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# The Effectiveness of A Local Potentiality Based Learning Video About Distillation Clove Leaf Essential Oil to Improve Generic Skill

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**Abstract.** A local potentiality based learning video about distillation clove leaf essential oil used in this study is a type of learning media which employs audio-visual elements. In this study, the learning video contains the integration of local potentiality referring to the distillation of clove leaf essential oil and science materials. The goal to achieve in this study is generic skill inprovement. Specifically, this study aims to investigate learning video effectiveness to improve students' generic skill. This study employed methods of a quasi experiment with a nonequivalent control group design. The subjects were the students of 7A and 7B of SMP Negeri 1 Samigaluh. 7A was the experimental class, while 7B was the control class. Experimental class received treatment in the form of learning with learning video about distillation clove leaf essential oil as media. In contrary, control class received treatment in the form of conventional learning with powerpoint as media. Data was collected through pretest and post-test results from students in both classes. A t-test was used and it is found that level of significance is 0,00 (sig < 0,05) proving that local potentiality based learning video about clove leaf essential oil is effective to improve students' generic skill.

## 1. Introduction

Education has an important role in building a nation. The law of no. 20 of 2003 about National Education System in chapter 1 mentioned that education is an a conscious effort planned manner in order to realize the learning condition and learning process whom students actively develop their potential, to have spiritual power religious, self-control, personality, intelligence, noble attitude and skills that is needed to build community and nation by themselves [1].

Education has an essential function to improve human resources. Education is functioned as utility, facility and guidance that could lead and develop education participants (students) to be better for him himself and community. For that reason the purpose of education shall be set up, and is given orientation and appropriate guidelines, so that formulation of such education can be implemented in order to achieve its function very well.

Science learning essentially includes some aspects: Factual, the balance between the process of and the products, actively took part in the investigation, think inductively and deductively, and development of behavior [2]. Science is human effort to understand of the universe through observations that is right on target, as well as using procedure and explained logically to get conclusion [3]. Science is part of knowledge about nature that was result of observation, thought, rationalizing, and a brilliant insight, but now science not only part of the knowledge, but also is a the process of discovery or scientific method [4].

Audio visual (video) is media that involves the sense of hearing as well as vision as in one process. The natures of a message that can be sent through the medium are in the form of verbal and non-verbal message. Messages that are heard and seen can be presented through the program of audio visual like movies, video and also television [5]. Video technology can help teachers to identify problems that are faced by in classes and as effective solutions to present learning in structured way that provide the explicit opportunity to observe and review learning repetitively [1].

The use of video by teachers in education is still quite popular. But, video itself does not define a lesson; it should be implanted through approach to encourage learning [6]. In addition, the use of video in education must be adjusted to the purpose of specific learning. It must be underlined the importance of selecting instructional approach taken an exact pattern while designing learning environment based on video [7].

Based on of its characteristics , there are beneficiaries in use of the learning media in the form of video such as: (1) overcome the limitations of distance and time, (2) video can be repeated if its needed it to add clarity, (3) messages are delivered quickly and easy to remember, (3) developing mind and opinions of students, (4) developing imagination of students, (5) clarifying things which are abstract and provides illustration which is even more realistic, (6) have high impact on viewer emotions, (7) explaining very well the process and skill sets, capable of demonstrating stimuli that reflects the objectives and response that hopefully be driven by students, (8) all participants can learn well from video, both the clever and less clever students, and (9) and growing their interests and motivation to study [5].

The purpose of using video as learning media is to clarify and simplify message delivering so it will become not verbal; overcome the limitation of time, place, power and the sense of students as well as instructors; and can be used in an unerring manner and varies [8].

Based on the various studies according to the experts it can be concluded that video learning is equipment which able to eventually be developed as a medium of learning by displaying audio visual that can be used in a repetitive manner. Video learning is tool to overcome limitation of distance and time and brings forth students' interest and motivation to study.

Each region has difference originality and specificity. The societies have their own way to face and treat environment. Local knowledge approach can overcome students' lack of concern to environment and local issues compared with global issues [9]. Local knowledge has proximity to students emotionally and has strong bond in the soul of students for having concern to environment, so it would become their motivation [10].

Local potential could not be separated from the local culture. Culture not merely potential just dealing with the art directly, culture is all matters of public life in the perspective of local relating to a belief, productivity, work, staple food, creativity, values and norms [11]. Local potential is a basic knowledge obtained from life that is balanced with nature [12].

According to the explanation given by several sources, it can be concluded that the potential of an area includes of belief, job, food, creativity, value of and norms, natural resources, culture, human resource, and technology. The local potential on this research deals with industry that using natural resources from the clove leaves in the form of distillation of clove oil as a source of science as well as key insight in learning. So, learning video about clove leaves distillation is helping tools that simplify teachers in presenting information or learning material which he can be repeated. This leads teacher can overcome the limitation of time, place, sense and power to learn contextually. This learning video is aimed to improve students' generic skill.

Results of observation in SMP Negeri 1 Samigaluh showed (1) students' difficulty in understanding abstract science subject matters, (2) some students showed inability to solve problems with logic that was given by their teachers, (3) students often guessed in analysis of cause and effect, and (4) students were having difficulty in proposing alternative problems solutions. Generic skill is one of main assets to increase the quality of human resources in the 21st century. The development of its education has a particularly important role in preparing graduates to supervise their existence. who have good generic skill will have a good job opportunity [13].

Generic skill is cognitive strategy thinking which are connected to cognitive, affective, as well as psychomotor who could be further explored by students. Generic skills can be used to study many concepts and solves every science problems [14]. Generic skill in science according to Brotosiswoyo is a skill that can be used to study various concepts and solves various science issues [15]. Science generic skill is a skill that being produced by some learning process structure using scientific approach [16]. Generic skill stated there is no single definition of generic skill indicator [17]. Generic skill is part of critical thinking, problem solving, interpersonal skill, capability to think logically and independent, communicationn and information management skill, curiosity, creativity and integrity [18].

Generic skill of science learning is reffered as generic science skill [19]. Brotosiswoyo explained that science generic skills can be categorized into 9 indicators: (1) direct observation; (2) indirect observation (3) sense of scale; (4) symbolic language; (5) logical self-consistency of natural law; (6) logical inference; (7) causality; (8) mathematical modeling; and (9) concept formation. Sudarmin adding: (10) abstraction.

Based on some explanation according to the experts, it can be concluded that generic skill is ability to think based on knowledge which deals with the cognitive, affective, and psychomotor owned by student through learning process. In science, generic skill can be used to study various concepts and solves problems issues.

The purpose of this study is to determine effectiveness of the use of learning video based on local potentiality about clove leaf oil essential to improve students' generic skill.

## 2. Research Method

### 2.1. Time and Place of Research
This research took place on SMP Negeri 1 Samigaluh that is located on Kulon Progo, Yogyakarta. Research is being held on odd semester of the academic year in 2017/2018.

### 2.2. Types of Research
This research used quasi experimental design with nonequivalent control group design. This research consists of two classes both are experiment and control class. In experiment class, students were given learning video about clove leaf essential oil to improve generic skill. In the other hand, control class students learned conventionally.

### 2.3. Research Subjects and Objects
Subjects of this research are students of class 7A as experiment class and 7B as control class. Each class consisted of 32 students. The object of this research was given learning video about clove leaf essential oil. Object was purposed to improve students' generic skill.

### 2.4. Techniques and Instruments of Data Collection
Data is collected in some steps, (1) giving pretest to both of experiment subjects, (2) giving learning video to experiment class and power point to control class, (3) giving post-test to both experiment subjects. Data collection format is served in Table 1 below.

**Table 1.** Nonequivalent Control Group Design Experiment

| Subject | Pretest | Treatment | Post-test |
|---------|---------|-----------|-----------|
| KE | $O_1$ | X | $O_2$ |
| KK | $O_3$ | Y | $O_4$ |

Note:
KE      : Experiment Class
KK      : Control Class
$O_1$      : Experiment class starting skill

$O_2$      : Experiment class final skill
$O_3$      : Control class starting skill
$O_4$      : Control class final skill
X          : The use of local potentiality based learning video about distillation clove leaf essential oil
Y          : The use of power point

Learning process is being held in two sessions for 5 meeting hours. First meeting in 3 hours discuss about separation of mixture by using learning video about clove leaf essential oil. This video discuss about filtration, centrifugation, sublimation, chromatography and distillation. Second meeting in 2 hours discuss about some objects that can be transformed by the process. The discussed transformed objects are reviewed physically and chemically. Through the process, students of experimental class received worksheet to observe and understand all information that is collected by watching the video but in the other hand, students of control class received learning by using power point as media.

Data collection instrument is based on experiment by Yulia Haeppi [20]. This research consists of 4 aspects which are comprised of 13 indicators as shown on table 2 below.

**Table 2.** Generic Skill Lattice

| Generic Skill Aspect | | Indicator |
|---|---|---|
| Indirect Observation | a. | Presenting object characteristic by observing experiment / natural phenomenon |
| | b. | Determining object and phenomenon (observed parameter) |
| | c. | Looking for differences or natural phenomenon |
| | d. | Identifying natural indicator (determining available concepts) |
| Logic Inference | a. | Determining phenomenon (objects/events) that are discussed |
| | b. | Arguing or explaining based on scientific source |
| | c. | Explaining events based on scientific source/law |
| | d. | Concluding symptoms based on scientific source |
| Law of Cause and Effect | a. | Identifying conditions of principal/theory enactment. |
| | b. | Identifying natural indicator (determining principal/theory) on discussed phenomenon |
| | c. | Estimating the cause of natural events |
| Modeling | a. | Creating table from available data |
| | b. | Suggesting alternative problem solving |

According to generic skill, experiment data can be collected through generic skill test. Generic skill test consists of 20 multiple choice questions and 5 essays. Data of generic skill result is gained from pretest as starting skill and post-test as final skill.

*2.5. Data Analysis Technique*
Data research analyzed based on the gain score, normality test, test of homogeneity, and T test using SPSS 22. Gain score is used to see the difference between post-test and pretest score. The value of the score is used in order to understand the increase in generic extra skill students after going through treatment. Gain score of generic can be calculated by using this formula:

$$gainscore = \frac{score_{posttest} - score_{pretest}}{score_{maksimal} - score_{pretest}} \tag{1}$$

Value of gain score can be categorized as shown in table 3 below [21].

**Table 3.** Conversion of N-gain Into Category

| No | Factor-g | Category |
|---|---|---|
| 1 | $g \geq 0.7$ | High |
| 2 | $0.7 > g \geq 0.3$ | Medium |
| 3 | $g < 0.3$ | Low |

Test of normality is used to see if generic skill data is distributed normally or not. Data that is used in normality test is gained from pretest. Result of normality test can be concluded as distributed by "Kolmogorov-Smirnov[a]" if sig. > 0.05.

Test of homogeneity is used to see similarity of variants in control class and experiment. Data that is used in homogeneity test are gained from pretest. Result of homogeneity test is based on "Levene Statistic" if sig. < 0.05 then variant can be concluded as is unequal (not the same) and if sig. > 0.05 then variant can be concluded as similar (equal).

The testing of hypotheses in the study is done by using independent t-test. Independent t-test is used to know the difference of the average generic skill between control class and experiment class. The base of decisions making in the independent efforts whatever survives this test could be done based on value of sig. (2-tailed). If value sig. (2-tailed) > 0.05 then $H_0$ were received and $H_a$ were rejected but if value sig. (2-tailed) < 0.05 then $H_0$ were rejected and $H_a$ were accepted.

$H_0$ : Learning Video About Clove Leaf Essential Oil is not effective to improve the generic skill of students

$H_a$ : Learning Video About Clove Leaf Essential Oil is effective to improve generic skill of students

## 3. Result and Discussion

This research was being held on SMP Negeri 1 Samigaluh which is located on Gerbosari Village of Samigaluh sub district, Kulon Progo, Yogyakarta. This research consists of two classes both are experiment and control class. In experiment class, students were given learning video about clove leaf essential oil to improve generic skill. In the other hand, control class students learned conventionally by using *PowerPoint*.

Learning video was developed by integrating science study matter with local potentiality of clove leaf essential oil distillation which shares same location with observed school on Samigaluh. Main discussion of learning video is separation of mixture between objects that were transformed. Material of video is divided into two meeting sessions.

Research was being held on 8 – 21 November 2017. Research is begun with pretest and then continued by doing learning session on 2 meeting sessions in both control class and experiment class and ended by doing post-test. Pretest is purposed to see starting generic skill of students. Learning process is being held in two sessions for 5 meeting hours in total. First session took 3 hours long and second session 2 hours. All sessions are purposed to give treatment to control clas and experiment class. Post-test is purposed to determine final generic skill of student after getting treatment. Average pretest and post-test result are shown in table 4.

**Table 4.** Average Score of Pretest and Post-test

| No | Class | Pretest | Post-test |
|----|-------|---------|-----------|
| 1 | Control | 30.63 | 46.02 |
| 2 | Experiment | 35.47 | 66.88 |

According to table 4, after getting treatment, control class and experiment class showing improvement in generic skill. But, average improvement (by looking at pretest and post-test) of experiment class is higher than control class. So it can be concluded that students' generic skill improvement in experiment class is higher than control class. It shows that learning by using the learning video about clove leaf oil essential oil is more effective than conventional learning by using *PowerPoint*. Learning using video can make abstract things to be obvious and give more realistic view [5]. This result is in accordance with Dale's Cone of Experience that learning with video is easier to remember than by only listening and seeing pictures.

Generic skill improvement analysis can be seen and categorized based on gain score as shown on Table 5.

**Table 5.** Average Gain Score

| No | Class | Gain | Note |
|----|-------|------|------|
| 1 | Control | 0.2194 | Low |
| 2 | Experiment | 0.4834 | Medium |

Gain score analysis on this research shows that gain score of experiment class is higher that gain score of control class. According to table N-gain conversion can be categorized that students generic skill improvement in control class are "low" but in the other hand are "high" in experiment class.

Hypothesis testing on this research is using Independent T-test. Conditions of parametric statistic testing on independent T-test had been through normality and homogeneity. Result of normality test is shown in Table 6 and homogeneity test is shown in Table 7.

**Table 6.** Test of Normality

|  | Class | Kolmogorov-Smirnov[a] | | |
|--|-------|-----------|----|------|
|  |  | Statistic | Df | Sig. |
| Pretest | Control | .080 | 32 | .200* |
| Score | Experiment | .122 | 32 | .200* |

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Normality test is being held to determine if generic skill data on control and experiment class are distributed normally or not. Normality test is based on Kolmogorov-Smirnov[a]. Result of normality test on table 6 shows that significance (sig.) of control class and experiment class are higher than 0.05 (0.200 > 0.05). It can be concluded that data of control and experiment class are distributed normally.

**Table 7.** Test of Homogeneity of Variances

|  | Levene Statistic | df1 | df2 | Sig. |
|--|----------|-----|-----|------|
| Pretest Score | 3.466 | 1 | 62 | .067 |

Homogeneity test is being held to see if generic skill of control and experiment class generic skill variance based on Levene Statistic are homogeneous or not. According to homogeneity test in Table 7 showed that significance (sig.) are higher than 0.05 (0.067 > 0.05). It shows that control and experiment class distribution are homogeneous.

According to normality and homogeneity test results, it shows that data is distributed normally and homogeneous. Data that distributed normally and homogenous can be tested using Independent T-test. Independent T-test is served in Table 8.

**Table 8.** Independent Samples Test

|  | T | df | Mean Difference | Sig. (2-tailed) |
|--|---|----|----------------|----------------|
| Equal variances assumed | 11.875 | 62 | 20.85938 | .000 |
| Equal variances not assumed | 11.875 | 46.255 | 20.85938 | .000 |

According to table 8, independent T-test result can be used to decide whether $H_0$ will be accepted or rejected. Value of sig. (2-tailed) of independent T-test is 0.000. It shows that value of sig. (2-tailed) 0.000 < 0.05, so $H_0$ is rejected and $H_a$ accepted.

Based on results of the experimental and control class analysis, it can be concluded that local potentiality based learning video about distillation clove leaf essential oil was effective to improve students' generic skill. This is consistent with the theory that the generic aspects of student skill developed in this study can be achieved through the developed science learning video. Use of technology has possitive effect [22]. The learning video as information technology tool and communication can be motivating and improve student interest [23]. The developed science learning videos was in accordance with advantages expressed [5]. In addition, the developed science learning video has its own advantages in integrating local potential. Local potentials provide emotional closeness and strong bonds of collectivity that can foster students' learning motivation [10]. The learning study through direct experience, deliberate learning, simulating (doing real thing) and represent reality in daily lives that can be accepted by students effectively [24]. In addition, used video in learning can clarify and simplify the delivery of messages so that it will become not verbal and the learning becomes varied so that students do not get bored in receiving lessons [8]. This is also in accordance that science learning integrated with local potency can affect students' generic skill [20], [25].

Generic skills can help students in understand concepts and solve problems in learning [26]. Generic skill is part of ability to communicate in problem solving [27]. Generic skills have a very important role in supporting learning, especially in science learning because it can emphasize the aspects of the process [28].

## 4. Conclusion

Based on data analysis result and discussion can be concluded that learning video based on local potentiality about clove oil essential is effective to improve students' generic skill. This result is based on experimental class average score gain is better than control class' average score with medium category. Usage of learning video based on local potentiality about clove oil essential improve students' understanding of abstract things and giving more realistic view. Besides that, learning by using video is easier to remember and it can improve students' concern for environment.

## References

[1]   Wang, J. & Hartley, K. 2003 *Journal of Technology and Teacher Education* **11** (1) 105-138
[2]   Muslichah Asy'ari 2006 *Penerapan Pendekatan Sains-Teknologi-Masyarakat* (Jakarta: Departemen Pendidikan Nasional)
[3]   Susanto, A. 2013 *Teori Belajar dan Pembelajaran di Sekolah Dasar* (Jakarta: Kencana Prenada Media Group)
[4]   Hewitt, Paul G., Suzanne Lyons, John Suchoki 2006 *Conceptual Integrated Science* (San Fransisco: Pearcon Education)
[5]   Munadi, Y. 2013 *Media Pembelajaran Sebuah Pendekatan Baru* (Jakarta: GP Press Group)
[6]   Blomberg, G., Sherin, M. G., Renkl, A., Glogger, I., dan Seidel, T 2014 *Intructional Science*. **42** (3) 443-463
[7]   Seidel, T., Blomberg, G., Renkl., A. 2013 *Teaching and Teacher Education* **34** 56-65
[8]   Cheppy Riyana 2007 *Pedoman Pengembangan Media Video* (Bandung: Program P3AI UPI)
[9]   Fien, J, Ai, Yencken, D, Sykes, H and Treagust, D. 2002 *The Environmentalist* **22** 205-216
[10]  Muhaimin 2015 *Social Science Education Journal* **2** (1), 12-21
[11]  Anwar, M. 2010 *Afro Asian Journal of Social Sciences* **1** (1) 1-13
[12]  Mungmachon, R. 2012 *International Journal of Humanities and Social Science*. **2** (13) 174-181
[13]  Freudenberg, B., Brimble, M., & Cameron, C. 2011 *Asia-Pacific Journal of Cooperative Education* **12** (2) 79-93
[14]  Selvianti, Ramdani, dan Jusniar 2013 *Jurnal Chemica* **14** (1) 55-65
[15]  Tawil, M and Liliasari 2013 *Berpikir kompleks dan implementasinya dalam pembelajaran IPA* (Makassar: Badan penerbit Universitas negeri Makassar)
[16]  Ratna, I. S., Yamtinah, S., Masykuri, M., & Shidiq, A. S. 2017 *Advances in Social Science, Education and Humanities Research (ASSEHR)* **158** 958-963

[17]    Maknun, J. 2015 *American Journal of Educational Research* **21** (6) 742-748
[18]    Badcock, P. B., Pattison, P. E., & Harris, K. L. 2010 *High Euc* **60** 41-458
[19]    Anwar, M. 2014 *Journal of Education and Practice* **5** (31) 149-154
[20]    Yulia Haeppi 2016 *Pengembangan Perangkat Pembelajaran IPA Berbasis Potensi Lokal untuk Meningkatkan Keterampilan Generik Sains dan Curiosity Peserta Didik SMP* (UNY Yogyakarta: Thesis-Unpublished)
[21]    Hake, R. R 1999 *Analyzing Change/ Gain Scores* (USA Indiana University: Dept. of Physics, Indiana University 24245 Hatteras Street, Woodland Hills, CA, 91367)
[22]    Shapley, K., Sheehan, D., Maloney, C. & Caranikas-Walker, F. 2011 *The Journal of Educational Research* **104** (5) 299-315
[23]    Gracia, M. J., Quintanar, C. S., Herrera, C. A. H. 2015 *International Journal of Business and Social Research* **5** (9) 40-49
[24]    Davis B, Summers M. 2015 *Qscience Proceedings* (USA: Purdue University) pp. 1-7
[25]    Susanti, Z. K. Prasetyo, I. Wilujeng, and I. G. P. Suryadarma 2017 *International Journal of Enviromental & Science Education* **12** (8) 1817-1827
[26]    Tricot, A., & Sweller, J. 2014 *Educ Psychol* **26** 265-283
[27]    Hockey, A., Bescos, C. J., & Maclean, J. 2010 *TPR* **81** (5) 523-540
[28]    Agustina, S., Muslim, M., dan Taufik 2016 *Jurnal Inovasi dan Pembelajaran Fisika* **3** (1) 1-7