



UTILIZATION OF *PHET SIMULATIONS* AS EFFORT TO SOLVE LEARNING DISABILITY OF DEAF STUDENTS IN DYNAMIC ELECTRICITY MATERIALS

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Abstract

Based on section 31 part 1 in UUD 1945 states education is right of everyone in Indonesia. Belongs to student with special needs is like deaf students. That's why has been done a research to try phet simulations as a visual media to the deaf students. This aim of this research is to describe the result of phet simulations visual media using to solve deaf student problem in studying at electricity matter and the students' response. This research use qualitative descriptive method by using data analyzing technique from Miles and Hiberman (in Pasarela, 2012 : 44). Data will be collected, then reduction step, then be presented, and for the last will be verified (be concluded). The result is the main studying difficulty of students is poor of words so that the students can't understand the words in sentences as soon as possible. Moreover, the schedule of science is only once in a week and student prefers to use sign language than oral language, that makes student poorer in words and sentences. That's why phet simulations media is given as learning media in class because this media consist of lots picture and has interested slide and the students give positive response. It's supported by evaluation result that shows good changing so that means this media is good and suitable as learning media to deaf student. From data analysis of research, be got conclusion that phet simulations visual media using can be used as effort to solve studying difficulty of deaf student in dynamic electricity matter and the students give positive response too.

Keywords: deaf student, studying difficulty, phet simulations, dynamic electricity

PREAMBULE

Education is one of main part of national building. It has been explained at basic constitution of Indonesia (UUD) 1945 at forth line of its opening that the aim of Indonesia nationality is educate human life. In another side of the constitution, it has been explained at number 31 point 1 in its content that "everyone should have get education". We can find the other one in number 28 C point 1 says "everyone can enlarge their human development to fulfill their basic daily needs, also can get education, knowledge, technology, and social culture with its advantages increase their life quality for human goodness". Based on two numbers of constitution, we can conclude that everyone should get education.

Nowdays, knowledge and technology development increase quickly. It can be proved from lots of people know and use computer, google, notebook, and almost everyone has

handphone. They use google as one of learning media beside books. There are lot of applications and new *software* makes student and another children are happy when they find and study new things.

Knowledge and technology development should be balanced with education development and social skill. That's why education should be enjoyed by everybody specially all Indonesian people belongs to the children, not only normal children but also special children (*Children with special needs*). Special students consist of deaf students, blind students, aqueduct students, etc. They should study inspecial school called "SLB".

One of special school that I find is SMALB Karya Mulia Surabaya. This school accepts deaf students. They learn the same lessons with another school but the curriculum has been modified in order to make the students are easy to understand. One of subjects matter is Natural science.



Need known that the teachers who teach here are graduated from special education program, one of studying program in faculty of education. The teachers are not from subjects matter program. That's why the matter of each subjects are possible to have some difficulties when learned, belongs to natural science subjects. In senior high school, there is a difficult subject matter for example physics. In physics lesson, there is a material about electricity. Other than that, there are lot of material that can be found in daily life in physics subject matter.

Need known that physics are one of difficult lesson to teach. Who feels physics are difficult is not only deaf students, but also normal students. That's why needs a media to help teacher share the matter to the students easily.

One of alternative media for deaf students is *Phet Simulations*. An application that can be download from internet and then use to teach in the class. *Phet Simulations* has a beautiful view, colorful, lot of movements, and interested. This media is possible to be a good choice to be used in teaching, especially for teaching deaf students who has weak hearing and strong vision. Moreover, this media can be used to teach physics matter that has difficult explanation. So, this media can help teacher to teach natural science especially physics easily.

In learning process, it is possible some students have difficulty. Sadi (2013) states studying difficulty is the meaning of *learning disability*. Learning disability affects studying activity. Studying activity at everyone is not always in good condition. There is not only be a student can understand the matter easily and fast, but also be a student feels so difficult to understand.

In eager side, there is not only be a student has a high spirit to study, but also be a student with low spirit to study. It is because everyone has some differences. This difference causes some differences in studying activity at each student.

Deaf students have special condition from physic, social, intelligence, and education factor. In another side, there are exogenous and indigenous factor. Exogenous is factor from outside and indigenous is factor from inside. The exogenous factor is anything comes from outside that affects the students like friends and environments. The indigenous factor is anything comes from inside of the students like self confidence and self motivation.

Learning disability of deaf students is difficulties to communicate with the others because of weak hearing. Meanwhile, *Phet Simulations* is a visualization media that has lot of pictures, animations, and colorful. That's why, this media can help deaf students to understand subject matter by good vision.

Some lessons that should be learned by students affect student intelligence. For example physics has some materials. In this observation, dynamic electricity is chosen to be observed. It is because dynamic electricity should be explained to the students clearly by using *phet simulations*. In dynamic electricity, there are some materials that should be seen by the students. *Phet simulations* helps it by giving animation about the basic concept of dynamic electricity. Students can see the matter clearly and try to understand.

According to the explanation above, arranged an observation with the theme is "Utilization of *Phet Simulations* as Effort to Solve Learning Disability of Deaf Students at Dynamic Electricity Materials".

METHODS

Kind of this observation is qualitative description. There are 3 methods to collect the data and information. They are observation, interview, and documentation. While the data analysis technique is Miles and Hiberman model (in Pasarela, 2012 : 44) that consist of 4 steps. They are data collection, data reduction, data presentation, and conclusion. So, data that will be presented is description of utilization of *phet simulations* as effort to solve learning disability of deaf students at dynamic electricity materials.

Along the observation process, observer has a *key informan*, who is the natural science teacher of SMALB Karya Mulia Surabaya. He can give information and that need by the observer. In other side, the observer also use questionnaire methods to get data about factors that make students get difficulty to study and their problems. One more way that observer do is evaluation to know the score of students after studying use *phet simulations*. This data will support and complete the other data that observer need.

Data that has been collected is data that has been reduced, then will be conclude. Data that has been collected is result of student questionnaire, result of student evaluation, result of data identified, and



documents. This all data will be processed in this observation.

Along this observation, observer get data about students audiogram from the English teacher of SMALB Karya Mulia Surabaya (as a examination officer of students deaf) as follows :

RESULT AND DISCUSSION

Tabel 1. Students Audiogram

No	Students Code	Sound Intensity can be Heard (dB)	
		Right Ear	Left Ear
1	Dr	100	110
2	Ek	105	110
3	Ri	115	110
4	Fd	100	115
5	Rg	115	105
6	Fu	110	115
7	Ys	110	115
8	Ry	95	110
9	Dm	90	100
10	Ag	115	110

Audiogram data is data collection from students and that is getting from students when they entered this school in first time. From this data, the observer knows that the students belong to deaf students. The students suffer *profound hearing loss* (more than 91 dB). The student can't hear sound at all more over the loud sound. They should wear tools or instruments to make them easy to hear something. Besides that, they should study at special school.

Another data can be got from this observation is the result of student evaluation after studying with *phet simulations*. The data is written as follows :

Tabel 2. The Result of Student Evaluation

No	Students Code	Scores	Notes
1	Dr	76	Pass
2	Ek	41	Not pass
3	Fd	62	Not pass
4	Ri	39	Not pass
5	Rg	66	Not pass
6	Fu	78	Pass
7	Ys	76	Pass
8	Ry	82	Pass
9	Dm	73	Pass
10	Ag	78	Pass

From the table, can be known that there are 4 students haven't been passed (40% because 4 from 10 times to 100%) and 6 students have passed (60% because 6 from 10 times to 100%) the evaluation. It shows that learning by using *phet simulations* is good enough (based on Likert scale, 41%-60% is good enough). From interview result with the key informant, the observer get information before using

phet simulations, the students who don't pass the evaluation are more than it (the data above). It shows that *phet simulations* gives advantages to score students development.

From the data known that Ek, Fd, Ri, dan Rg haven't been passed the evaluation. Ek can't hear at all. Along the learning process, Ek always be focus on board and attend to the explanation of teacher. But, when Ek is asked, Ek is only smile. He is shy to write



the answer of the question. And finally, Ek's answer is wrong. It is because information that Ek get is not completed and cleared. Similar with Depdikbud statements (in Undariyantiningasih, 2008 : 15) that deaf students will slow in communication and development, so that they need more attention and special treatment. In other side, Ek emotional skill is good enough. It is proved by kindness of his habit in class. What Ek happen is also happen to Fd.

Different with Fd and Ek, Ri has more confident than them. When answered the multiple answer question, Ri try to answer right answer more than the others. When he answered the essay question, he feels difficult and finally his answered is wrong. Ri is students with very good attention in lesson. It is proved by answering question with high spirit to get first opportunity to answer. He tried to get first person answering the question. It is suitable with Depdikbud statements (in Undariyantiningasih, 2008 : 18) that the characteristics of deaf students has special physic. It is quick eyes movement, hand and leg moves fast and cheerful.

In other case, Rg suffers missed in understanding the question and difficult to find and determine the right answer especially in essay question. But, in multiple choices, Rg is able to determine the right answer. Observer tries to guide Rg because he is hard to understand abstract simulations. It proves Depdikbud statement (in Undariyantiningasih, 2008 :

18) that deaf students is hard to understand abstract situation and anything is not cleared, moreover in writing and words especially in communication.

Commonly, the four students haven't been passed above are good potential students in intelligence side. It is proved by their spirit when they operate the Phet simulations. They understand the way to use phet simulations fast. What they look is cleared and easy. Unfortunately, when they try to share it by writing and saying something, it is very hard.

Similar with Rosalina observation (2014) that students will be motivated and be happy with computer media because the students can observe anything they look. So that, the students can understand the subjects what they look. Dibuktikan dengan hasil penelitian Rosalina (2014) has proven that students always increase to know something new and space.

It is also written on observation of Yuswanjaya (2013) that use audio visual media to enlarge words of deaf students. Shortly, the data shows deaf students can increase the number of words that they have after learning use audio-visual media like *phet simulations*.

Beside the result of student evaluation, there is result of student response. The data is as follows :

Tabel 3. The result of Student Response Questionnaire

No	Statements	Answer		Percentage (%)	Notes
		Yes	No		
1	Students are more active to give questions after studying with <i>Phet simulations</i>	7	2	77,8	Good
2	Students are happy studying with <i>Phet simulations</i>	9	0	100,0	Very good
3	<i>Phet simulations</i> can help students to understand the matters easily	9	0	100,0	Very good
4	<i>Phet simulations</i> is easy to use	7	2	77,8	Good
5	<i>Phet simulations</i> can help students to study and learn the matter	8	1	88,9	Very good
6	The students experienced an increase in value after studying with <i>Phet simulations</i>	9	0	100,0	Very good
7	The students become like natural science lesson	9	0	100,0	Very good



According to Likert scale (Riduwan, 2012 : 15), with average value 92,1 % can be concluded that *phet simulations* gives good effects to students achievements. If the students enjoy use *phet simulations*, easy to operate animation of *phet simulations*, it will make the students easy to understand the matter of lesson too. If the students are easy to understand the lesson, the report of student evaluation will increase student mark and achievement.

According to questionnaire result, it shows good and very good criteria. In observation activity, there is a small obstacle when the deaf students try *phet simulations*. The obstacle is less of laptops and notebooks. So the students should wait their friends to operate *phet simulations*.

Commonly, can be conclude that the students give good response to the *phet simulations*. It can be used as learning media in class specially for demple in dynamic electricity matter.

Findings can be reach in this observation is the deaf students are still possible to have good intelegence potential. The difference is deaf students cann't listen and focus to the words and letters very well. That's why many informations cann't be reached with them. Less informations, less knowledges. The deaf students cann't understand long sentences, many words, and letter arrangements. AS a result, the good intelegence potential cann't develop as well as normal students.

By using *phet simulations* media that has interested views, it will make the students happy in learning and can easy in lesson understanding. Because of many pictures and animations can be seen, it can help deaf students who has difficulties in understanding words and letters. So the students can use their eyes to understand the lesson by seeing the animations of *phet simulations*.

CLOSING

Conclusion

According to the result of data analysis, can be conclude that the main problem and studying difficulty of deaf students at SMALB Karya Mulia Surabaya are understanding the lesson in many words and letters. It is because the student can not listen and understand the words very well and correctly. Because of the deaf that suffer the students, teacher can not do communication very well with them.

That's why the lesson are tried to deliver by teacher to the deaf students can't reach the students all. By using *phet simulations* as learning media, it can be one of suggestions to solve studying difficulty of deaf students. Fortunately, the deaf students give good response and welcome when the observer come and try to teach dynamic electricity use *phet simulations* as visualization media at learning activity in class.

Suggestion

According to the conclusion form this observation, we can suggest some advices. First, the deaf students need parent attention, motivation, and participation to guide the learning process at home. Second, teacher of deaf students should have lot of creativities to share information and knowledge . Third, use more visual media to teach deaf students who has limited skill to understand words long sentences.

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