P-ISSN: 1693-1246
E-ISSN: 2355-3812
December 2020

Jurnal Pendidikan Fisika Indonesia 16 (2) (2020) 102-110
DOI: 10.15294/jpfi.v16i2.19581

http://journal.unnes.ac.id/nju/index.php/jpfi

Improving Self-Learning for Deaf Students in SMPLB Through Use of BISINDO Video in Heat and Temperature

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Received: 15 June 2020. Accepted: 21 September 2020. Published: December 2020

Abstract

Deaf students have limitations on the sense of hearing, so to grow self-learning requires special processes and training. The results of the observations at the especialy needs secondary school (Sekolah menengah pertama luar biasa negeri/SMPLB-N-in Indosesia) found that one of the goals of the SMPLB-N Ungaran was to produce graduates who were independent and could live in community life. This study aims to improve the learning independence of SMPLB-N Ungaran students by using BISINDO-based videos. This video is equipped with sign language that makes it easy for students to understand the material being studied. The method used is an experiment with the design of single subject A-B patterns. A is baseline dan B is Intervention. The data analysis technique uses descriptive percentages. BISINDO-based video-assisted learning helps students improve self-learning. The increase in the learning independence of deaf students from the baseline phase to the intervention phase was 2.29 in the high category. The average increase in students' self-learning is 46.1% for the personal aspects of attributes, 52.4% for the aspect process, and 10.2% for the learning context aspect.

Key words: Self-learning, deaf student, video BISINDO

INTRODUCTION

Every student has thinking and understanding ability towards different learning material, whether for normal or has special needs student. For student of special need (ABK), they needs treatment according to their especially. ABK is a child with special characteristic and have difference of physics, mental, or social behavior (Akram, 2013). The differentiation that had by the ABK caused the learning process faced difficulty so they need different education treatment (Maftuhatin, 2014). One of the factors that hamper the learning process of ABK student is the weakness of self-learning of deaf student. The deafness is known when the student speaking, they will speak without sound or unclearly sound/unclearly articulation (Kwesi, 2013). Several deaf students are find can't speak and used language signal in communication. Because of that, it's need concern and help to develop their self-learning.

Secondary School Need (SLB) in Ungaran especially SMPLB, it is divided class in several categories according to student's need such as deaf student. Students who have limitedness in hearing sense are grouped in class of deaf students. The main goal of SMPLB Ungaran is produce graduate who independently and walk on their live in community life.

Deaf student definitely faced problem in verbal communication ability. The weakness of verbal communication ability is influence their self-learning (Sungmin, Im & Ok-ja Kim, 2014). There are many ways that done by the school to exercise students independently by giving skill subjects such as stitch, food science, and make up. Those skill subjects' activities used many measure instruments such as in stitch need skill in used ruler and in food science need knowledge about measuring temperature and heat. That means its

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need other subject role in supporting the skill subject. The subject is science (IPA) especially in physics knowledge.

Learning process outside the skill subject in SMPLB Ungaran is less used learning media. Whereas, learning media is extremely help student in understanding the material that they learned. Kemp (1985) explain that learning media for student with special need should be appropriated with the characteristic and student's need so that the useful usage. The characteristic of deaf student is weak in learning sense so that they maximum sight sense and sign language. The activity that is done to facilitate deaf student's need is by developing learning video which fully equipped of sign language. In Indonesia, there are two sign language that are Indonesia language sign system (Sistem Isyarat Bahasa Indonesia, SIBI) and Indonesia Sign Language ((BISINDO) (Mursita, 2015).

Condition of self-learning of deaf student in SMPLB Ungaran is still low. It can be seen in their activity when following learning activity in class. Availability of science learning video (physic) used sign language not yet. Based on that problem, the purpose of the research is to increase learning independently and learning result of deaf student through video usage based on BISINDO for science subject especially in heat and temperature material.

METHOD

This research used experimental research method with single subject design of A-B pattern. A is base line condition that is beginning condition of student before used BISINDO video. B is intervention condition that is condition after used BISINDO video. This research activity is done in three time intervention activity. Video that used is development of Purwaningtyas, Rusilowati Fianti & Perwitasari (2019). Material that taught is heat and temperature, especially in recognize the usage and read the result of thermometer measurement.

Research instrument is observation sheet and *Likert* scale to know the student's self-learning in learning process. Student's self-learning that inspected are the aspects i.e. personal attributes, processes and learning context. Those three aspects are described in 8 indicators and 30 expressions. Aspects and indicators of self-learning can be seen in Table 1.

Table 1. Aspects and Indicators of Student's Self-Learning

Aspects	Indicators
Personal Attributes	• They have responsibility on their task and they didn't leave their task before finish.
	• They have awareness used many learning sources.
	• They have ability to arrange learning strategy.
Processes	• They can manage time by effectively and determined priority.
	• They can cooperation in active
	• They can accept the feedback from the task that given and determine the activity to self-development.
Learning Context	• They can follow the learning activity that helped by video based BISINDO
	• They can learning with learning model structure helped by video based BISINDO

The measurement of student's self-learning at SMPLB Ungaran used *Likert* scale with 4 answers chooses i.e. always, often, sometimes and never. Student and observer give check sign (√) in answer column in instrument sheet according to student's condition. Scoring for each expression is 4 for the highest (always) and 1 for the lowest (never). The score of self-learning is determine with percentage technique and interpretation of result assessment based on categories such as in Table 2.

Table 2. Category of result assessment of self-learning

Value of self-learning (%)	Criteria
82 ≤ X≤100	Higher
63 ≤ X<82	High
44 ≤ X<63	Average
25≤ X< 44	Lower

The increasing of student's self-learning is calculated used equation of *effect size* Cohen type *single participant research design,* this type used to measure the large of increasing of self-learning that gained in *baseline and intervention phase*. Election of the abbreviation that used based on the relationship strength between those phases. Dunts, Deborah, & Trivette (2004) said that if the correlation between *baseline and intervention phase* has low value (r < 0.5), so the equality which is used as follows:

$$d = \frac{M_y - M_x}{\sqrt{\frac{{SD_x}^2 + {SD_y}^2}{2}}} \qquad (1)$$

If the correlation between *baseline and intervention* has big value (r ≥ 0.5), so that the equality that used as follows:

$$d = \frac{M_y - M_x}{\left(\frac{SD_p}{\sqrt{2(1-r)}}\right)} \qquad (2)$$

where :

M_y : mean score of *intervention phase*

M_x : Mean score of *baseline*

SD_y : Deviation standard of *intervention*

SD_x : Deviation standard of *baseline*

SD_p :Deviation standard between two phases

r : Correlation between *baseline & Intervention phase*

$$SD_p = \sqrt{\frac{\sum y^2}{\frac{{SD_x}^2 + {SD_y}^2}{2}}}$$

The big correlation between two phases can be seeking used correlation of *product moment* for single data, the equality as follows:

$$r_{xy} = \frac{\sum xy}{N.SD_x.SD_y}$$

where:

r_{xy} : Correlation coefficient

$\sum xy.$:Amount of multiplication between deviation score X with deviation score Y

SD_x : Déviation standard of base line

SD_y : Déviation standard of *intervention*

N : amount of data

Categories of effect size that can be seen in Table 3.

Table 3. Criteria of effect size

Arithmetic value	Category
d ≤0,2	Low
0,2< d ≤0,5	Average
0,5< d ≤0,8	High

RESULT AND DISCUSSION

Deaf students at SMPLB Ungaran of 7th grade at academic year 2018/2019 amount 9 students. Category of deafness is light and medium. This amount is appropriate with student that had by those SLB.

The improvement of self-learning

Observation result at base line phase (A) is achievement from average value data of deaf student in science self-learning at SMPLB Ungaran for every meeting is 30%, 32%, and 32%. Self-learning of student that inspect include 3

aspects i.e. *personal attributes*, *processes*, and *learning context*. Personal attributes aspect consists of motivation, resource use and strategy use. Processes aspects consist of planning, monitoring, and evaluation. Learning context aspects consist of structure and nature of task. Intervention phase is done 3 times.

Before the intervention result is served in completely, as an illustration is served the improvement of self-learning for each respondent. However, the illustration is not for all respondents. As illustration for 1st student the intervention result is served 3 times experiment. The student faced improvement in self-learning although the evaluation result is in low and average category. Evaluation result of 1st student can be seen in Figure 1.

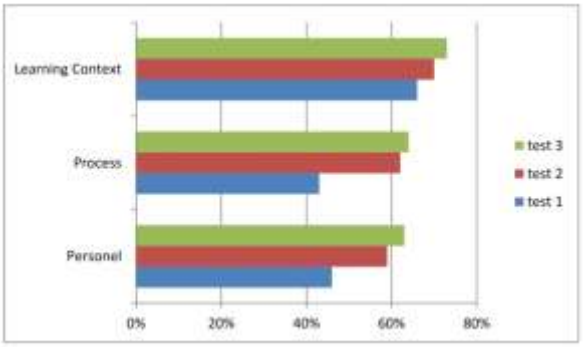

Figure 1. Percentage of self-learning of 1st student

Three aspects that become based of self-learning evaluation of 1st student, all the aspects faced improvement whether in 1st, 2nd, and 3rd experiment. Personal attributes aspects consist of motivation, learning source that used, and student's learning strategy. In the beginning of learning activity before usage video media based BISINDO, 1st student has low learning motivation. It can be seen when the learning activity is take place, the student has not have attraction to understand the material that was taught by teacher. The homework that was given also did not do. Assessment result of 1st students of personal attribute aspect in first experiment is 30% with low category. In next experiment, this aspect has improved so that in the last experiment the improvement is 54% with average assessment criteria. First experiment until third experiment shows that 1st student faced improvement in personal attribute aspects, although the final result that gain the student not yet achievement high or highest category because of the deafness of the student is in average category. The weak of hearing made 1st student is not maximal in process the information so that the assessment score is not maximum yet. Good communication ability is important to learning process and finished problem (Aji, Wiyanto, & Nugroho, 2015).

Process aspect consists of indicator that related to time management that is done by student at learning process, cooperation with friend and feedback. In the first experiment not doing learning activity used video media based BISINDO. Indicators in process aspects cannot be seen for each student at SMPLB Ungaran of deaf class, include 1st student. Value that gained in first experiment is 45% with low category. In the next experiment, assessment of the aspect is had increase. Final result that is gain by 1st student of process aspect is 52% with average category. Value achievement and improving that gain by student is not maximum yet, however there is attitude change that show by student after doing learning activity helped video based BISINDO i.e. time accuracy in collection task. This attitude change is achievement of time management indicator that is done by student in teaching learning process.

Learning context aspects consist of student's ability to follow the learning activity. In the beginning, students' ability is average. Limitedness of hearing that have by deaf student is influential to student's ability to follow learning activity. In Figure 1, there is percentage of learning context aspects in first experiment is 60% with average category. In the next experiment, the assessment of the aspect has improved to gain maximum result become 70% in the last experiment. First experiment until third experiment show that 1st student faced improvement in learning context aspects. The maximum result achievement in the last experiment after doing learning model helped video based BISINDO show that 1st student has improvement in self-learning.

The usage of learning model can increase learning quality (Dewi, Nugroho & Sulhadi, 2015).

Students' self-learning of 1st student has improved, although only in learning context aspects with maximum score are 70% in high category.The same ways are faced by other 8 respondents, with variation self-learning. The improvement for each intervention phase can be explained as follows: The measurement result of students self-learning for each intervention of personal attribute process and learning context aspects are presented in Table 4, 5 and 6.

A personal attributes aspect in 2nd and 3rd intervention is show in improvement if it compared with 1st intervention. The improvement of 1st intervention to 2nd intervention is 4 points, if its count from 1st to 3rd intervention, the improvement is 17 points or 40%. Processes aspects in 2nd and 3rd intervention also faced improvement if it is compared with 1st intervention. The improvement from 1st to 2nd intervention is 9 points and for 2nd to 3rd intervention is 2 points. If it is count the improvement 1st to 3rd intervention is 21 points or 49%.

Table 4. Score of students' self-learning of personal attribute aspects in each intervention

Students' code	Intervention 1		Intervention 2		Intervention 3	
	Score		Score		Score	
	(%)	Category	(%)	Category	(%)	Category
01	44	Low	50	Average	54	Average
02	40	Low	56	Average	60	Average
03	42	Low	60	Average	69	Average
04	35	Low	55	Average	60	Average
05	60	Average	63	Average	67	Average
06	62	Average	62	Average	67	Average
07	34	Low	60	Average	63	Average
08	61	Average	61	Average	64	Average
09	33	Low	60	Average	65	Average
Mean	46	Low	59	Average	63	Average

Table 5. Score of students' self-learning of processes aspects in each interventio

Student's code	Intervention 1		Intervention 2		Intervention 3	
	Score		Score		Score	
	(%)	Category	(%)	Category	(%)	Category
01	45	Low	50	Average	52	Average
02	50	Average	72	High	75	High
03	32	Low	60	Average	61	Average
04	30	Low	63	Average	64	Average
05	55	Average	71	High	73	High
06	42	Low	63	Average	66	Average
07	40	Low	60	Average	62	Average
08	37	Low	62	Average	64	Average
09	60	Average	61	Average	63	Average
Mean	43	Low	62	Average	64	Average

Table 6. Score of students' self-learning of learning context aspects for each intervention

Student's code	Intervention 1		Intervention 2		Intervention 3	
	Score (%)	Category	Score (%)	Category	Score (%)	Category
01	60	Average	65	Average	68	Average
02	69	Average	70	High	71	High
03	67	Average	72	High	75	High
04	66	Average	70	High	75	High
05	68	Average	72	High	79	High
06	66	Average	66	Average	68	Average
07	69	Average	70	High	73	High
08	65	Average	71	High	74	High
09	68	Average	74	High	76	High
Mean	66	Average	70	High	73	High

In Table 6, there is an improving of learning context aspects at 1st, 2nd and 3rd intervention. The improvement from 1st to 2nd intervention is 4 points and for 2nd to 3rd intervention is 3 points. If it is count from 1st to 3rd intervention had improvement 7 points or 11%. The improvement of deaf students' self-learning is because of video implementation based BISINDO in learning activity. Score of learning context aspects had higher rank if it's compare with to other aspects.

Analysis result towards correlation coefficient between baseline and intervention score is 0.98 in high category. So that, improvement calculation of self-learning from baseline phase to intervention phase used equation (2), improvement of each self-learning aspects are calculated from baseline phase are 46.1% for personal attributes aspects, 52.4% for processes aspects and 10.2% for learning context aspects. In totality, the improvement of self-learning of deaf students is d = 2.29 with high category.

Calculation result towards students' improvement of self-learning shows that deaf student can follow learning activity with video usage based BISINDO. Questionnaire result also shows that student feel happy in learning activity with video usage based BISINDO because the video is completed with sigh language that made the deaf student more easy to understanding the material. It is proved by the student played the video through the hand phone many times. The teacher also gives freedom to the students to play the video at school. Deaf students had normal think ability such other normal students, but they lost their hearing ability so that they less vocabulary and difficulty in communication (Perwitasari, Rusilowati, Sujarwata & Purwaningtyas, 2019). It is appropriate with research of Furth (1996) that said language deficit didn't hamper the deaf people to think normal. If it is different with normal people, it's because of the less of experience or concept that was tested not because of deafness cognitive deficit. Fusick (2010) said that less of hearing will affect the language capability. The comfortable of environment with variety in learning process will help student in understanding the material, especially for special need student (Rudiyati, 2013).

Self-learning of deaf students is not released from their ability in self-management. Improvement of self-management can be done through systemic intervention which planned to teach a skill and improvement of self-students in studying. Self-management (or studying that manage by their self) refers to think, feel, and action that self-produce which planned and adapted by systemic according to their need to influence their learning and innovation (Schunk & Etmer, 2000). Self-management refers to students'

activity level by metacognitive, motivation, and behavior in their learning activity. This way that need to applied to deaf students. Students can manage their different learning dimension, include their motivation to study, method they used, achievement result and resource of social and environment that they used. So that, self-management had qualitative and quantitative aspects because it involved process that used by student, how many time they used it, and how much they used it. The availability of lesson material helped video based BISINDO can facilitate the deaf students to repeat the usage, so that it help students in understanding the concepts.

Besides that, the video based BISINDO support the opinion of Schunk (1994) said that teacher or parents in helping student to become self-regulated learner. Availability of video based BISINDO can move the student passion in playing un-relevant game, train students to understanding the instruction and grow their self-confidence. It according to several expert, there are many ways that can be used to train self-learning i.e. (1) it avoid something that can offend student learning for example video game or un-relevant game, (2) it can train student in follow a clue, (3) it can push students to understanding the right method and procedure to finish their task (Shunk. 1994; .Sumarmo, 2004; Butler, 2002). Video based BISINDO developed to helped deaf student to improve students' autonomy and learning result. Application program of learning based multimedia influence towards learning improvement of deaf students (Effendi, Hardiyana, & Gustina, 2016). Media that completely with language sign can improve students' learning result because language sign is need by deaf students in communication (Cirtha, 2012).

Improvement of students' learning result

Video based BISINDO also can improve students' learning result in cognitive domain. Before doing learning intervention with video, they did measurement of learning result in base line condition. The measurement is conducted 3 times (or until stable students' condition). Learning result in intervention condition is measured after implementation of learning usage video based BISINDO. The measurement also conducted 3 times. Learning result in base line and intervention condition can be seen in Table 7.

Table 7. Students' learning result

StudentCode	Students' value					
	Baseline			Intervention		
	1	2	3	1	2	3
01	3	7	7	7	7	7
02	53	67	73	73	77	77
03	27	37	43	50	53	53
04	30	30	33	40	47	53
05	53	63	67	70	73	73
06	17	23	30	33	47	47
07	30	30	33	33	37	37
08	43	50	50	53	57	63
09	53	60	60	67	70	77
Mean	36	42	45	50	55	57

In Table 7, the students' score had improved although the final result of part of student has not achieved minimum completeness criteria (KKM) yet is 60. Learning activity for students with special needs should be repeatedly. Apparently, the intervention which is conducted is not enough to accompany student to achieve KKM. 1st students achieve low learning result score if he compared with other student. Giving a test in base line condition is achieve mean score 16. Test result of base line and intervention condition for 1st student can be seen in Figure 2.

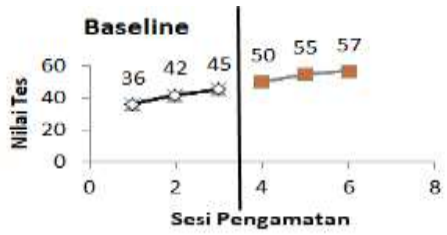

Figure 2. Learning result in baseline and intervention conditions of 1st student

1st student need motivation in order to improve his communication ability. Appropriate

with research of Kwesi (2013) that main priority of teacher is to improve communication ability of student. Video based BISINDO give influence towards ability of communication and learning result of 1st student. Contents of the video based BISINDO is completely with sign language to facilitated the student in communication understand the learning material. Mean score of posttest that achieve by the student s is increase become 34. The result is not maximum yet because its less then minimum completely criteria (KKM), however there is significant improvement score.

Learning result of other students also improved. Three students can gain the KKM and six students aren't yet, but there is significant improvement. In generally, learning result of deaf student at SMPLB Ungaran had improved after doing learning activity used video based BISINDO. In average, the improvement percentage of students' learning result is 58%. It is proved that video based BISINDO is proper to be used to improved learning result of deaf student at SMPLB Ungaran. The mean test result in base line and intervention condition for all students can be seen in Figure 3.

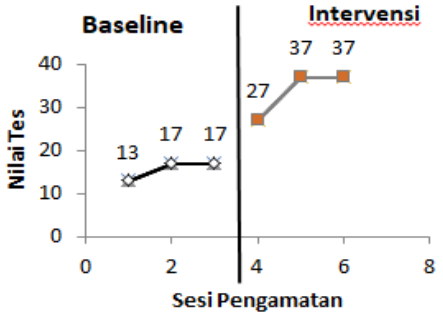

Figure 3. Mean of learning result in Baseline and intervention condition of deaf students at SLBN Ungaran

Improvement result of students' learning calculates used equation of Cohen effect size with single participant *research design* type. Result of calculation used equation of *product moment* is achieve correlation index value between those two phases are 0.05 with very low relation level criteria. Because of correlation value between base line and intervention is low, so that the formulation which is used to determine *effect size* is equation (1) calculation result is achieve d = 0,48 in average category.

CONCLUSION

Self-learning of deaf student at SMPLB Ungaran experience improvement after conducted learning activity used video based BISINDO which has tested the validity. The amount of self-learning improvement from base line to intervention phase is 2.29 with high category. The mean of improvement of each aspects of students' self-learning is 46.1% for personal attributes aspect, 52.4% for process aspect, and 10. 2% for learning context aspect. Besides that, learning result of student is improve with effect size is 0.48 in average criteria.

Suggestion that give by the researcher who want to doing same research is they should can manage the good time that refers to the limitation of the students' hearing capability. Drill program or repeatedly that given to learning activity with BISINDO video is preferable designed and done by structurally so that the purpose can be good achieve.

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