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EFFECTIVENESS OF ANDROID-BASED LEARNING MEDIA WITH GUIDED INQUIRY LEARNING MODELS ON SCIENCE PROCESS SKILLS

HERMAN JUFRI ANDI¹, LUBNA DWI MASLUHAH², SUPRIANTO³,
CHAIRATUL UMAMAH⁴

^{1,2,3,4}Physical Education FKIP Universitas Islam Madura
hermjufriandi@gmail.com, masluhahloubnadwi@gmail.com
087777589749

Abstract

Utilization of science and technology in the field of education further enhances and expands knowledge, so that in conveying a lesson in the classroom, the teacher becomes more creative and innovative. The latest technology in education for the development of learning media is Android. The use of Android in the form of a smartphone is one of the media that is often used by the general public, especially students. Researchers want to know the effectiveness of the use of Android-based media with the guided inquiry learning model on students' science process skills. This research is a quasi-experimental study with a pretest-posttest control group design. The population of this study was class X, even semester, of MA Al-Djufri Blumbungan, Pamekasan. In this study, there were two sample groups consisting of one control class and one experimental class. To find out the effectiveness of effect size calculations using the SPSS version 24 program and Microsoft Excel, these calculations yielded a value of 0.723, which is in the high category with an interpretation of the Cohen's value of 79%. This is obtained because, with the use of Android-based media and the guided inquiry learning model, students are more enthusiastic and active in the process of teaching and learning activities, which makes it easier for them to carry out the experiments given and to prepare reports better.

Keywords: *Android based media; guided inquiry; science process skills*

Abstrak

Pemanfaatan ilmu pengetahuan dan teknologi bidang pendidikan lebih meningkatkan serta memperluas pengetahuan agar dalam menyampaikan suatu pembelajaran didalam kelas guru menjadi lebih kreatif dan inovatif. Teknologi terkini dalam pendidikan untuk pengembangan media pembelajaran adalah android. Penggunaan android berupa smartphone merupakan salah satu media yang sering digunakan oleh masyarakat umum, khususnya pelajar. Peneliti ingin mengetahui efektifitas dari penggunaan media berbasis android dengan model pembelajaran inkuiri terbimbing terhadap keterampilan proses sains siswa. Penelitian ini merupakan penelitian Quasy-Eksperimental dengan desain pretes-posttest control group design. Populasi penelitian ini adalah kelas X semester genap MA Al-Djufri Blumbungan, Pamekasan. Sedangkan sampel dari penelitian ini ada dua kelompok sampel yang terdiri dari satu kelas kontrol dan satu kelas eksperimen. Untuk mengetahui keefektifan dilakukan perhitungan *effect size* menggunakan program SPSS versi 24 dan Microsoft excel, dari perhitungan tersebut diperoleh 0,723 yang masuk kategori tinggi dengan interpretasi nilai Cohen's 79%. Hal ini didapatkan karena pada penggunaan media berbasis android dengan model pembelajaran inkuiri terbimbing siswa lebih antusias dan lebih aktif dalam proses kegiatan belajar mengajar serta mempermudah siswa dalam melakukan percobaan yang diberikan dan mampu menyiapkan hasil laporan dengan lebih baik.

Kata Kunci: Media berbasis android, inkuiri terbimbing, keterampilan proses sains siswa.



INTRODUCTION

learning process that has implemented on Independent Curriculum, teaching and learning activities should be more student-centered. In fact, students are not only objects and will play an active role in a teaching and learning activity. Efforts to overcome this really need a learning model that can help teachers and make it easier for students to understand the material. One alternative that can make students more active in teaching and learning activities is the use of guided inquiry learning model. guided inquiry learning model is a learning model that encourages students be able to learn independently and to be more active in learning activities (Fahmi et al., 2021). Meanwhile, according to (Rafiah et al., 2018), guided inquiry is a learning model that emphasizes a concept discovery process.

In addition, with the existence of science and technology that is developing rapidly in life, especially in the field of education, it is better for teaching staff to improve and expand their knowledge of technology so that in conveying learning in the classroom, teachers become more creative and innovative. Advances in technology in this era will also help make it easier for teaching staff to create learning tools for subjects that require quite high costs ((Muyaroah & Fajartia, 2017). The use of technology in education can be an alternative to be developed it as a learning media. One of them utilizes Android media. Because the benefits of Android media itself cover all fields, one of which is education.

The development of Android-based learning media originates from the use of modern technology in form of smartphones, where smartphones are one of media that is often used by general public, especially students. The use of Android-based learning media is one of the 21st century's learning styles (Ulfa et al., 2022). Learning process is one of the things that can attract students' attention because, with that, they will more easily understand what is conveyed by the teacher. So one of the benefits of learning media is that it does not replace existing guidebooks but basically only serves as a tool in teaching and learning activities. However, usually, most Android users use facilities for nothing but entertainment; many even use them to access things that are negative. Therefore, as a teacher, you should make good use of science and technology, one of which is to use Android media as a means of learning activities. Because a teacher is required to be more creative and innovative in delivering a lesson.

Learning media plays an important role in learning process because material that is difficult to understand can be simulated so that it is easily understood by students (Novianti & Shodikin, 2018). However, the learning medium most often used by teachers is PowerPoint, which can cause difficulties for students to understand the material (Hikmawati et al., 2017). One of them is in learning Physics



related to Newton's 3rd Law material, in which students will find it difficult to understand the concept of Newton's 3rd Law if the teacher only explains a theory with methods that do not variation. So it is important for teachers to utilize and innovate in the field of teaching by developing Android as learning media. Android is the most widely used working system among many working system options for mobile phones. Android is a Linux-based framework that is open source and intended for contact-screen phones, for example, cellphones and tablet PCs (Rais et al., 2020). One of the Android-based learning media that can be used is the codular-assisted application.

Codular is a website that provides several tools using block programming. In designing electronic teaching materials, Codular Web is used to create applications that can be used without coding and are free of charge for making applications (Djuredje et al., 2022). Within Kodullar, there is also application coding on the Codular platform by compiling block puzzles from each component on the application design page. Compiling block puzzles can be done on each screen by dragging and dropping into the block work area. Using the block programming function makes it easy for new users who don't understand programming to keep making applications. This can make it easier for those who are experienced or even for beginners who want to make Codular software Android applications. In this way, the development of Android-based learning media is expected to be one of supports in learning activities to improve student learning completeness, none other than in physics learning activities. Suggest that kodular-assisted android-based learning is a feasible and practical learning medium for helping students understand the concept of Pythagoreans (Pitorini et al., 2020).

Based on the results of initial observations at senior high school in Pamekasan, the facts that occur in field of students' science process skills in physics are still relatively low. This problem happens because learning process in the classroom, where teachers transfer knowledge and factual concepts, tends to use conventional methods without involving students to be more active, learning resources tend to use worksheets without varying them with other media, and practicum learning is still said not to be maximally carried out. Because science learning should emphasize a series of scientific processes, students can be said to fulfill a science process skill. Learning activities that make the teacher more of a center learning and students only involved as recorders and listeners will tend to make students' science process skills unable to develop. The science process skills that students must have are the ability to observe, classify, interpret, predict, apply, plan research, and communicate (Hikmawati et al., 2017). To develop a science process, an appropriate learning approach is needed, namely the scientific process approach with the guided inquiry learning model. Because the guided inquiry learning model is a learning model that allows students to become more active with the stages of identifying problems, formulating problems, forming hypotheses, collecting data, verifying results, and drawing

conclusions (Rafiah et al., 2018), (Fatwa et al., 2018) also explain that the application of guided inquiry learning is also very significant and suitable for improving students' science process skills. This is also reinforced by the statement (Hikmawati et al., 2017). So researchers aim to find out the use of guided inquiry models in learning activities can improve students' science process skills.

RESEARCH METHODS

this study was used quasi-experimental research with a pretest-posttest control group design. data collected is collecting from pretest and posttest data to see students' understanding and observations of science process skills sheets to determine the development of science process skills in students. This research was conducted on March 11, 13, and 14, 2023, at Ma Al-Djufri Blumbungan, Pamekasan. In this study, there were two samples, where class X IPA A as the experimental class and class X IPA B as control class. The difference treatment given two the sample groups was in the use of media; the experimental class used Android-based media with guided inquiry learning model, and control class used guided inquiry learning model without media. The variables in this study are control variable (guided inquiry learning model), the independent variable (android-based learning media), and the dependent variable (scientific process skills). Some of instruments which used in this study include observation sheets for science process skills and pretest and posttest questions. The Student Worksheet instruments, RPP, and pretest and posttest questions used have been judged by a group of experts and have been declared valid for use in research.

Data analysis techniques used in this study were the normality test, homogeneity test, hypothesis T test, N-gain test, and effect size using SPSS version 24 and Microsoft Excel. A normality test was carried out using the Shapiro-Wilk test with SPSS version 24 to find out whether data obtained was normal or not. After the data was proven to be normal, a homogeneity test was carried out to determine the homogeneity of two sample groups. After the data is proven to be normal and homogeneous, T-hypothesis is tested using the independent sample T-test. The statistical hypothesis used is: Alternative hypothesis (H1): There is a significant effect of the use of Android-based media with guided inquiry learning model on students' science process skills. Then proceed N-gain test to find out the magnitude of the increase in science process skills in the class that has been sampled and the effect size using the SPSS version 25 program and Microsoft Excel to determine the effectiveness of Android-based learning media with the guided inquiry learning model on students' science process skills.

RESULTS

The description of the data on the results of student understanding in the experimental class pretest was 0.856, and the pretest in the control class was 0.675. Meanwhile, the posttest results in both

classes showed a change in value, namely 0.791 in the experimental class and 0.095 in the control class. A summary of the normality test is presented in the following table:

Table 1. Normality test results

	Shapiro-Wilk		
	Statistic	df	Sig.
PreTestcontrol	.975	20	.856
PostTestcontrol	.966	20	.675
PreTestExperiment	.972	20	.791
PostTestExperiment	.919	20	.095

Based on Table 1, The results of the Shapiro-Wilk test show that the data on the science process skills scores of physics students for both classes are normally distributed. in the control class pretest $0.856 > 0.05$ and posttest control class $0.675 > 0.05$. The pretest of the experimental class had a significance value of $0.791 > 0.05$, and the posttest of the experimental class was normally distributed with a significance value of $0.095 > 0.05$. From the results of this analysis, it can be concluded that the two sample groups are normally distributed, so data analysis can be continued for the homogeneity prerequisite test. The homogeneity test results can be seen in the following table:

Table 2. Homogeneity test results

		Levene Statistic	df1	df2	Sig.
PreTest	Based on Mean	.017	1	38	.898
PosTest	Based on Mean	.629	1	38	.433

Based on the table above, the significance value of the Test Of Homogeneity Of Variances is at the pretest $0.898 > 0.05$ and at the posttest $0.433 > 0.05$. This means that the value of understanding physics learning in the control and experimental classes is homogeneous, so that data analysis can be continued on the hypothesis test.

Table 3. Hypothesis test data

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Class	Equal variances assumed	.629	.433	-2.285	38	.028	-6.500	2.845	-12.259	-.741
	Equal variances not assumed			-2.285	37.150	.028	-6.500	2.845	-12.263	-.737

From Table 3, a significance value of $0.028 < 0.05$ is obtained. These results can be interpreted to mean that the research hypothesis is accepted, namely, 'there are significant differences in students' science process skills between groups that study through the use of android-based media with the guided inquiry learning model and the use of the guided inquiry learning model'. This shows that the android-based media with the guided inquiry model has a significant influence on the science process skills of MA Al-Djufri Blumbungan students, Pamekasan. Furthermore, a test was carried out. The calculation of the N-gain value was used to determine the magnitude of the increase in students' learning understanding in the experimental class and the control class. The calculation of the N-gain value is carried out using IBM SPSS version 24 for Windows. The calculation results are as follows:

Table 4. N-Gain test data

		N	Mean	Std. Deviation	Std. Error Mean
Class	Control	20	.6654	.12701	.02840
	Experiment	20	.7966	.11937	.02669

Based on Table 4, an average of 0.66 was obtained in the control class and 0.79 in the experimental class. It can be said that there is an increase in students' understanding of learning with the use of Android-based media with guided inquiry models on students' science process skills. Based on the conclusion of the hypothesis test, which stated that there was an effect of using the guided inquiry model assisted by digital media based on Android on students' science process skills, So to find out the effectiveness of using Android media with the guided inquiry learning model on students' science process



skills, it can be seen at 0.723, which is classified as in the high category with an interpretation of the Cohen's value of 79% from the effect size test data. So it can be said that the use of android-based media with the guided inquiry model on the science process skills of class X students is more effective than the use of the guided inquiry model without media.

DISCUSSION

The implementation of the research began with meeting the curriculum representative to submit a research letter from the Teaching and Education Faculty. This study involved two sample groups, namely the experimental group in class X IPA A and the control group in class X IPA B. The experimental class used android-based collaborative media with the guided inquiry model, while the control class only used the guided inquiry model. This research was conducted to determine the effectiveness of learning media based on Android using the guided inquiry model on the science process skills of class X high school students in physics subjects between the experimental class and the control class. Based on the results of the pretest, X IPA A was chosen as the experimental class and X IPA B as the control class. The difference in the treatment given lies in the use of Android media using the guided inquiry model, which is applied to the experimental class, while the application of the guided inquiry learning model is applied to the control class. Prior to use, the form of the instrument used in this study was first tested for validity. The instruments that were tested for validity included problem instruments, lesson plans, and worksheets.

To test students' initial understanding by giving pretest questions to both sample groups. The experimental class used android-based media with the guided inquiry learning model, while the control class used the guided inquiry model. Besides that, the instrument used to determine science process skills uses observation sheets of science process skills. After treatment, the two sample groups were given a posttest as an evaluation test to determine the effect between the experimental class (using Android-based media) and the control class (without media). Data processing in this study was carried out using the SPSS version 24 test for normality. Both classes had a significance of 0.05, so it could be concluded that the research data obtained was normally distributed. After the data is normally distributed, a homogeneity test is then carried out to determine the homogeneity of the two sample groups. Based on this test, the significance obtained was 0.433, which means > 0.05 , so the two sample groups can be said to be homogeneous.

The data that proved to be normal and homogeneous then continued with the analysis at the hypothesis testing stage using t-test analysis using the independent sample T-test. The test results obtained $t_{\text{count}} > t_{\text{table}}$ sig value (0.28) < 0.05 , so H_0 was rejected and H_1 was accepted. It can be concluded



that there is a significant influence on the use of media with guided inquiry learning models in the learning process. Because the existence of learning media in teaching and learning activities can attract students' attention, they can be an introduction to students' curiosity about the material to be presented. This is in line with the opinion (Novianti & Shodikin, 2018) that a learning medium plays an important role in a learning process because it can simulate a material so that it is easily understood by students. The results of other studies explain that codular-assisted android-based media is also beneficial for teachers and students when studying in class or online because this media is equipped with a virtual lab as well as practice questions to strengthen student understanding of concepts. Students can fill in practice questions directly on codular media and get feedback from the answers given, so that students can be motivated and more enthusiastic about carrying out evaluations to get better results (Ulfa et al., 2022).

Based on Table 4, The results of the N-Gain test can be concluded to show that there is an increase in students' understanding in the experimental class of learning physics using android-based media with the guided inquiry learning model of students' science process skills compared to students' understanding in the control class with the guided inquiry learning model without the use of media. This happens because the learning process in the classroom has been varied with new learning methods that can make students more active with the help of media, in addition to the availability of virtual labs on media carried out by students as practical learning, so that students are able to process and can be said to fulfill a skill. Because learning activities that are only teacher-centered will tend to make students' science process skills not develop, This is in line with the statement by (Fatwa et al., 2018) in their research, which revealed that the guided inquiry learning model can have a significant influence on students' science process skills in Newton's 3rd Law material. Besides that, the use of Android-based media with the guided inquiry learning model is very effective on students' science process skills because, in the process of learning activities, it is able to create a pleasant learning atmosphere and is also able to become a new vehicle for learning.

To find out the effectiveness of using Android-based media with the guided inquiry learning model on students' science process skills, effect size calculations were carried out using the SPSS version 24 program and Microsoft Excel. From these calculations, students' science process skills in the experimental class were classified in the high category with an interpretation of Cohen's values. 79%. Because of the use of Android-based media with the guided inquiry learning model, students are more enthusiastic and active in the process of teaching and learning activities, which makes it easier for them to carry out the experiments given and prepare reports better (Wandal et al., 2023). This is because Android-based media is an interesting medium, easy to operate, and makes it easier for students to



understand physics material, especially Newton's 3rd Law material. In addition, in codular-assisted Android-based learning media, there is animation that functions to explain material constructively, and there are worksheets that are equipped with PheT software and are equipped with quizzes and practice questions to facilitate understanding and improve students' science process skills (Ulfa et al., 2022). This is in line with research conducted by (Hayati et al., 2023), which states that Android-based media can assist the teaching and learning process and can be used as an educational tool because of its fast, effective, and efficient operation. Meanwhile, (Tangu et al., 2023) states that the use of assistive devices (media) in teaching and learning activities can increase student motivation and interest and can even cause psychological effects on students (Febryan et al., n.d.).

From the results of the research and data analysis that have been carried out, it shows that there is a significant influence between the use of android-based media and the guided inquiry learning model on students' science process skills and the effectiveness of learning using android-based media combined with the guided inquiry learning model on students' science process skills at MA. Al-Djufri Blumbungan, Pamekasan, on the subject of Newton's 3rd Law.

CONCLUSION

Based on the research that has been done, it can be concluded that There is a significant effect of the use of Android-based media with the guided inquiry model on the science process skills of class X high school students. The use of android-based media with the guided inquiry model has a high impact on the science process skills of class X students and can be categorized as higher and more effective than the use of the guided inquiry model without the use of media.

REFERENCES

- Djuredje, R. A. H., Hermanto, & Himawan, R. (2022). Pengembangan Media Berbasis Aplikasi Kodular dalam Pembelajaran Teks Persuasi di SMP Kelas VIII. *GERAM*, 10(2), 32–41. [https://doi.org/10.25299/geram.2022.vol10\(2\).10602](https://doi.org/10.25299/geram.2022.vol10(2).10602)
- Fahmi, Abdullah, & Irhasyuarna, Y. (2021). Empowering Peat Lands as a Resource of Learning Natural Science to Strengthening Environment Care: 2nd International Conference on Social Sciences Education (ICSSE 2020), Banjarmasin, Indonesia. <https://doi.org/10.2991/assehr.k.210222.072>
- Fatwa, M. W., Harjono, A., & Jamaluddin, J. (2018). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Keterampilan Proses Dan Penguasaan Konsep Sains Ditinjau Dari Pengetahuan Awal Peserta Didik. *Jurnal Pendidikan Fisika dan Teknologi*, 4(1), 121–130. <https://doi.org/10.29303/jpft.v4i1.572>



- Febryan, I., Dharma, I. M. A., & Sudewiputri, M. P. (n.d.). The Effect Of Cooperative Learning Model Of Discovery Learning Assisted With Video Learning On Students' Critical Thinking Ability.
- Hayati, N. M., Muhyani, M., & Sutisna, S. (2023). The Effect Of The Application Of Team Games Tournament On Pai Learning Interest In Smp Negeri 2 Cipanas Cianjur. *JURNAL EDUSCIENCE*, 10(1), 332–339. <https://doi.org/10.36987/jes.v10i1.4140>
- Hikmawati, N., Sutrio, S., & Hikmawati, H. (2017). Pengaruh Model Pembelajaran Berbasis Masalah Dengan Pembekalan Pengetahuan Awal Terhadap Keterampilan Proses Sains Peserta Didik SMA. *Jurnal Pendidikan Fisika dan Teknologi*, 3(1), 92–100. <https://doi.org/10.29303/jpft.v3i1.335>
- Muyaroah, S., & Fajartia, M. (2017). *Pengembangan Media Pembelajaran Berbasis Android dengan menggunakan Aplikasi Adobe Flash CS 6 pada Mata Pelajaran Biologi.*
- Nuraisyah, S., Harahap, R., & Harahap, D. (2021). Analysis of Internet Media Use of Student Biology Learning Interest During COVID-19. *Jurnal Penelitian Pendidikan IPA*, 7(2), 213-217. doi:<https://doi.org/10.29303/jppipa.v7i2.624>
- Novianti, A., & Shodikin, A. (2018). Pengembangan Bahan Ajar Kalkulus Diferensial Berbasis Animasi Dengan Pendekatan Kontekstual Dan Kearifan Lokal. *De Fermat: Jurnal Pendidikan Matematika*, 1(2), 12–18. <https://doi.org/10.36277/deferat.v1i2.20>
- Pitorini, D. E., Suciati, S., & Ariyanto, J. (2020). Kemampuan argumentasi siswa: Perbandingan model pembelajaran inkuiri terbimbing dan inkuiri terbimbing dipadu dialog Socrates. *Jurnal Inovasi Pendidikan IPA*, 6(1). <https://doi.org/10.21831/jipi.v6i1.27761>
- Rafiah, R., Arifuddin, M., & Mahardika, A. I. (2018). Meningkatkan Keterampilan Proses Sains dan Hasil Belajar IPA Melalui Model Pembelajaran Inkuiri Terbimbing. *Jurnal Ilmiah Pendidikan Fisika*, 2(3), 186. <https://doi.org/10.20527/jipf.v2i3.1023>
- Rais, A. A., Hakim, L., & Sulistiawati, S. (2020). Pemahaman Konsep Siswa melalui Model Inkuiri Terbimbing Berbantuan Simulasi PhET. *Physics Education Research Journal*, 2(1), 1. <https://doi.org/10.21580/perj.2020.2.1.5074>
- Riwayani, S., Harahap, RD. (2022). Does Blended Learning Improve Student's Learning dependence during the Covid-19 Pandemic? Evidence from a Labuhanbatu University, North Sumatera. : *Jurnal Kependidikan*. 8 (1), DOI: <https://doi.org/10.33394/jk.v8i1.4509>
- Saputra, A., Harahap, RD. (2022). An Analysis of Student Learning Challenges in Elementary School Science Subject. *Jurnal Kependidikan*. 8 (1), DOI: <https://doi.org/10.33394/jk.v8i1.4508>



- Tangu, Y. Y., Bano, V. O., & Ndjoeroemana, Y. (2023). The Effect Of The Jigsaw-Type Cooperative Model With The Assistance Of Paired Card Media On The Learning Outcomes Of Grade Vii Students At Kristen Payeti Junior High School. *JURNAL EDUSCIENCE*, 10(1), 19–27. <https://doi.org/10.36987/jes.v10i1.3985>
- Ulfa, S. M., 'Ardhuha, J., & Sahidu, H. (2022). Pengembangan Perangkat Pembelajaran Model Inkuiri Terbimbing Berbantuan Simulasi PhET Untuk Meningkatkan Keterampilan Proses Sains Peserta Didik. *Jurnal Pendidikan Fisika dan Teknologi*, 8(SpecialIssue), 67–75. <https://doi.org/10.29303/jpft.v8iSpecialIssue.3759>
- Wandal, K. K., Makaborang, Y., & Ndjoeroemana, Y. (2023). The Effect Of The Jigsaw Type Cooperative Learning Model On The Learning Outcomes Of Class Viii Students At SMP Negeri 2 Waingapu. *JURNAL EDUSCIENCE*, 10(1), 287–298. <https://doi.org/10.36987/jes.v10i1.4130>