based on the prerequisite test, the data obtained were normally distributed and homogeneous so that a hypothesis test was carried out with parametric statistical tests, namely the independent sample t-test. If the results obtained are different, then a further test is carried out, namely the effect size test. The effect size test is used to convert the research results obtained in each study into a large effect. The effect size coefficient can be analyzed from the effect size application using the formula from Cohen [14]:

$$ES = \frac{M1-M2}{\sigma}$$ (1)

According to Cohen, the criteria for the magnitude of influence are as in the Table 1. [14].

TABLE 1. Effect size criteria

Effect Size Coefficient	Criteria
ES<0,2	Small
0,2<ES<0,8	Medium
ES>0,8	Large

RESULTS AND DISCUSSION

The results of students' critical thinking skills were based on pretest-posttest questions in the control class and the experimental class. The pretest was conducted in the control class and the experimental class on Monday, November 9, 2020.

TABLE 2. Classification of control and experiment class pretest results

Class	Number of Students	
	Complete	Not Complete
Control	0	21
Experiment	3	19

The control class students scored below the minimum criteria of mastery learning (KKM). It can also be seen in the experimental class that 19 students scored below the minimum criteria of mastery learning (KKM) and 3 students scored above the minimum criteria of mastery learning (KKM). It can be seen that the initial ability of the control class and experimental class students to have critical thinking skills is low. The results of the statistical calculation of the pretest values of the control class and the experimental class with the help of SPSS 22 are shown in Table 3

TABLE 3. Control and experiment class pretest results

Class	Maximum Score	Minimum Score	Mean	Sum
Control	67	7	53,33	1120
Experiment	80	20	53,045	1167

The average pretest value obtained from the control class is 53,333 and the pretest value obtained from the experimental class is 53,045. The difference between the average values of the control and experimental classes is 0.288.

The posttest was conducted in the control class and the experimental class on Saturday, November 17, 2020.

TABLE 4. Classification of posttest results for control and experiment class

Class	Number of Students	
	Complete	Not Complete
Control	11	10
Experiment	14	8

It can be seen that 11 control class students who scored above the minimum criteria of mastery learning (KKM). It can also be seen in the experimental class that 14 students scored above the minimum criteria of mastery learning (KKM). It can be seen that the critical thinking skills of students in the control class and experimental class increased. The results of the statistical calculation of posttest scores for the control class and the experimental class with the help of SPSS 22 are as follows:

TABLE 5. Control and experiment class posttest results

Class	Maximum Score	Minimum Score	Mean	Sum
Control	93	20	65	1365
Experiment	93	60	76,318	1679

The average posttest score obtained from the control class is 65 and the posttest value obtained from the experimental class is 76,318. The difference between the average scores of the control and experimental classes is 11.318. Based on the difference between the posttest average scores of the control and experimental classes, there are differences in critical thinking skills between the control and experimental classes.

The comparison of pretest and posttest for control and experimental classes can be seen in Fig. 2.
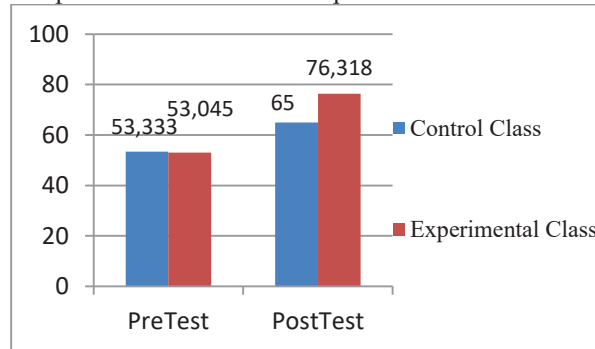

FIGURE 2. The comparison of pretest and posttest

The class obtained an average pretest score of 53,345 and the average posttest score obtained was 65. The difference between the average pretest and posttest scores for the control class was 11,655. While in the experimental class, the average pretest value was 53.045 and the posttest value was 76,318. The difference between the average pretest and posttest scores for the experimental class is 23,273. Changes in the difference between the pretest and posttest scores in the control and experimental classes showed differences in critical thinking skills.

The implementation of the learning process was observed by the observer by referring to the learning implementation sheet. The control class and the experimental class the learning process went very well. The results of learning observations can be seen in Table 6.

TABLE 6. Data observation of implementation of learning

Class	Meeting	Percentage	Category
Control	1	92,5%	Very good
	2 and 3	100,0%	Very good
Experiment	1	100,0%	Very good
	2 and 3	100,0%	Very good

The results of the study were then analyzed using a prerequisite test. The results of the prerequisite test can be seen in Tables 7 and 8.

TABLE 7. Normality test for control class and experiment class

	Class Control		Class Experiment	
	Pretest	**Posttest**	**Pretest**	**Posttest**
Rata-rata	53,333	65	53,045	76,318
Asymp. Sig. (2-tailed)	0,001	0,147	0,200	0,130

The results of the above analysis obtained:

- Pretest control class with Asymp.Sig (2-tailed = 0.001) < (0.05) so that Ho is rejected. The data is not normally distributed.
- Pretest experimental class with Asymp.Sig (2-tailed = 0.200) (0.05) so that Ho is accepted. The data is normally distributed.
- Posttest control class with Asymp.Sig (2-tailed=0.147) (0.05) so that Ho is accepted. The data are normally distributed.
- Posttest experimental class with Asymp.Sig (2-tailed=0,130) $\geq$ ½ α (0,05) so that Ho is accepted. The data is normally distributed.

TABLE 8. Homogeneity test of control class and experiment class

	Levene Statistic	Sig.
PreTest	0,76	0,784
PostTest	3,026	0,089

The results of the homogeneity test analysis of the variation of the control and experimental class data. If the Levene statistic is > 0.05, it can be said that the data variation is homogeneous. Based on the results of the analysis above, it was obtained that the pretest with Levene statistic value = 0.76 > 0.05 so that the variation of the control class and experimental class data were taken from homogeneous samples and the posttest with Levene statistic value = 3.026 > 0.05 so that the variation of the control class data and the experimental class taken from a homogeneous sample.

The prerequisite test, the data obtained were normally distributed and homogeneous so that a hypothesis test was carried out with parametric statistical tests, namely the independent sample t-test. The results of the independent sample t-test analysis can be seen in Table 9.

TABLE 9. Independent sample t-test

		Uji-t	
		T	**Sig. (2-tailed)**
PreTest	Equal variances assumed	0,63	0,950
	Equal variances not assumed	0,63	0,950
PostTest	Equal variances assumed	-2,514	0,016
	Equal variances not assumed	-2,488	0,018

The results of the analysis Table 9, it is obtained

- Pretest values obtained Sig (2-tailed = 0.950) > (0.05), then Ho is accepted. It's mean that there is no difference, there are differences in students' critical thinking skills between the experimental class and the control class.
- Posttest obtained the value of Sig (2-tailed = 0.016) < (0.05), then Ho is rejected. It's mean that there are differences in students' critical thinking skills between the experimental class and the control class.

Furthermore, using the effect size test to convert the research results obtained in each study into a large influence. In the effect size test, posttest data is used because the posttest data has a different effect, while in the pretest data there is no difference in influence. The effect size test of the posttest data obtained an effect size coefficient of 0.76 with a medium effect size criterion. This is because students answered correctly for indicators of critical thinking skills, which gave simple explanations of 77.27%, connecting 80.68%, comparing and differentiating 71.58%, analyzing and evaluating 72.72%, and creating and expressing opinions of 81,81%.

The contextual approach containing local potential "getuk" can have a higher effect on students' critical thinking skills than the scientific approach. The contextual approach plays a role in the learning process to connect contextual material contained in local potential with the knowledge being taught and local potential "getuk" integrated into teaching materials in the form of videos and worksheets can object to facilitate critical thinking skills.

Learning with a contextual approach, students actively relate learning materials to situations in the real world. Students also actively build knowledge based on experience, ask questions, conduct experiments, connect data with the knowledge they have gained, compare and contrast the data they have obtained, analyze data, discuss with classmates, and convey experimental results and analysis. The contextual learning process involves students fully being able to find the material being studied and relate it to real-life situations so that students become more critical thinkers [15-17]. Each component of the contextual approach can facilitate students to think critically. The contextual approach has seven main components of effective learning, namely constructivism, questioning, inquiry, learning community, modeling, reflection, and authentic assessment. Contextual can train identification, analysis, critical thinking, and have a curious attitude to solve problems [6][18].

The integration of local potential "getuk" with a contextual approach makes the learning taught further enhance critical thinking skills and connect learning with the local potential. Local potential integrated science learning on the critical thinking skills of students has a significant effect [4].

CONCLUSION

The contextual approach containing the local potential of getuk influences the critical thinking skills of eighth-grade students of 10 Junior High School Magelang. This is indicated by the results of the hypothesis test that the value of Sig (2-tailed = 0.016) < (0.05), then Ho is rejected and H1 is accepted. The influence of the contextual approach with local potential of getuk has moderate criteria with an effect size coefficient of 0.76. The large influence of the contextual approach with local potential is caused by several things. First, the contextual approach plays a role in the learning process to connect contextual material contained in local potentials with the knowledge being taught that can train critical thinking skills. Second, the local potential of getuk which is integrated into teaching materials in the form of videos and worksheets can be an object to facilitate critical thinking skills.

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REFERENCES

1. B. E. Jiniarti, H. Sahidu, and N. N. S. P. Verawati, Jurnal Pendidikan Fisika dan Teknologi **1**, 185-192 (2017).
2. D. Pratiwi and A. Lepiyanto, Jurnal Pendidikan Biologi **9**, 41-44 (2018).
3. BSNP, Paradigma Pendidikan Nasional Abad XXI [internet]. BSNP. 2012 [update 2012 April; cited 2020 February 23] Availabel form : www.bsnp-indonesia.org › 2012/04 › Laporan-BSNP-2010.
4. I. P. M. Dewi, I. G. P. Suryadarma, I. Wilujeng, and S. Wahyuningsih, Jurnal Pendidikan IPA Indonesia **6**, 103-109 (2017).

5. Nurhadi, *Pendekatan kontekstual* (Departemen Pendidikan Nasional, Dirjendikdasmen, Jakarta, 2002).
6. W. Irawati, *Prosiding Seminar Nasional Pendidikan Ekonomi*, Yogyakarta, 2015 (FE UNY, Yogyakarta, 2015). P. 10.
7. Parmin, Sajidan, Ashadi, Sutikno, and Y. Maretta, Journal of Turkish Science Education **13**, 3-14 (2016).
8. P. W. Hastuti, W. Setianingsih, and E. Widodo, Journal of Physics: Conference Series **1387**, 012059 (2019).
9. P. W. Hastuti, W. Setianingsih, and P. Anjarsari, Journal of Physics: Conference Series **1440**, 012108 (2020).
10. Priyana, *Getuk Bukan Sekadar Kuliner tetapi Juga Doa dan Pengaharapan*, [update 2019; cited 2020 February 23] Availabel form : https://jateng.antaranews.com/berita/280619/telaah--getuk-bukan-sekadar-kuliner-tetapi-juga-doa-dan-pengharapan.
11. P. P. Aji and M. Utama, Jurnal Culinaria, **2**, 75-87 (2020).
12. Sugiyono, *Metode Penelitian Kuantitatif dan Kualitatif dan R&D* (Alfabeta, Bandung, 2009).
13. D. Mardapi, *Teknik Penyusunan Instrumen Tes dan Nontes* (Mitra Cendekia Press, Yogyakarta, 2008).
14. Becker, Lee A., Effect Size [online]. [cited 2020 July 1]. Availabel form : http://web.uccs.edu/lbecker/Psy590/es.htm
15. N. Huda, H. Hikmawati, and K. Kosim, Jurnal Pijar MIPA **14**, 62-72 (2019).
16. W. R. Mustika, Journal of Education Action Research **3**, 117 (2019).
17. Triatmadji, Suprihanto, and Hamid, "Meningkatkan Aktivitas Dan Hasil Belajar Ekosistem Melalui Pendekatan Kontekstual Dengan Pembelajaran Kooperatif Stad Siswa Kelas XI IPA 2 Di SMA Muhammadiyah Gombong" Thesis, STIE Widya Wiwaha, 2019.
18. H. Erwin, I. S. Awang, and A. Anyan, Jurnal Pendidikan Dasar Perkhasa **4**, 169-178 (2018).

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