

## Utilization of Smartphones in a Science Class through Guided Inquiry Method on Hearing Impairment

Niky Dewi Karunia Mariana, Ahmad Samawi, Sihkabuden

Universitas Negeri Malang  
Email: nicydewi@yahoo.com

**Abstrak :** Guided inquiry method is a method that emphasizes the process of finding its own answers to a problem. The purpose of guided inquiry learning is to help students to develop intellectual discipline by the use of smartphones to facilitate the delivery of material that cannot be explained just by theory but should be equipped with illustrations. This research used the quantitative method of one group pre-test post-test. Data were collected by observation and interview while data analysis was conducted using with Wilcoxon non parametric test. The results of this research indicated the value before being given treatment was 38.14 and after being given treatment was 83. The conclusion is that there is an influence in the use of guided inquiry method through smartphone on the outcome of science learning.

**Keywords:** Guided Inquiry Method, Smartphone Utilization, Science Learning Outcomes.

### INTRODUCTION

The manifestation of a smart nation should be done by providing a good education.

A good education can not be separated from the role of an educator or teacher who is professional in teaching. Creative thinking fosters a creative attitude for each learning process. It is important to emphasize so that the learning process that is carried out further is able to develop the independent attitude of a student and the process of understanding. A teacher must encourage students to master the materials of the subject and does not position themselves as the learning resources that delivers the information. Insetead, a teacher should be the manager of the learning resources that can be utilized by students.

As a mttter of fact, there is no difficult subject matter. This perception appears only because of negative psychological factors which makes students find it difficult to understand the materials. Therefore, it is better if the learning process is delivered in a way that is not monotonous, fun, and interesting so that students feel comfortable, not scared and welcome to the advancement of tscience and technology. In the era of advances communication technology, it cannot be denied that smartphone easy to carry, and it provides a variety of features for today's convenience. However, it is important to note that it must be used wisely. According to Fadilah in Warisyah (2015) with positive habituation and appropriate stimulation, smartphones can be used for as learning media, so that children will focus on positive activities and get two benefits at once while learning through playing.

Using a guided inquiry learning model is expected to be able to create conducive learning environment and open up students' knowledge in an increasingly advanced technological era. Guided inquiry is a student-centered approach which has a positive influence on students' academic success and develops scientific attitudes. The purpose of the inquiry model is used to develop intellectual skills, critical thinking, and scientific problem skills (Dimiyati & Mudjiono in Isa et al 2016).

Based on the observations conducted at Grade VIII SMPLB YPTB Malang, it was found that students with hearing impairment did not use their smartphones to study and were more likely to use smartphone to play. Even during a learning process, the students stealthily opened their smartphone many times just to check on social media. When the teacher looked away, they even made video calls with their friends who were outside the school. These are the examples of students' bad behavior in using smartphones when learning.

Effendi (2014) stated that smartphones make it easy for a learning process because the materials that cannot be delivered verbally can be presented with the help of technology accompanied with more details to attract students' interest.

Therefore, the use of guided inquiry method through the utilization of smartphones with advanced features, such as google and youtube to search for information, will further facilitate the delivery of science learning material, so that it can improve the learning outcomes for students with hearing impairment at SMPLB-B YPTB, Malang.

**Table 1. Students' scores before getting the treatment**

No	Name	Score
1	YAH	43
2	BOS	41
3	CMI	30
4	MAR	44
5	HA	34
6	FW	36
7	DOP	39
total		267
Average		38,14

**Table 2. Students' scores after getting the treatment**

No	Name	Score
1	YAH	85
2	BOS	86
3	CMI	81
4	MAR	76
5	HA	71
6	FW	95
7	DOP	86
Total		580
Average		83

**Table 3. Score Comparison of Pre-test and Post-test**

No.	Name	Score		Change Sign
		Pre-test (X)	Post-Test (Y)	
1.	YAH	43	85	+
2.	BOS	41	86	+
3.	CMI	30	81	+
4.	MAR	44	76	+
5.	HA	34	71	+
6.	FW	36	95	+
7.	DOP	39	86	+
Rata-Rata		38,14	83	

## METHOD

In this research, the quantitative approach used by the researchers was a quasi experimental type with one group pretest posttest, where direct observations of one group of subjects were carried out without a comparison group or control group, so that each subject was a class control over itself. Punaji in Noermasari (2016) explained that one group pretest and post test design was only carried out in one group of research subjects who received one treatment and later on were measured twice at the beginning and the end of the research (pretest and posttest).

Data collection of this research was conducted as follows: the preparation stage consisting of (a) Observing the use of smartphone students with hearing impairment in SMPLB YPTB-B using the interview sheet; (b) arranging research permit documents at the faculty which was addressed to the school; (c) composing instruments in the form of assessment sheets and lessonplans; (d) validating instrument validation to expert lecturers and practitioners. The second stage is Implementation which includes: (a) Pre-Test activities carried out once to determine the ability of the subject before giving the treatment; (b) Giving treatment using the inquiry learning strategy through the use of smartphones so that students actively sought their own information with the guidance of teachers and was expected to be wiser in using smartphones. The treatment was given twice during the research; (c) Post-Test given as a way of measuring the guided inquiry method through the use of smartphones after students received the treatment twice. the Post-Test was carried out once. The Final Stage consists of (a) Processing the results of Pretest and Posttest (b) Conducting analysis of the results and discussing the research findings; (c) Drawing conclusions based on the results of the data; (d) Providing recommendations according to the results of the research.

## FINDINGS AND DISCUSSION

### Findings

Below is the result of Pre-test of science learning before students were given guided inquiry method treatment through the use of smartphones.

From Table 1, it is found that students got the highest score of 44 before having guided inquiry learning through smartphone utilization, while the lowest score was only 30 with the average score of 38.14

The next table provides the post-test data on the ability of science learning after students were treated using guided inquiry method through the use of smartphones

From Table 2, it is found that after having a guided inquiry method through smartphone, students got the highest score of 95 and the lowest score of 71 with average score of 83. The results of the post-test table showed that all students experienced an increase in science learning after getting the guided inquiry method twice.

After obtaining the results from pre-test and post-test, a comparison can be made to determine the ability of students' science learning before and after the treatment.

Based on data from table 3, it can be seen that the outcomes of science learning from 7 students increased indicated by 7 plus signs (+).

**Table 4. Calculating  $T_{calc}$** 

No	Name	Score		Dif-fer-ence (Y-X)	Rank	Sign	
		Pre-test	Post-Test			+	-
1.	YAH	43	85	42	3	+3	0
2.	BOS	41	86	45	4	+4	0
3.	CMI	30	81	51	6	+6	0
4.	MAR	44	76	32	1	+1	0
5.	HA	34	71	37	2	+2	0
6.	FW	36	95	59	7	+7	0
7.	DOP	39	86	47	5	+5	0
T=28							

The average scores between the pre-test and post-test also increased where The pre-test score was 38.14 and the post-test score was 83.

The Wilcoxon's marked sequence test was used as a refinement of the sign test. In the marked sequence test, in addition to paying attention to the differences of the signs (positive or negative), it is also important to carefully determine whether there is a real difference between the paired data taken from the samples and related samples.

Based on the criteria of hypothesis testing:

If  $T_{calc} < T_{tab} = H_0$  is accepted

If  $T_{calc} > T_{tab} = H_0$  is rejected

From Table 4, it is known that the statistical calculation using the Wilcoxon test was 28 and  $T_{table}$  obtained was 4. It is found that  $T_{calc} < T_{tab} \alpha 0.05$  or ( $28 > 4$ ), therefore  $H_0$  is rejected and  $H_1$  is accepted, meaning that there are effects on learning outcomes of the students between before and after receiving guided inquiry method through smartphone utilization. It can be concluded that the guided inquiry method through smartphone utilization gives an effect on the ability of science learning eighth grade hearing impaired students of SMPLB-B YPTB Malang.

## DISCUSSION

In the initial conditions before the treatment, students had difficulty working on science questions, so that when given a pre-test to determine their initial abilities, it was found that the average score was very low. The average score of 7 VIII Grade students of SMPLB B YPTB Malang was 38.14. During the pre-test, some conditions were found in the class, such as students who did not completely understand the questions, some who were quite able to answer the questions based on the teacher's instructions, and those who often asked for the answers to the questions. From the pre-test, it can be seen that the use of smartphones for learning was still lacking because students only use smartphones to play and have fun. They did not

understand that smartphones can also be used for learning.

This is in line with Rahma's opinion (2015) who stated that communication technology among teenagers such as using smartphones has become multifunctional. However, it depend on the way they use it either positively or negatively. A positive example is that smartphones can facilitate learning. The negative example is that it is only used to play games, to be exist on social media, and to visit some banned websites. Therefore, to avoid these negative effect, guidance and direction from teachers are needed to assist and bring about understandings to students that smartphones can also be used for learning. This guidance will take the use of smartphones to a more positive direction. Fatimah & Mufti (2014) also said that smartphone learning in a science class is a systematically arranged knowledge that is not only supported by facts but also by scientific methods and scientific attitudes through the process of inquiry / discovery. According to Bursan & Fitriyah (2015), smartphones can be used as teaching aids in the form of educational games based on android smartphones with mobile learning technology.

Poedjiastoeti & Liliyasi, (2016) mentioned that students with hearing impairment experience obstacles in processing information through hearing that has an impact on education and life so that the advantages of other sensory functions need to be optimized, among others, through visualization with the help of multimedia. Multimedia is a combination consisting of text, photos, videos, animations and graphics. Suyadi (2013) states that inquiry learning places more emphasis on the process of thinking critically and analytically to seek and find out for themselves the answers to a problem. According to Hifni & Turnip (2015), inquiry learning can be designed by the teacher according to the ability of students or their intellectual level. However, because these hearing impaired students have difficulty understanding language, the use of the guided inquiry method is very suitable for students at SMPLB-B YPTB Malang. The strategy teaches children to independently find information on their own by utilizing smartphones in the learning activities but still with guidance and assistance from teachers. The teachers will reiterate to simplify the language so that students with hearing impairment are easier to understand so as to improve the learning outcomes of the science subject. This reiteration by teachers should be done due to the fact that the explanation on the internet is too long to be understood by hearing impaired students.

According to Ferawati (2015), learning is a combination that consists of material, human, facilities, equipment, and procedures that influence each other to achieve the learning objectives. After being given treatment twice, the learning outcomes of Grade VII students with hearing impairment in the science class increased compared to the learning outcomes in the the

pre-test. The post-tests was conducted in several steps: a) the teacher gave a set of questions in the form of a written test; b) the teacher helped to give instructions to students on how to answer the questions; c) the students answered 15 questions in the form of multiple choice and essay. Students' scores after having guided inquiry method through smartphone utilization in the learning activities were very good in which the average score was 83.

During the learning process, students were active, focused, and happy in in the science class through the use of smartphones because they finally understand that smartphones can also be used for learning not just for playing or being active on social media. In line with Effendi's opinion (2014), smartphones make it easy for learning because material that cannot be delivered verbally, can be facilitated by the advanced technology and presented in detail to attract students' interest. In the material of the science class, for example, the functions of human organs when digesting food in the stomach or the damaging process of human organs if they often consume cigarettes can be presented in animated visualization. This smartphone assisted teaching is not replacing the role of educators to deliver teaching material, but only as an alternative media for students with the aim of increasing the stimulation of students' thinking skills by animation.

Hardman in Handariyati (2006) states that deafness is a severe hearing loss so that a person experience a disruption in the process of receiving linguistic information through hearing, whether or not using a hearing aid, which ultimately affects educational ability. According to Azmi (2014), deafness is a condition where the hearing organ is not functioning properly, so that in a pedagogical manner special education or guidance services are needed. This disorder can be partially or completely affected. Likewise, Linawati (2012) also states that students with hearing impairment experience limitations in understanding language which influence the process in receiving information and require the right method to deliver the materials to make it easier for them.

Based on the above opinion, it can be inferred that hearing impaired students are students who experience obstacles to hear so the process of receiving information is quite limited and require the help of media to facilitate them to understand learning materials.

According to Dewi et al (2013), guided inquiry emphasizes the process of children to be able to find their own information so that scientific attitudes arise in students. The guided inquiry model can be designed by the teacher according to the ability of students or the level of intellectual development. Junior high school students must be introduced to the current learning materials in accordance with the development of science and technology to be wiser and smarter. Therefore, the teacher must direct and guide

the students to utilize this technology in the learning activities. According to Sofiani (2011), the inquiry learning process can provide students in developing skills according to what they need and understanding problems to find the solutions.

According to Safitri, I & Rohani (2016), students actually have good ability and creativity to support their education if directed at positive things. Students' ability to operate applications on smartphones specifically to find information will be faster out of curiosity. They will continue to search and compile the information for example in the use of the youtube application that provides so many videos for learning. Moreover, the use of smartphones in learning is also an attraction during the learning activities because this is the first time students can continue learning without being stopped to use their smartphones. The use of smartphones can improve the learning outcomes in science for Grade VIII students at SMPLB YPTB Malang.

Based on the results of hypothesis testing, it shows that there are differences in the inquiry method through the use of smartphones in the learning outcomes of science class for hearing impaired students SMPLB B YPTB Malang. Judging from the table of the test score, it can be seen that the average pre-test was 38.14 and the average post-test was 83. It shows the comparison of the average score of science class in answering questions before and after the guided inquiry method through the use of smartphones. From the Wilcoxon test table, it can be concluded that the guided inquiry method with the use of smartphone affects the learning outcomes of science class of Grade VIII hearing impaired students at SMPLB-B YPTB Malang.

Therefore in this research, the use of guided inquiry method with smartphones can improve the learning outcomes in the science class because the method provides fun and interesting lessons for meetings in which each meeting lasted for 35 minutes

## CONCLUSIONS

Based on the data obtained about the research entitled "Utilization of Smartphones Guided Inquiry Learning Method through Guided Inquiry Method on Students with Hearing Impairment", it can be concluded that:

Students' average score in the science class before the treatment was 38.14 with the lowest score of 30 and the highest score of 95.

After the treatment, the average score increased to 83 with the lowest score of 71 and the highest score of 95.

Based on the criteria of hypothesis testing:

If  $T_{\text{calc}} < T_{\text{table}} = H_0$  is accepted

If  $T_{\text{calc}} > T_{\text{table}} = H_0$  is rejected

It was found that the statistical calculation using the Wilcoxon test was 28 and  $T_{table}$  was 4, so  $T_{calc} < T_{table}$   $\alpha$  0.05 or (28 > 4). Therefore  $H_0$  is rejected and  $H_1$  is accepted, meaning that there is an effect in the utilization of smartphones in guided inquiry method on the students' learning outcomes in science class . It can be concluded that smartphone utilization through guided inquiry method has an effect on students' ability in the science class at SMPLB-B YPTB Malang

## SUGGESTION

Based on the research , the researcher gave advices to the concerned parties that educators do not rule out the use of smartphones in education, considering that technology is now advanced enough to be used as a facility in the class. However, using smartphone just for playing and being active in social media can be minimized. Students can be directed to use their smartphone to study and to be more active. In the guided inquiry method, students find answers and information about related subjects on their own but still in the direction and supervision of the teacher so that they can use smartphones wisely.

## REFERENCES

- Azmi, A. (2015). Development of Science Subject Pop-Up Learning Materials for Deaf Class IV SDLB B Children in Yogyakarta. Student Thesis Journal TP, 4 (1). Downloaded from <http://eprints.uny.ac.id/>
- Busran, B., & Fitriyah, F. (2015). Designing Educational Games Learning to read on Preschool Children Based on Android Smartphones (Case Study: Iqra Padang Selatan Kindergarten Curriculum. TeknoIf Journal, 3 (1). Downloaded from [http://ejournal.itp.ac.id/index.php / tinformatika / article / download / 255/252](http://ejournal.itp.ac.id/index.php/tinformatika/article/download/255/252)
- Dewi, N. L., Dantes, N., & Sadia, I. W. (2013). Effect of guided inquiry learning model on scientific attitudes and learning outcomes of science. PENDASI: Journal of Indonesian Basic Education, 3 (1). Downloaded from [http://119.252.161.254/ejournal/index.php/jurnal\\_pendas/article/viewFile/512/304](http://119.252.161.254/ejournal/index.php/jurnal_pendas/article/viewFile/512/304)
- Effendi, Diana. (2014). MAteri Science Learning Application Program Human Circulatory System for Multimedia Class B Students of SDLB Part B (Deaf). This journal is presented at the National Seminar and Electrical Engineering Expo, Department of Information Systems Studies, Bandung. Downloaded from [https://www.researchgate.net/profile/Diana\\_Effendi/publication/](https://www.researchgate.net/profile/Diana_Effendi/publication/)
- Fatihah, S., & Mufti, Y. (2014). Development of Science-Physics Smartphone Learning Media Based on Android as Strengthening Students' Character Science. Journal of Kaunia, 10 (1), 59-64. Downloaded from <https://media.neliti.com/media/publications/104179-ID-pengembangan-media-pembelajaran-ipa-fisi.pdf>
- Ferawati, Y. (2015). Bungong jeumpa creation dance learning in deaf children in Semarang State SLB. Dance Art Journal, 4 (1). Downloaded from <https://www.google.com/>