DEVELOPMENT OF SCIENCE LEARNING VIDEO-BASED LOCAL POTENTIAL RIVER TUBING TO IMPROVE CRITICAL THINKING SKILLS STUDENTS OF TEMPUREJO 2 STATE JUNIOR HIGH SCHOOL

Mahla Noer Rozqiyah Syam [1)], Ana Wardatul Jannah [2)], Miftahul Hasanah [3)], Tanti Lutfiatul Hidayah [4)], Sri Wahyuni [5)]
[12345]Faculty of Teacher Training and Education, University of Jember
email: mahlanoer27@gmail.com

Abstract

River Tubing's local potential-based learning video is an alternative for developing learning tools by implementing local potential into science learning. This research is a development research that uses the Plomp development model which is adjusted to 4 stages. This study aims to describe the validity of River Tubing's local potential-based science learning videos, find out the practicality of River Tubing's local potential-based science learning videos in terms of the implementation of learning using science learning videos, and determine the effectiveness of River Tubing's science learning videos. Tubing's local potential-based science learning video in terms of ability. students' critical thinking and to find out student responses. River Tubing's local potential-based science learning video on substance pressure material in junior high school is valid with a final validity result of 60%-80% in the fairly valid category. Field trials were conducted in class VIII B of SMP Negeri 2 Tempurejo with 32 students. The results of practicality show that the level of implementation reaches a fairly practical category, namely 70% p <80% and the results of the effectiveness of using student critical thinking skills tests and student response questionnaires, student responses to science learning videos based on local potential River Tubing can be said to be good if the student response category is minimal pretty good category.

Keywords: *Critical thinking, Learning videos, Local potential, River tubing, Student responses*

1. INTRODUCTION

Science learning is learning that involves students to gain direct, student-centered, and contextual experience, so that students can find concepts related to science lessons as a whole. According to Setyowatiet al., (2013) that Natural Science (IPA) is a learning concept that discusses natural phenomena that have a reciprocal relationship with humans and is a broad study object, consisting of a collection of concepts, principles, laws, and theories. It is important that students' critical thinking skills are trained in science learning, reinforced by Yustiqvar's statementet al., (2019) that students' critical thinking skills in science learning require interpretation, analysis, and evaluation. According to Hidayahet al., (2016) that critical thinking is a person's process of actively and skilled in understanding, interpreting various information, analyzing, applying, and evaluating various information obtained from experience, observation, and reasoning.

The surrounding environment presents real concepts in everyday life that can be used as a science learning that has more potential could develop experience and competence of students in understanding science concepts in the surrounding environment (Listyawati, 2012). Therefore, it is necessary to have a conducive atmosphere and environment to achieve competence. The atmosphere and learning environment vary widely, but from a context point of view, students will be more optimal if learning is related to local potential around their school or home. According to Kartono et. al., (2010) that the development of science learning can rely on the uniqueness and superiority of an area. The physical environment or local potential owned by the community of Sanenrejo Village, Tempurejo District, Jember has various potentials that can be explored and developed to support science

learning. One of the local potentials in Sanenrejo Village is local potential River Tubing.

Implementation of local potential River Tubing into science learning is very necessary because many science concepts are found in River Tubing. One of the science concepts that can be found in River Tubing namely the subject of pressure of substances. Substance pressure material can be combined with local potential River Tubing because the concept of substance pressure is found in many activities River Tubing.

Fact proved that the implementation of local potential into science learning is very rarely or even never done or combined. The results of interviews with science subject teachers at SMP Negeri 2 Tempurejo that students do not know that there is local potential River Tubing and in science learning, there has never been a link about local potential. This certainly raises concern because students' knowledge of the potential of their own area is not grown in learning.

Based on interviews with teachers of science subjects at SMP Negeri 2 Tempurejo, data were obtained that the use of teaching materials at the school was not optimal. Teaching materials obtained from various publishers have drawbacks, namely the context of the book is still general in nature and has not been adapted to the local environment such as local potential. Another problem is that students' critical thinking skills are still relatively low because one of them is the lack of learning media that can support the learning process. This is confirmed by Maolidah et. al., (2017) which explains that this junior high school student in Indonesia has low critical thinking skills, especially in terms of reasoning.

One of the efforts to overcome these problems is the role of teachers in utilizing learning media to deliver material creatively and innovatively that can trigger students' desire to learn. Learning media that can involve students to build their understanding with critical thinking skills is learning videos. Learning videos are student-oriented media. According to Aminah et al. (2017) that the benefits of videos in science learning can improve students' critical thinking, because videos can improve students' ability to analyze what is being seen, be able to describe the conditions in the problems discussed in learning, be able to explicitly state the conditions and intentions discussed.

Local potential-based learning videos River Tubing created by recording activities River Tubing in linking material pressure substances by spurring on students's critical thinking skills. The selection of real visuals around the school or student residence is very interesting and can motivate students to learn and easily understand concepts.

2. RESEARCH METHOD

This type of research is a type of development research. This development research is to produce science learning video products based on local potential River Tubing. This study uses the Plomp development research model. The Ploom model uses five phases, namely the initial investigation phase (Prelimenary Investigation), the design phase (Design), the realization/construction phase (Realization/Construction), the test phase, evaluation, and revision (Test, Evaluation and Revision), the Implementation phase (Implemantation). (Rochmad, 2012) can be seen in Figure 1:

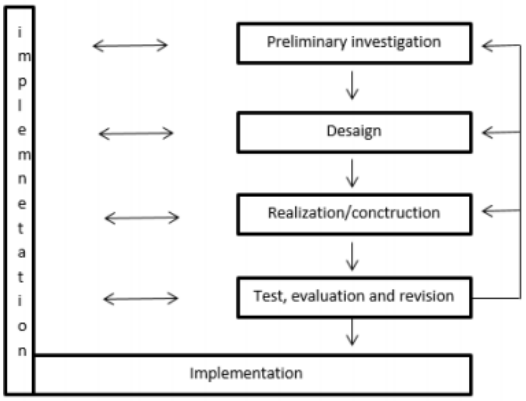

Figure 1. Flow of development stages Plomp models. (Source: Plomp, 1997)

The Plomp method used in this research is up to the test, evaluation, and revision (Test, Evaluation and Revision) phase so that the implementation phase is not carried out. Limitations are made because the implementation phase requires a long process and takes a long time.

The test, evaluation, and revision (Test, Evaluation and Revision) phase consists of two main activities, namely

validation and trial development of local potential-based science learning videos.River Tubing. Validation activities were carried out by three validators, namely two lecturers of the Science Education Study Program at the University of Jember and one teacher in the science field at SMP Negeri 2 Tempurejo. Learning video validation activities are assessed by the validator giving a mark with a checklist in each row and column of aspects that are measured according to the criteria.

The research instrument used is a validation sheet. Furthermore, the results of the validation using the formula:

$$V = \frac{TSE}{TSM} \times 100\% \quad \ldots(1)$$

Information:
V = Number of rating levels
T_{SE} = Total score achieved
T_{SM} = Maximum total score
(Akbar, 2013)

Table 1. Validity Criteria

Validity Criteria	Category Validity
90.00% < x ≤ 100.00%	Very valid and can be used without revision
80.00% < x ≤ 90.00%	Valid and can used with little revision
60.00% < x ≤ 80.00%	Quite valid and usable however need to be revisied sufficiently
40.00% < x ≤ 60.00%	Invalid and need major revision
20.00% < x ≤ 40.00%	Invalid, need major revision and recomended not used
00.00% < x ≤ 20.00%	Very invalid and can't used

(Akbar, 2013)

Criteria for state videos local potential-based science learning River Tubing developed has good validity, if the minimum level of validity achieved is 60% -80% in the fairly valid category.

Trial activities for developing local potential-based science learning videosRiver Tubingcarried out on class VIII B SMP Negeri 2 Tempurejo totaling 32 students. The trial was carried out in four meetings and carried out an assessment by giving questionspretest at the beginning of learning and questions posttestat the end of the lesson after being given a learning video to determine the improvement of students' critical thinking skills. The pretest and posttest questions are in the form of essays and are given at the beginning and end of the lesson. After that, it was continued by giving student response questionnaires after learning local potential based science learning videos River Tubing.

Local potential-based science learning video trial activities River Tubing. implemented to obtain data on practicality and effectiveness in terms of students' critical thinking skills and to determine student responses. The research instrument used to determine the practicality of learning videos using the formula:

$$P = \frac{skor\ item\ yang\ diperoleh}{skor\ maksimum} \times 100\% \quad \ldots(2)$$

Table 2. Practical Criteria

No	Criteria	Category
1	P 90%	Very practical
2	80% p < 90%	Practical
3	70% p < 80%	Practical enough
4	60% p < 70%	Less practical
5	p < 60%	Not practical

(Riduan in Efdillah, 2013)

Criteria for state videos local potential-based science learning River Tubing developed has good practicality, if at least the level of implementation reaches the sufficient category practical that is 70% p <80%.

The research instrument used to determine the effectiveness of local potential-based science learning videos River Tubing by using a test of students' critical thinking skills and student response questionnaires. Test students' critical thinking skills using essay questions, namely pretest and posttest. Product testing using design One Group Pretest-Posttestin Figure 2.

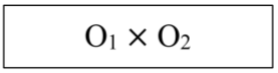

Figure 2. Research Design (Source: Sugiyono, 2012)

Information:
O_1 = value pretest (bevore given treatment)
O_2 = value posttest (after given treatment)

The calculation of the value obtained by students from the written test uses the formula:

$$N = \frac{R}{S} \times 100 \quad \ldots(3)$$

After calculating the pretest and posttest scores, then proceed with the analysis of increasing critical thinking skills using the N-test.gainso that the value of the increase can be obtained. Steps to determine N-gainis:

1. Calculating the score gain normalized by the formula:
2. Categorize the average score gain which can be seen in Table 2

Response student is known with using a student response questionnaire to the learning video. The results of the student response questionnaires are distributed which will later be accumulated and get the percentage of student responses on local potential-based science learning videos River Tubing. The percentage of student response can be calculated using the formula:

$$Presentase\ respon\ siswa = \frac{A}{B} \times 100\% \quad \ldots(4)$$

Information:
P = Percentage of student responses
A = Proportion of student choosing
B = Number of students (respondents)
(Trianto, 2009).

Table 3. Student Response Criteria

No	Criteria	Category
1	80% < p ≤ 100%	Very good
2	60% < p ≤ 80%	Well
3	40% < p ≤ 60%	Pretty good
4	20% < p ≤ 40%	Not good
5	0% < p ≤ 20%	Very less well

(Apsari and Ismono, 2014)

Student responses to local potential-based science learning videos River Tubing can be said to be good if the student response category is at least good enough category.

3. RESULT AND DISCUSSION

The results of the investigation phase beginning (Prelimenary Investigation) found that the teaching materials used at SMP Negeri 2 Tempurejo were textbooks for the 2013 curriculum. Never implemented a learning video that suits students' needs, the video was taken directly on a tour River Tubing. Meanwhile, the material pressure of substances, students tend to understand the concept in real terms.

Phase design obtained The design of the initial investigation is how the design of the development of science learning videos based on local potential is, whether the learning videos are valid and feasible to use, whether the learning videos are effective for improving critical thinking skills. This phase produces a design in the form of an initial product concept which is then made a local potential-based science learning video River Tubing. Researchers design videos using the VN editor application. The results of the design or media design are in the form of video drafts, then the drafting of the video form concept with creative and innovative content. In addition to containing the teacher in explaining about.

The realization/construction phase (Realization/Construction is the manufacture of products designed according to the initial design of the design phase. Science learning video products based on local potential River Tubing to improve critical thinking skills by adjusting the lesson plans, one learning video was produced. The content of the material and teacher narration in the video is adjusted to the draft made in the design phase. Local potential-based science learning videos River Tubing on material pressure substances formulate the realization/construction phase which consists of several stages, namely:

a. Take teacher teaching activity video

The initial video that was made was recording the teacher teaching which was made like the teacher was teaching students. the researcher teaches the science subject of substance pressure. Videos are arranged in such a way as to support the activities in the video to be interactive and meaningful, as can be seen in Figure 3.

Figure 3. process take activity videos teach

b. Take video *River Tubing*

Record video for River Tubing during River Tubing activities. The application of video on pretest, posttest, and LKPD questions that use video questions in it can be seen in Figure 4.

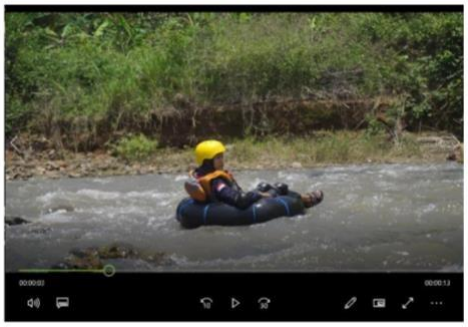

Figure 4. Video River Tubing

c. Editing process

This process is done by editing videos of teacher activities and River Tubing by using video editing, namely the VN editor so as to produce learning videos that are in accordance with the initial design. The editing process on local potential-based science learning videos River Tubing can be seen in Figure 5.

Figure 5. Learning video

The result of the local potential-based science learning video River Tubing is the content of the video which includes 6 critical thinking indicators that are formulated into learning indicators. An example of a learning video that has been made can be seen in Figure 6.

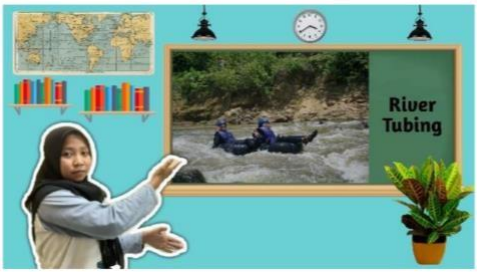

Figure 6. Example of the display of the content section science learning videos

The realization results for LKPD and test questions are as follows:

a. Student Worksheet (LKPD)

Substance pressure worksheets were made containing questions accompanied by related videos that were made so that students think critically related to local potential.

b. Critical Thinking Ability Test Questions

The critical thinking ability test that was developed is accompanied by questions and videos that refer to critical thinking indicators.

The test, evaluation, and revision phase (Test, Evaluation And Revision), the results of the validity of the science learning videos were obtained from three expert validators, namely two lecturers of the Science Education Study Program at the University of Jember and one teacher in the field of science at SMP Negeri 2 Tempurejo. The results of the analysis of the validity of the learning video can be seen in Table 4.

Table 4. Video Validity Analysis Result Learning

No	Aspect Evaluation	Interval score			Percentage (%)	Category
		Validity r1	Validity r1	Validity r1		
I	Subtance Theory	0.80	0.80	0.83	84%	Valid
II	Design Learner	0.93	0.88	0.91	90%	Valid
III	Utilization Media	0.75	0.80	0.90	90%	Very valid
Average score		**0.85**	**0.83**	**0.89**	**85%**	**Valid**

Results analysis data three validators obtained an average of 85%. The ator's results on each aspect of the average total score from 3 h 89.6 with a score of, when converted to

video validity scores learning outcomes, namely 85. The results of this validity indicate that science learning videos are based on local potential River Tubing meet the valid criteria. Likewise, the percentage of each aspect assessed, each aspect on the average of the three validators shows results in a valid category. This shows that science learning videos are based on local potential River Tubing valid and may need some revision.

The results of the local potential based learning video trial River Tubing implemented in a limited way to class VIII B SMP Negeri 2 Tempurejo. The results of the analysis of the practicality of science learning videos can be seen in Table 5.

Table 5. Result of Practically Analysis Tutorial Video

No	Activities Appraiser	Meeting			Percentage (%)	Category
		I	II	III		
I	Activities Early	73%	80%	93%	82%	Practical
II	Activities Core	80%	89%	86%	85%	Very Practical
III	Activities Closing	95%	90%	80%	88%	Very practical
Average score		**83%**	**86%**	**86%**	**85%**	**Very practical**

The results of the practical analysis of learning videos obtained the percentage value of the implementation of science learning videos based on local potential River Tubing is 85%. Based on the predetermined category, this value shows that the specified learning video is in the very practical category. So, it can be said that local potential-based learning videos River Tubing. This is practical and implemented based on the implementation of learning.

Result analysis effectiveness videos local potential-based learning River Tubing in improving critical thinking skills and also student responses after using local potential-based science learning videos River Tubing. Critical thinking skills through students' cognitive can be measured and assessed from the results of formative tests. The level of critical thinking skills is seen from the indicators of critical thinking skills used in research. Analysis of scores preteston students' critical thinking skills showed that the difference with the score posttest after being taught using the local potential based science learning video River Tubing. Result data average value pretest and posttest The critical thinking skills of junior high school students in class VIII B can be seen in Diagram 1.

Diagram 1. Analysis of the average value of pretest and posttest

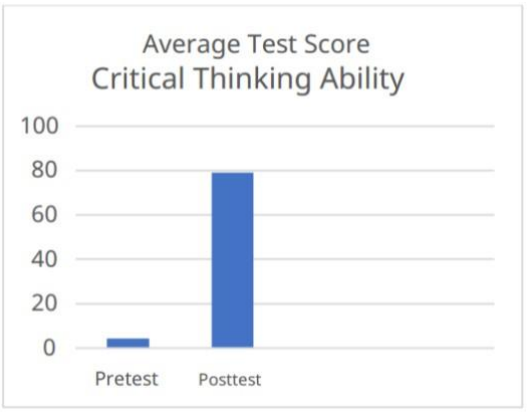

Figure 7 shows that before being given treatment, the average critical thinking ability pretest score in class VIII B was only 31 students. however, after being given treatment, the average posttest score of critical thinking skills increased by 79. These results indicate an increase. And continued processing and analysis of pretest and posttest data using normalized gain (N-gain) on each indicator of critical thinking skills. The data on the average test scores and N-gain are presented in Table 6 according to the achievement of the indicators of student's critical thinking skills.

Table 6. Achievement Result of Each Critical Thinking Ability Indicator

Indicator	Activity	N	mean	N-*gain*	Category N-*gain*
Interpretation *(Interpretation)*	*Pre test*	32	31	0.66	Currently
	Post test	32	77		
Analysis *(Analysis)*	*Pre test*	32	32	0.63	Currently
	Post test	32	74		
Evaluation *(Evaluation)*	*Pre test*	32	35	0.68	Currently
	Post test	32	79		
Inference *(Inference)*	*Pre test*	32	31	0.71	Tall
	Post test	32	80		
Explanation *(Explanation)*	*Pre test*	32	32	0.71	Tall
	Post test	32	80		
Self Regulation (Self Regulation)	*Pre test*	32	29	0.69	Currently
	Post test	32	78		
Average N-gain				**0.68**	**Currently**

Based on Table 6 that the value of N-gain the results obtained for each indicator of

students' critical thinking skills can be seen from the average N-gain all indicators are 0.68, indicating that the increase in students' critical thinking skills is in the medium category. This medium category shows that there is an increase in students' critical thinking skills after learning using local potential-based science learning videos River Tubing. Judging from if students in analyzing get N-gain 0.63. From other indicators, the analysis value is in the medium category. Meanwhile, the indicators of enference and explanation of critical thinking skills are in the high category. And the results of the average value indicate that the product is in the good category. These results indicate that there is a significant increase in critical thinking skills compared to before using local potential based science learning videos River Tubing.

Effectiveness analyzed with using student responses after being given learning use videos local potential-based science learning River Tubing. The results of Student Response Data Analysis can be seen in Table 7.

Table 7. Result of Student Response Data Analysis

No	Aspect that Interested	Percentage Response	Category
1	Appearance videos	85%	Very well
2	Content	86%	Very well
3	Attention Student	85%	Very well
4	Interest Student	86%	Very well
Average Student Response		**85%**	**Very well**

The results of the average student responses shown in the table above show that the science learning videos are based on local potential River Tubing get a very good response. Average student responses to local potential-based science learning videos River Tubing by 85%. For each aspect, the percentage of student responses showed a very good category.

4. CONCLUSION

a. Validity

The results obtained from the validity of 85% on the local potential-based science learning video River Tubing meets the valid category and can be used as a science learning medium for SMP Negeri 2 Tempurejo.

b. Practicality

Practical results obtained based on the implementation of learning obtained an average overall implementation percentage of 85% and included in the good or practical category. So, local potential-based science learning videos River Tubing can be implemented as a medium for learning science at SMP Negeri 2 Tempurejo.

c. Effectiveness

Obtained effectiveness videos local potential-based science learning River Tubing able to improve students' critical thinking skills by using science learning videos which are classified as moderate in the sense that students think critically enough. And the average result for student responses shows a percentage of 85% indicating that science learning videos are based on local potential River Tubing.

5. REFERENCE

Akbar, S. (2013). *Instrumen Perangkat Pembelajaran*. Bandung: Remaja Rosdakarya.

Aminah, S., Susiani, T. S., & Suryandari, K. C. (2017). Peningkatan Keterampilan Berpikir Kritis Melalui Model Pembelajaran Inkuiri Terbimbing Dengan Multimedia Dalam Pembelajaran IPA Tentang Energi. *Kalam Cendikia*. *5*(3), 261–265.

Hidayah, S. R., Trapsilasiwi, D., & Setiawani, S. (2016). Proses Berpikir Kritis Siswa Kelas VII F Mts. AlQodiri 1 Jember dalam Pemecahan Masalah Matematika Pokok Bahasan Segitiga dan Segi Empat ditinjau dari Adversity Quotient. *Jurnal Edukasi. 3*(3), 1-21.

Kartono, Hairida, & Bujang, G. (2011). Penelusuran Budaya dan Teknologi Lokal dalam Rangka Rekonstruksi dan Pengembangan Sains di Sekolah. *Jurnal Cakrawala Kependidikan*. *9*(1), 19-26.

Listyawati, M. (2012). Pengembangan Perangkat Pembelajaran Ipa Terpadu Di Smp. *Journal of Innovative Science Education*. *1*(1), 61–69.

Maolidah, I. S., Ruhimat, T., & Dewi, L. (2017). Efektivitas Penerapan Model Pembelajaran Flipped Classroom pada Peningkatan Kemampuan Berpikir Kritis Siswa. *Edutcehnologia*. *3*(2), 160–170

Plomp, T. (1997). Educational Design: Introduction. From Tjeerd Plomp (eds). Educational & Training System Design: Introduction. Design of Education and Training (in Dutch). Utrecht (the Netherlands): Iemma, Netherland. Faculty of Educational Science and Technology, University of Twente.

Rochmad. (2012). Desain Model Pengembangan Perangkat Pembelajaran Matematika. Kreano: *Jurnal Matematika Kreatif-Inovatif. 3*(1), 59–72.

Setyowati, R., Parmin, & Widiyatmoko, A. (2013). Modul IPA Berkarakter Peduli Lingkungan Tema Polusi sebagai Bahan Ajar Siswa SMK N 11 Semarang. *Unnes Science Education Journal*. *2*(2), 245-253.

Sugiyono. (2004). *Statistika Untuk Penelitian.* Bandung: Alfabeta.

Trianto. (2009). *Mendesain Model Pembelajaran Inovatif-Progresif.* Jakarta: Cerdas Kencana Prenada Media.

Yustiqvar, M., Gunawan, G., & Hadisaputra, S. (2019). Green Chemistry Based Interactive Multimedia on Acid-Base Concept. *Journal of Physics: Conference Series*, 1364(1), 1-8.