JPPIPA 9(2) (2023)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

Analysis Study of Student Responses to the Science Practicum E-Module on Conductor and Insulator Materials

Mirsya Adelia[1*], Asri Widowati[1], Jumadi[1], Fitria Lafifa[1]

[1] Master Program of Science Education, Faculty of Science and Mathematics, Yogyakarta State University, Yogyakarta, Indonesia.

Received: June 11, 2022
Revised: February 5, 2023
Accepted: February 25, 2023
Published: February 28, 2023

Corresponding Author:
Mirsya Adelia
mirsya0218fmipa.2021@student.uny.ac.id

DOI: 10.29303/jppipa.v9i2.1752

Abstract: This study is a quantitative study of calculating student responses to the development of e-modules science practicum on conductors and insulators. This study aims to determine the response of students to the e-module which is declared eligible for testing. Student responses were measured using a response questionnaire. Response Questionnaire used in the validity and reliability test before being used. The validity test was carried out on 4 instrument experts to measure precisely. Reliability tests were carried out to generate agreement values between validators. The product trial was conducted at the Darul Dakwah Integrated Junior High School, Sooko District, Mojokerto Regency in class VIII. The sampling technique was purposive sampling. Student responses to the science practicum e-module on conductors and insulators material were given to 16 students at Darul Dakwah Terpadu Junior High School, Sooko District, Mojokerto Regency and received a very good response with a score of 89%.

Keywords: Conductors; Insulators; E-Module; Questionnaire; Response; Science Practicum

Introduction

Science learning that related to the processes, products and attitudes of science which are contained in the nature of science itself. Science learning is learning that can connect scientific knowledge with everyday life (Fitriyati et al., 2017). Science learning in schools certainly has its own characteristics. Science learning in elementary school is different from junior high school. Science learning in elementary school is the first introduction of students to science materials so that the teacher will present science material in an interesting way and not pay much attention to the nature of science as a whole (Kusumaningrum, 2018; Prananda et al., 2020). While learning science in junior high school is a level that really needs to be paid attention to by the teacher, this is because students are given the basic concepts of science from this level (Ichsan et al., 2018). So that it can be said that learning science in junior high school is the main key to students' understanding, and learning science in elementary school is the main key to students' initial interest in science. For this reason, science subject matter in elementary and junior high schools looks the same even though the science material in elementary school is simpler.

Science learning should have all science components starting from the science process, the products of the science process, to the attitude of science as the end result. These 3 components can connect science learning materials at school with the daily lives of students. Therefore, every science learning material must be related to the lives of students. In addition, teachers must also provide a good science learning experience with their innovations. However, there are still many teachers who have not provided a direct experience to students when learning science at school (Arini et al., 2019).

Rapidly developing technology can also be an important factor for teachers to use in learning. Currently, all aspects of life are made easier by using technology. Science learning should also make good use of technology so that the final results of science learning can be felt by students (Jamaluddin et al., 2020). Teachers should provide learning media that utilize technology to increase student interest so that students feel enjoy learning science (Triwahyuningtyas et al., 2020).

How to Cite:
Adelia, M., Widowati, A., Jumadi, J., & Lafifa, F. (2023). Analysis Study of Student Responses to the Science Practicum E-Module on Conductor and Insulator Materials. *Jurnal Penelitian Pendidikan IPA*, *9*(2), 465–470. https://doi.org/10.29303/jppipa.v9i2.1752

Practicum is one method for teachers to increase the interest and attention of students. In addition, practicum can also provide real direct experience for students to understand the process of science in learning science. Practicum is a way for students to prove a theory in science learning and provide fun real experiences and make students active (Darmaji et al., 2019; Widayanti et al., 2018). Practicum can also be a means of improving students' psychomotor skills, not only improving intellectual skills (Sunardi et al., 2020). A good practicum is a practice that pays attention to the existence of guidelines in the form of practicum worksheets or practicum instructions or also known as practicum modules (Darmaji et al., 2019; Widayanti et al., 2018; Widyaningrum et al., 2019). Because practicum guidelines are needed for students to understand work steps, scientific concepts, tools and materials needed, and other things that support the implementation of practicum.

E-module is a learning module that utilizes technology in its manufacture and use. The e-module can be used as a practicum guide. Modules that utilize technology can make students understand more about the contents of the module and can solve existing problems in a fun way (Triwahyuningtyas et al., 2020). E-modules have many advantages over printed modules, namely, they are easy to carry anywhere, e-modules can increase students' independence in learning, and lastly e-modules can display videos, moving images, and also audio which can increase students' interest (Sriyanti et al., 2021).

Therefore, for several previous reasons, the researcher wanted to develop a science practicum e-module on conductor and insulator material that pays attention to student responses. This is because students are the main actors in the science process of learning. In addition, students are the target of understanding the nature of science in learning science. Student responses will be very useful for teachers in the continuity of their learning, so that teachers will continue to improve the quality and quantity of their learning in a better direction so that students acquire even better knowledge and skills (Kartini et al., 2020). Responses can be in the form of negative or positive impressions or reactions from the activities that have been given (Arini et al., 2019).

Method

This type of research is quantitative research based on the results of the student response questionnaire given during the trial of the science practicum e-module on conductor and insulator materials. The development of science practicum e-modules on conductor and insulator materials is carried out until the product is declared fit for use with a feasibility test. The feasibility test on this product is carried out by paying attention to the eligibility of the product and also the feasibility of the material presented in the Science practicum e-module. The followings are product feasibility categories used in the development of science practicum e-modules on conductor and insulator materials.

Table 1. Feasibility Criteria

Score (%)	Feasibility Category
75.01 – 100.00	Very Feasible
62.01 – 75.00	Feasible
50.01 – 62.00	Less Feasible
01.00 – 50.00	Not Feasible

This research was conducted at Darul Dakwah Integrated Junior High School, Sooko District, Mojokerto Regency. The selection of research samples by purposive sampling by paying attention to samples that have studied conductor and insulator materials. The sample used was class VIII with a total of 16 students. Students are asked to do practicum independently by following the e-module guide that has been developed. After that, students were given a questionnaire to measure responses to the e-module.

A questionnaire is a method or collection technique in the form of a statement in which there are answer options for the available statements (Arifin, 2016). The statements given are positive and negative statements. The answer options and scores given can be seen in the following table:

Table 2. Response Questionnaire Answer Options

Option	Score	
	Positive Statement	Negative Statement
Very Agree	4	1
Agree	3	2
Less Agree	2	3
Disagree	1	4

Each statement represents an indicator of a different aspect of student response. The following are the aspects and indicators that are measured.

Table 3. Aspects and Indicators of Student Response Questionnaire (Modified from Kartini & Putra, 2020)

Aspects	Indicator
Content quality and purpose	Initial material accuracy
	Initial materials
Quality of learning	Provide assistance for practicum
	Can have an impact on students
	Can have an impact on teachers and learning
Technical quality	Legibility
	Easy to use
	Quality of video and image display

The response questionnaire that was given first went through the validity and reliability test stages of the instrument. Calculation of the validity test with the following formula 1 (Bahri, 2018).

$$score = \frac{score\ obtained}{max\ score} \quad (1)$$

The average calculation of several validators is calculated by the formula 2 (Ernawati, 2017).

$$\bar{x} = \frac{\sum x}{n} \quad (2)$$

Description:
$\bar{x}$ = average score
n = number of validators
$\sum x$ = the number of values from the validator

Calculation of the validity test is then categorized according to the feasibility of the same category in table 1. Test the reliability of the instrument by means of the PA test or Percentage Agreement with the formula 3 (Viana et al., 2016).

$$\text{PA} = \left(1 - \frac{A-B}{A+B}\right) x\ 100\% \quad (3)$$

Description:
A = a larger rating score
B = a smaller rating score

The reliability of this instrument was carried out to determine the level of agreement and suitability of the data provided by several validators, which in this study used 4 instrument validators. Instrument reliability criteria can be seen as follows:

Table 4. Reliable Criteria (Wardhani, 2018)

Range (%)	Category
0 ≤ PA ≤ 40	Less Reliable
41 < PA ≤ 60	Quite Reliable
61 < PA ≤ 80	Reliable
81 < PA ≤ 100	Very Reliable

The results of student responses that have been filled in are then analyzed using the following formula 4 (Fitriani et al., 2019).

$$P = \frac{F}{N}\ x\ 100\% \quad (4)$$

Description:
P = Percentage
F = Number of Respondents Answers
N = The maximum number of respondents

The results of the analysis and calculations performed are then categorized into the following response categories.

Table 5. Student Response Criteria (Khairiyah et al., 2020)

Range (%)	Category
85 ≤ P	Very Good
70 ≤ P < 85	Good
50 ≤ P < 70	Not Good
P < 50	Bad

Result and Discussion

The science practicum e-module on conductor and insulator material is one of the developments of a science practicum module or guide that utilizes technology, namely flipbooks that can be accessed on smartphones, computers, or other personal computers. This e-module can display various images and videos along with audio which can make it easier for students to do the practicum. The practicum presented in this e-module is an identification of surrounding objects including conductors and insulators. This material is simple material, but there are still many students who have not been able to relate this material to everyday life (Marnita, 2018). This material is also science material in elementary school and is repeated with the development of science material in junior high school.

Trials of the science practicum e-module on conductor and insulator materials are carried out after the product is declared valid or suitable for use. The feasibility test of the science practicum e-module on conductor and insulator materials was carried out by 4 experts who measured the feasibility of the product and the material inside. Following are the feasibility results of the products that have been developed:

Table 6. Feasibility Test Results

Aspect	Score	Category
Product Aspect	96%	Very Feasible
Material Aspect	94%	Very Feasible
Range	95%	Very Feasible

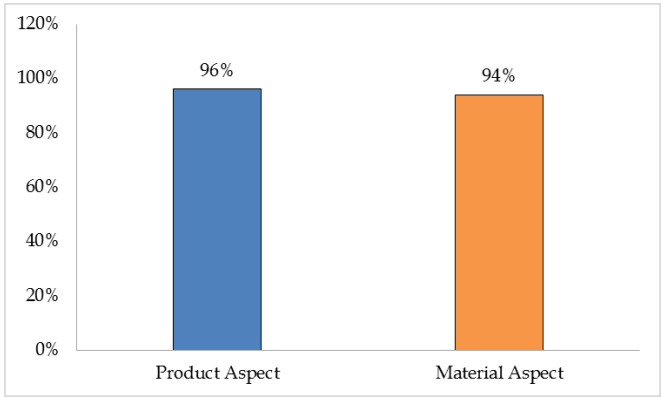


Figure 1. Feasibility test diagram

Based on the results of the feasibility test of the science practicum e-module on conductor and insulator materials, it was stated that the product and the material in it were very feasible to use. Furthermore, prior to the tryout, a validity and reliability test was carried out on the student response questionnaire instrument. The results of the validity and reliability tests can be seen in the following table and diagram.

Table 7. Feasibility of Response Questionnaire Instruments

Test	Score	Category
Validity	97%	Very Feasible
Reliability	97%	Very Reliable

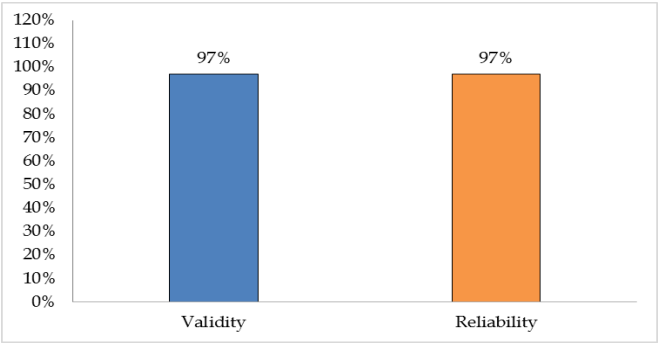


Figure 2. Response questionnaire instrument feasibility diagram

Students who have been given the opportunity to access the Science practicum e-module on conductor and insulator material, are then given a response questionnaire. Following are the results of the average response questionnaire by 16 students from Darul Dakwah Integrated Junior High School, Sooko District, Mojokerto Regency:

Table 8. Student Response Results

Aspect	Score	Category
Content Quality and Purpose	86%	Very Good
Quality of learning	88%	Very Good
Technical Quality	93%	Very Good
Range	89%	Very Good

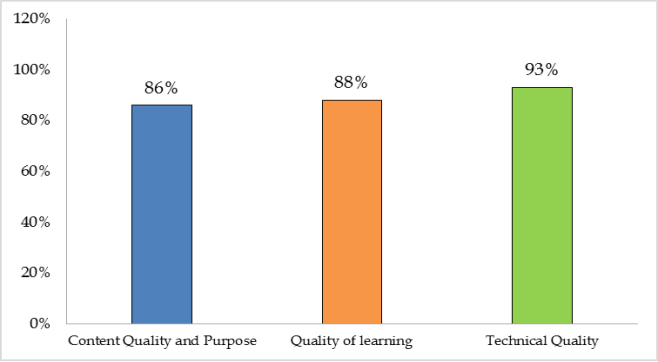


Figure 3. Student response diagram

Based on the results of the data it can be seen that the overall average of the data generated from various aspects is 89% with a very good response category. From this data it can be concluded that the science practicum e-module on conductor and insulator material received a very good response from students. These results are in line with research Dewi et al. (2019) which stated that the student's responses were very good given practicum in science learning, students tended to look more happy and active in practicum activities. These results are also in line with the constructivist learning theory of Jean Piaget which states that students who are given the opportunity to understand the material and experience the science process independently can make students more comfortable in learning (Hamid et al., 2019; Sudarsana, 2018). In addition, technology that is integrated with this e-module can also increase the independence of students in learning, so that students will feel happier (Herpratiwi, 2016; Sudarsana, 2018).

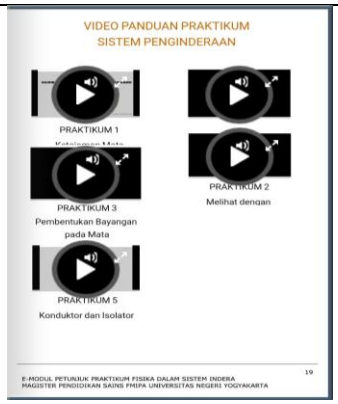
Aspects of student responses to content quality and objectives contain indicators of accuracy and completeness of material on a theoretical basis at the beginning of the Science practicum e-module on conductor and insulator material. This aspect has a response result of 86% with a very good response category. The aspect of learning quality contains indicators about helping students learn the material, impacting students, and impacting teachers. This aspect relates to the impact of the Science practicum e-module on conductor and insulator materials on the quality of learning with a response result of 88% and is included in the very good category. The last aspect of the response of this e-module is the aspect of technical quality which contains indicators of the readability of the e-module's writing, ease of use, and the quality of the appearance and images presented in the e-module. This aspect has a response result of 93% with a very good response category.

The results of assessing student responses produce an average score in the very good category. The highest percentage is technical quality with a value of 93%. So it can be said that this aspect is one of the advantages of the science practicum e-module on conductor and insulator materials. The advantages that support these aspects can be seen in Table 9.

The first advantage can make it easier for students to do practical work anywhere and anytime. That's because students can see the video as a guide to doing the practicum. The second advantage is that there are many buttons that can be used to make it easier for students to use the module. Like the menu to change pages, provide music, zoom in and out on pages, and display the entire page. Based on these two advantages, it is in line with the technical quality results of the

student response questionnaire which contains an ease of use and video insertion.

Table 9. The Advantages of Science Practicum E-module on Conductor and Insulator Materials

Picture	Description
	There is a video tutorial on how to do the practicum
	There are complete buttons to make it easier to use the module

Conclusion

The development of the science practicum e-module on conductor and insulator materials produces a very feasible product with an average validity value of 2 aspects, namely 95%. Products that have been declared feasible are then tested and given a student's response questionnaire. Student responses to the Science practicum e-module on conductor and insulator material were given to 16 student responses at the Darul Dakwah Integrated Middle School, Sooko District, Mojokerto Regency, which received an excellent response with a score of 89%.

References

Arifin, Z. (2016). *Evaluasi Pembelajaran*. PT Remaja Rosdakarya.

Arini, W., & Lovisia, E. (2019). Respon Siswa Terhadap Media Pembelajaran Alat Pirolisis Sampah Plastik Berbasis Lingkungan Di Smp Kabupaten Musi Rawas. *Thabiea : Journal of Natural Science Teaching*, *2*(2), 95–104. https://doi.org/10.21043/thabiea.v2i2.5950

Bahri, S. (2018). Implementation of Think Talk Write (Ttw) Learning Model To Increase Learning Results Write Poetry on Grade 5 Elementary School. *Jurnal Pendidikan Dasar Nusantara*, *4*(1), 87. https://doi.org/10.29407/jpdn.v4i1.12164

Darmaji, D., Kurniawan, D. A., Astalini, A., & Nasih, N. R. (2019). Persepsi Mahasiswa pada Penuntun Praktikum Fisika Dasar II Berbasis Mobile Learning. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *4*(4), 516. https://doi.org/10.17977/jptpp.v4i4.12345

Dewi, N. L. P. R., Suastra, I. W., & Pujani, N. M. (2019). Pengembangan Modul Praktikum IPA SMP Kontekstual pada Materi Pencemaran Lingkungan untuk Meningkatkan Keterampilan Proses Sains dan Karakter Peduli Lingkungan. *Indonesian Values and Character Education Journal*, *1*(2), 57. https://doi.org/10.23887/ivcej.v1i2.20314

Ernawati, I. (2017). Uji Kelayakan Media Pembelajaran Interaktif Pada Mata Pelajaran Administrasi Server. *Elinvo (Electronics, Informatics, and Vocational Education)*, *2*(2), 204–210. https://doi.org/10.21831/elinvo.v2i2.17315

Fitriani, L., Buchori, A., & Nursyahidah, F. (2019). Pengaruh Penggunaan Media Pembelajaran Kahoot Dengan Model Pembelajaran Computer Assisted Instruction (Cai) Terhadap Hasil Belajar Siswa. *Seminar Nasional Matematika Dan Pendidikan Matematika (4th SENATIK)*, *4*, 292–300. http://103.98.176.39/index.php/senatik/article/view/69

Fitriyati, I., Hidayat, A., & Munzil. (2017). Pengembangan Perangkat Pembelajaran IPA untuk Meningkatkan Kemampuan Berpikir Tingkat Tinggi dan Penalaran Ilmiah Siswa Sekolah Menengah Pertama. *Jurnal Pembelajaran Sains*, *1*(1), 27–34. https://doi.org/10.17977/um033v1i1p27-34 Refbacks

Hamid, M. A., Hilmi, D., & Mustofa, M. S. (2019). Pengembangan Bahan Ajar Bahasa Arab Berbasis Teori Belajar Konstruktivisme Untuk Mahasiswa. *Arabi : Journal of Arabic Studies*, *4*(1), 100. https://doi.org/10.24865/ajas.v4i1.107

Herpratiwi. (2016). *Teori Belajar dan Pembelajaran*. Media Akademi.

Ichsan, I. Z., Dewi, A. K., Hermawati, F. M., & Iriani, E. (2018). Pembelajaran IPA dan Lingkungan: Analisis Kebutuhan Media Pembelajaran pada SD, SMP, SMA di Tambun Selatan, Bekasi. *JIPVA (Jurnal Pendidikan IPA Veteran)*, *2*(2), 131. https://doi.org/10.31331/jipva.v2i2.682

Jamaluddin, J., Jufri, A. W., Muhlis, M., & Bachtiar, I. (2020). Pengembangan Instrumen Keterampilan Berpikir Kritis Pada Pembelajaran IPA di SMP. *Jurnal Pijar Mipa*, *15*(1), 13–19. https://doi.org/10.29303/jpm.v15i1.1296

Kartini, K. S., & Putra, I. N. T. A. (2020). Respon Siswa Terhadap Pengembangan Media Pembelajaran Interaktif Berbasis Android. *Jurnal Pendidikan Kimia Indonesia*, *4*(1), 12. https://doi.org/10.23887/jpk.v4i1.24981

Khairiyah, U., & Faizah, S. N. F. (2020). Respon Siswa Terhadap Penggunaan Modul Tematik dalam Meningkatkan Kemampuan Berpikir Kritis.

ElementerIs, *2*(1), 1–8. https://jim.unisma.ac.id/index.php/je/article/view/4903

Kusumaningrum, D. (2018). Literasi Lingkungan Dalam Kurikulum 2013 Dan Pembelajaran Ipa Di Sd. *Indonesian Journal of Natural Science Education (IJNSE)*, *1*(2), 57–64. https://doi.org/10.31002/nse.v1i2.255

Marnita. (2018). Peningkatan Hasil Belajar Siswa Kelas Vii SMP Pada Materi Kalor Dan Perpindahannya Melalui Media Powerpoint Berbasis PBL. *Jurnal Pendidikan Almuslim*, *6*(1), 36–44. http://www.jfkip.umuslim.ac.id/index.php/jupa/article/view/335

Prananda, G., Riyadi, S., & Ricky, Z. (2020). Meningkatkan Hasil Belajar Menggunakan Media Lagu Anak Dalam Pembelajaran Ipa Sekolah Dasar. *Jurnal IKA PGSD (Ikatan Alumni PGSD) UNARS*, *8*(2), 304. https://doi.org/10.36841/pgsdunars.v8i2.830

Sriyanti, I., Almafie, M. R., Marlina, L., & Jauhari, J. (2021). The effect of Using Flipbook-Based E-modules on Student Learning Outcomes. *Kasuari: Physics Education Journal (KPEJ)*, *3*(2), 69–75. https://doi.org/10.37891/kpej.v3i2.156

Sudarsana, I. K. (2018). Optimalisasi Penggunaan Teknologi Implementasi Kurikulum di Sekolah (Perspektif Teori Konstruktivisme). *Cetta: Jurnal Ilmu Pendidikan*, *1*(1), 8–15. https://jayapanguspress.penerbit.org/index.php/cetta/article/view/41

Sunardi, O., & Suchyadi, Y. (2020). Praktikum Sebagai Media Kompetensi Pedagogik Guru Sekolah Dasar. *Jurnal Pendidikan Dan Pengajaran Guru Sekolah Dasr (JPPGuseda)*, *03*(September), 124–127. https://doi.org/10.55215/jppguseda.v3i2.2737

Triwahyuningtyas, D., Ningtyas, A. S., & Rahayu, S. (2020). The problem-based learning e-module of planes using Kvisoft Flipbook Maker for elementary school students. *Jurnal Prima Edukasia*, *8*(2), 199–208. https://doi.org/10.21831/jpe.v8i2.34446

Viana, R. ., & Subroto, S. (2016). Pemngembangan sistem Assessment dalam Pembelajaran Materi Usaha dan Energi Berbasis Medai Audio Visual di SMAN 1 Prambanan. *Jurnal Pendidikan Fisika*, *5*(5), 311–319. https://journal.student.uny.ac.id/index.php/pfisika/article/view/1025

Wardhani, S. W. (2018). Pengembangan Media Scrapbook pada Materi Pengelompokan pada Hewan untuk Materi Kelas III Sekolah Dasar. *Jurnal Sekolah*, 124–130. https://jurnal.unimed.ac.id/2012/index.php/js/article/view/9934

Widayanti, W., Yuberti, Y., Irwandani, I., & Hamid, A. (2018). Pengembangan Lembar Kerja Praktikum Percobaan Melde Berbasis Project Based Learning. *Jurnal Pendidikan Sains Indonesia*, *6*(1), 24–31. https://doi.org/10.24815/jpsi.v6i1.10908

Widyaningrum, D. A., & Wijayanti, T. (2019). Implementasi buku petunjuk praktikum biokimia berbasis inkuiri terbimbing untuk meningkatkan kemampuan kerja ilmiah. *Edubiotik : Jurnal Pendidikan, Biologi Dan Terapan*, *4*(02), 58–67. https://doi.org/10.33503/ebio.v4i02.437