ENHANCING STUDENTS' PRACTICAL SKILLS: THE EFFECT OF QR-CODE BASED E-JOBSHEET ON ELECTRICAL INSTALLATION LEARNING OUTCOMES

RESEARCH ARTICLE

AMIRUDIN MUSTOFA
Universitas Negeri Surabaya, Indonesia
Corresponding author: amirudinmustofa.20047@mhs.unesa.ac.id

SUBUH ISNUR HARYUDO
Universitas Negeri Surabaya, Indonesia

FENDI ACHMAD
Universitas Negeri Surabaya, Indonesia

M. SYARIFFUDDIEN ZUHRIE
Universitas Negeri Surabaya, Indonesia

Abstract

Education is a conscious and planned effort to create a conducive learning atmosphere and a structured learning process so that students actively develop their potential. This study aimed to determine whether there was an effect of QR-CODE-based e-job-sheet on the learning outcomes of electrical lighting installation practices for class XI TTTL students in the electrical lighting installation subject at SMK Negeri 1 Driyorejo. This study used a quantitative approach with a pre-experimental design, specifically using a one group pretest-posttest format. The population for this study comprised Class XI TTTL students engaged in electrical lighting installation, with a sample size of 35 students drawn from this population. The sample used was a saturated sample, a sampling technique that included all members of the population as participants. The instruments for data collection were in the forms of a job-sheet and an observation sheet for students' psychomotor assessment which were first validated by 3 validators consisting of an electrical engineering lecturer and two TTTL teachers. The results of this study found that the significance value (Sig.) amounting to 0.000 this means that the value (Sig.) is greater than 0.05 this means. H_0 is rejected and H_1 is accepted. While when viewed from the t test value it is known that the t-count value = 4.359 and the t-table value = 2.034 this means. H_0 is rejected H_1 is accepted. Thus, it could be concluded that there was a significant effect of using e-job-sheet on the psychomotor learning outcomes of students in class XI TTTL in the subject of electrical lighting installation.

Keywords: Creative, critical, crossword, puzzle

Introduction

Education goes with the times, goes with the life of a society that continues to develop as well. Education in its journey cannot avoid the problems that continue to emerge in its way. Advances in science and technology are now having various influences on the learning process in Vocational High Schools (SMK). Vocational School (SMK). The utilization of science and technology applications in learning in SMK is closely related to human efforts to simplify their tasks simplify their tasks. In addition, the development of science and technology is also widely utilized in the modern industrial sector. Therefore, SMKs, as educational institutions that produce Human Resources (HR), must be able to keep up with the continuous development of science and technology.

Ongoing SMK Negeri 1 Driyorejo, majoring in electrical power installation engineering, strives to increase the competitiveness of its graduates by providing electrical power installation engineering department tries to increase the competition of its graduates through the provision of local content subjects, one of which is electrical lighting installation. in the teaching and learning process, requires the existence of learning tools that are prepared are teaching materials that are compiled based on the target prepared is teaching material that is compiled based on the final competition target to be achieved as well as the ability of to be achieved as well as the ability of students to catch.

Development of teaching materials are needed in order to help the learning process effectively and efficiently and efficient learning process. One of the materials taught in engineering at SMK Negeri 1 Driyorejo is electrical lighting installation. The process learning process that takes place in the Electrical Power Installation Engineering department experienced several obstacles. The subject of electrical lighting installation in class XI class of SMK Negeri 1 Driyorejo has quite a lot of material, but it is not comparable with the available time allocation comparable to the time allocation available. Lack of availability of facilities to support practice.

How to deliver material that is still conventional makes students bored, less motivated, so that it will cause less than optimal learning results. Learning results that are less than optimal. Another cause is the lack of learning media used learning media used. However, conventional learning approaches are often less attractive to students' millennials and generation Z who grew up in the digital era. Generation Z feels less eager to learn because of the abundance of information that is always available at all times, but in this day and age they need more interesting and practical learning media. In this case this, QR Code learning media learning media is one of the media that can be used because it is easily accessible and more practical in its use in learning the subject of practical in its use in learning the subject of Electric Lighting Installation subject.

Literature Review

Education

Education is an effort to shape and develop human character, both in terms of spiritual and physical. Education is the process of transforming the behavior of individuals or groups through the process of teaching and training to achieve maturity (Salsabilah et al., 2021). Education has an important role in advancing life and strengthening the progress of this nation, especially in shaping

its character. Therefore, the introduction of values and character building through education can reduce negative attitudes that may arise in students. Education is not only about efforts to increase knowledge, but also about the formation of attitudes and skills that are considered important in the learning process and the expected results of an educational institution (Angga et al., 2022).

Learning is a process that allows learners or learners to learn according to their needs. Learning is defined as an effort to influence a person's emotions, intellect, and spirituality so that he learns according to his own wishes. Furthermore, learning in a special sense is a learning process built by teachers to maximally develop different potentials and abilities such as the ability to think, create, and build knowledge, solve problems, and master learning materials (Angga et al., 2022).

Learning Media

The media is one of the means to improve learning process activities. Media has different characteristics, so it is necessary to choose it carefully and precisely so that it can be used appropriately (Wulandari et al., 2023). Learning media is a tool that can help the teaching and learning process so that the meaning of the messages conveyed becomes clearer and educational or learning objectives can be achieved effectively and efficiently (Ibrahim et al., 2023). Active learning media can arouse the motivation and focus of students, thereby increasing their learning motivation (Iskandar et al., 2023).

As explained above, the conclusion that can be drawn is that the definition of learning media is a tool that connects teachers and students to convey learning content in a fun way with the aim of creating effective and efficient learning. Media that functions as a means of nonverbal communication must be designed as well as possible so that it becomes an effective and efficient learning media to achieve learning objectives. From this it can be concluded that learning media must be designed as well as possible to improve student learning outcomes. Active learning media can arouse the motivation and focus of students, thus increasing their learning motivation (Iskandar et al., 2023).

Learning media in general is a tool for the teaching and learning process. Everything that can be used to stimulate the thoughts, feelings, attention and abilities or skills of students so that it can encourage the learning process. Based on some of the above definitions, it can be concluded that the definition of learning media is an intermediary between teachers and students to convey learning material in a fun way with the aim of creating effective and efficient learning.

E-Jobsheet

The emergence of the Industrial Revolution 4.0 has encouraged innovations in various fields of work, especially in the education sector. All business sectors are shifting towards the use of digital and virtual technology. The education system becomes a place to facilitate people in developing themselves into creative and innovative educators (Firmansyah et al., 2023). Education 4.0 or the 21st century education era is very different from the current type of work, which will certainly have an impact on the characteristics of the job.

The online e-job-sheet system has changed the conventional format of job-sheets into interactive e-job-sheets because students can access them online and submit directly to their

teachers (Khikmiyah, 2020). Traditional e-job-sheets do not provide an engaging practical learning experience, therefore they need to be transformed into interactive electronic media such as e-job-sheets (Alfia et al., 2023). The school digitization program is a new step forward for the Ministry of Education and Culture through the use of ICT advances to support the teaching and learning process (Firmansyah et al., 2023). Teachers and students will more easily access learning materials, and teachers can also collaborate in creating digital learning materials.

Online media e-job-sheets can turn conventional job-sheets into interactive online e-job-sheets because students can work on them online and submit them directly to their teachers (Khikmiyah, 2020). The use of traditional e-job-sheets makes practical learning less interesting, so it needs to be developed into interactive electronic media such as e-job-sheets (Alfia et al., 2023).

QR-Code

One example of smartphone utilization in learning is by using the Quick Response Code (QR Code) application. QR code is a two-dimensional image consisting of a collection of lines that represent data. QR Code is an evolution of barcodes which were originally one-dimensional to two-dimensional (Yahya & Bakri, 2019). QR Codes consist of black modules arranged in a square pattern on a white background. They are designed to decode data quickly. It is easy to create and use these codes according to the opinion of Pons cited by (Durak et al., 2016).

QR Code is used in various fields such as media, street banners, all places that lead to websites, music, videos and social networks. Smartphone utilization in learning can be done by utilizing the Quick Response Code (QR Code) application as an example. QR code is a two-dimensional image consisting of lines that represent information. QR Code is the development of barcodes which initially only had one dimension into two dimensions (Yahya & Bakri, 2019). Creating and using these codes is very simple. QR Codes are magical images consisting of black squares arranged in an orderly fashion on a white background. They are designed with the purpose of solving such problems (Durak et al., 2016).

QR Codes are used in various fields such as media, street banners, all places that lead to websites, music, videos and social networks. To choose the right media is not easy, because each type of media has advantages and disadvantages. Creating and applying these codes is very easy. QR Codes are unique graphic codes consisting of black squares neatly arranged on a white background. They are designed with the intention of solving the issue. One of the reasons why e-job-sheets are used is for easy job management and monitoring. By using e-job-sheets, the job management process can be done efficiently and transparently.

In addition, the use of e-job-sheets can also speed up the reporting process and minimize the possibility of human error in recording work. Thus, e-job-sheet can help in increasing productivity and effectiveness in working on a project or job. QR Code-based is to facilitate students in practicum. The use of e-job-sheet is expected to improve student learning outcomes because it can facilitate a more adaptive and responsive learning process to the diverse learning styles of students.

Methodology

Research design and approach of the study

The research method used in this study was quantitative. In this research method, researchers and statisticians used mathematical frameworks and theories related to the quantity in question. This approach was also used as a way to examine various aspects of education. The term quantitative research is often used in the social sciences to distinguish it from qualitative research (Suharsimi, 2020). The study used a research design in the form of Pre-Experimental Design in the form of a one Group Pretest-posttest design. It is said to be Pre-Experimental Design because this design is a research design in which there are still external variables that contribute to the formation of the dependent variable (Sugiyono, 2019).

One Group Pretest-Posttest was a design in which before being given treatment, an initial test (pretest) is given and after being given treatment is also retested with the same test questions as the final test (posttest). The population in this study was class XI TTTL. The sampling technique used was saturated sample. This research was conducted at SMK Negeri 1 Driyorejo. The data analysis technique used validity test, classical assumption test and hypothesis testing using SPSS.

$$O_1 \quad X \quad O_2$$

Description according to (Sugiyono, 2019): O1 = Score before using the treatment, O2 = Score after using the treatment, X = Treatment

Research site and participants

The population in research can also be interpreted as the entire unit of analysis whose characteristics will be estimated. The unit of analysis is the unit or units that will be researched or analyzed (Abdullah et al., 2022). In this case, this research used a population in the form of class XI TTTL 1 with a total of 35 people studying the Electrical Lighting Installation subject at SMK Negeri 1 Driyorejo. In this study, the number of samples used to determine whether there was an influence from using QR-code based e-job-sheets was 30 students. The sample was taken using a Nonprobability Sampling technique in the form of Saturated Sampling. Nonprobability sampling is a sampling technique that does not provide equal opportunities for each element or member of the population to be selected as a sample (Sugiyono, 2019). Meanwhile, Saturated Sampling is a technique for determining samples when the population is relatively small (Sugiyono, 2019). By taking samples using this technique too, the resulting sample was more representative of the population as a whole.

Data collection and analysis

Test was used as data collection in this study. The data analysis technique used in this study was a simple linear regression test. In this study, a simple linear regression test was also used to study the linear relationship between two variables (Tawe & Bado, 2022). In addition, the simple

linear regression test was also used to measure the magnitude of the effect of an independent variable on the dependent variable. The requirements in conducting this simple linear regression test were that the number of samples used must be the same, the number of independent variables must be one, the residual value must be normally distributed, there was a linear relationship between the independent variable and the dependent variable, and there are no symptoms of heteroscedasticity. Therefore, the simple linear regression test was tested using SPSS. Before conducting a simple linear regression test, a prerequisite test was first carried out which could be described as follows:

Normality test, the state of normally distributed data is a requirement that must be met. The normality test is carried out to test whether the confounding or residual variables have a normal distribution or not regression. In testing normality, researchers used the Shapiro wilk normality test with the help of SPSS by paying attention to the normality test decision as follows.

1)   If the significant value (Sig.) >0.05 then the data is normally distributed.
2)   If the significant value (Sig.) <0.05 then the data is not normally distributed.

Linearity test, in general, the linearity test is used to determine whether two variables have a significantly linear relationship or not. The linearity test pays attention to the following test decisions.

1)   If the value of Deviation from Linearity (Sig.) >0.05 then there is a significantly linear relationship between the independent variable and the dependent variable.
2)   If the value of Deviation from Linearity (Sig.) <0.05 then there is no significant linear relationship between the independent variable and the dependent variable.

Heterokedasticity test, the heteroscedasticity test is a classic assumption test used as a condition for the simple linear regression test which aims to test whether the regression model occurs inequality of variation from the residual value in a study. The basis for decision making in the heteroscedasticity test using the Glejser test is as follows.

1)   If the significance value (Sig.) >0.05 then there are no symptoms of heteroscedasticity in the regression.
2)   If the significance value (Sig.) <0.05 then there are symptoms of heteroscedasticity in regression.

In order to see the proposed hypothesis is rejected or acceptable, the t-test is used. The t-test is often used in experiments involving correlated samples. Sample correlation refers to a sample that has been matched in one of its variables (Mulyanto et al., 2023). In this study, the pretest learning outcomes and posttest learning outcomes were compared (Putra, 2022).

Results

Analysis of learning implementation

To get the results of this study, especially to obtain whether there is an effect of using qr code-based e-job-sheet on the learning outcomes of students in class XI TITL 1. Researchers first validated the QR-Code-based e-job-sheet that was used to a lecturer and two teachers concerned with the subject of electrical lighting installation. After obtaining accurate job-sheet validation results, researchers conducted the testing on 35 students of class XI TITL 1 with three meetings.

In the first meeting, the researcher gave a pre-test first using a manual job-sheet. At the second meeting, then the researcher conducted teaching treatment using QR-code based e-job-sheet to students in the form of introduction and how to work after that at the last meeting the researcher conducted a post-test to get the results of the study. After obtaining the research results in the form of pre-test and post-test scores, the researchers then tested the results of the two values whether there was an effect of using QR-code-based E-Job-sheet on the learning outcomes of XI TTTL class students using a simple linear regression test.

Before conducting a simple linear regression test, of course, it must first fulfill the prerequisite test or classical assumption test in the form of normality test, linearity test, and heteroscedasticity test. If all test requirements were met, then simple linear regression testing was carried out to find out how much influence the use of QR-Code-based e-job-sheet had on the learning outcomes of students in class XI TTTL 1.

Table 1. *Result of pretest normality test*

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.134	35	.111	.945	35	.081

Based on table 1, it was known that the significance value (Sig.) of the normality test with Kolmogorov Smirnov was 0.111, while the significance value (Sig.) of the normality test with Shapiro wilk was 0.81. The results of the two normality tests showed results> 0.05. So, it could be concluded that the pretest data had a normal distribution.

Table 2. *Result of posttest normality test*

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Posttest	.144	35	.065	.939	35	.054

Based on the table, it was known that the significance value (Sig.) of the normality test with Kolmogorov Smirnov was 0.144, while the significance value (Sig.) of the normality test with Shapiro wilk was 0.54. The results of the two normality tests showed results> 0.05. So, it could be concluded that the pretest data had a normal distribution. The linearity test was used to determine whether two variables had a significantly linear relationship or not. The result could be seen from table 3 below.

Table 3. *Result of linearity test*

			Sum of Squares	df	Mean Square	F	Sig.
Pretest * Posttest	Between Groups	(Combined)	878.793	7	125.542	2.863	.023
		Linearity	751.537	1	751.537	17.137	.000
		Deviation from Linearity	127.256	6	21.209	.484	.815
	Within Groups		1184.051	27	43.854		
	Total		2062.844	34			

When it was viewed from the significance value based on table 3, it was known that the Deviation from Linearity (Sig.) value was 0.815, this meant that the value (Sig.) > 0.05. this showed that the two data in the form of pretest and posttest had a linear relationship. Meanwhile, when it was viewed from the F value, the value of F-count = 0.484 < F-table = 2.46. So, from both, it could be concluded that there was a linear relationship between the two variables.

The heteroscedasticity test is a classic assumption test used as a condition for the simple linear regression test which aims to test whether the regression model occurs inequality of variation from the residual value in a study. The result could be seen from table 4 below.

Table 4. *Result of heterokedasticity test*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.912	5.660		1.751	089
	Posttest	-.060	.070	-.148	-.860	396

When it was viewed from table 4, it could be seen that the significance value (Sig.) for posttest was 0.396 which meant the value (Sig.) > 0.05. So, it could be concluded that there were no symptoms of heteroscedasticity

Data Analysis of Simple Regression Test Result

In this study, a simple linear regression test was also used to study the linear relationship between two variables (Tawe & Bado, 2022). In addition, the simple linear regression test is also used to measure the magnitude of the effect of an independent variable on the dependent variable.

Table 5. *Simple regression test result*

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	13.782	10.214		.349	.186
	Posttest	.551	.127	.604	.349	.000

Based on table 5, it was known that the significance value (Sig.) was 0.000. It indicated that the value (Sig.) <0.05, this meant. H0 was rejected and H1 was accepted. Meanwhile, when it was viewed from the t test value, it was known that the t-count value = 4.359 and the t-table value = 2.034, this meant. H0 was rejected and H1 was accepted. Thus, it could be concluded that there was a significant effect of posttest on psychomotor learning outcomes.

Table 6. *R square test result*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.604[a]	.364	.345	6.304

Based on table 6, it was known that the R Square value was 0.364, which meant that the effect of using e-job-sheet on students' psychomotor learning outcomes was 36.4%.

Table 7. *N-gain results*

	N	Minimum	Maximum	Mean	Std. Deviation
NGain	35	.13	.86	.5335	.18018
Valid N	35				

Based on table 7, the results of the N-Gain score from 35 samples with a minimum value of 0.13 and a maximum value of 0.86 so that the average N-Gain score was 0.53. This value was in the interval $0.30 \leq n \leq 0.70$ which meant that the average N-Gain score was in the medium criteria. Thus, the use of e-job-sheet could improve psychomotor learning outcomes

Discussion

This hypothesis test was conducted to determine whether or not there is an effect of using a QR code-based e-job-sheet on the psychomotor learning outcomes of XI TITL class students in the Electrical Lighting Installation subject at SMK Negeri 1 Driyorejo. For data collection, student learning outcomes were taken from pretest and posttest scores. Prerequisite tests or classical assumption tests carried out included normality tests, linearity tests, and heterokedastitas tests. The condition of normally distributed data is a requirement that must be met (Rosalina et al.,

2023), so the normality test is carried out to test whether the confounding or residual variables have a normal distribution or not regression

The normality test was conducted on the manual job-sheet value (pretest) with SPSS using the Shapiro wilk formula obtained a result of 0.81. This figure showed that it was greater than the significance level of 0.05, meaning that the data of students' manual job-sheet learning outcomes were normally distributed. Then on the QR-code-based e-job-sheet value (posttest) with SPSS using the Shapiro wilk formula of 0.054 meant that the data on student QR-code-based e-job-sheet learning outcomes were normally distributed.

While in general the linearity test was used to determine whether two variables have a linear relationship significantly or not (Rosalina et al., 2023). Linearity test is used to determine whether the two variables, in this case the use of QR-code-based e-job-sheet, have a significant linear relationship or not to the psychomotor learning outcomes of students. In the linearity test resulted of the two variables using SPSS, the Deviation from Linearity (Sig.) value was greater than 0.05, which was 0.815. This can be interpreted that there was a significant linear relationship.

In addition, using the Deviation from Linearity value, to be able to determine the existence of a linear relationship between the two variables could also be seen through the calculation of the F value. From the results of the linearity test using SPSS, the F-count value was 0.484 and the F-table value = 2.46. From this value, it is known that the F-count value < F-table, so there is a significant linear relationship between the two variables studied. Simple linear regression test or can be known as simple linear regression is used to study the linear relationship between two variables (Tawe & Bado, 2022).

Then a linear regression test was carried out, obtained a t-count value of 4.359 and a t-table value of 2.034. Then H0 was rejected and H1 was accepted. Thus, it could be concluded that there was a significant effect of using QR code-based e-job-sheet on the psychomotor learning outcomes of XI TTTL class students in the Electrical Lighting Installation subject at SMK Negeri 1 Driyorejo. Getting pretest and posttest scores, then analyze the scores obtained, in this case, the analysis used was the N Gain test to determine the effectiveness of the treatment given (Kusuma & Julianto, 2023). It could be obtained from the N-Gain score value on the difference in posttest-pretest scores with a result of 0.53. This value indicated that the use of QR code-based e-job-sheet could improve the psychomotor learning outcomes of XI TTTL class students in the Electrical Lighting Installation subject at SMK Negeri 1 Driyorejo.

The effect of using QR code-based e-job-sheet was very necessary in the teaching and learning process because it can improve students' psychomotor learning outcomes. The use of smartphones to access e-job-sheets contained images of tools and materials with attractive designs so that students did not feel bored in working on electrical lighting installation practices compared to the use of manual job-sheets.

Conclusion and Implications

Based on the results and discussion of the study, it could be concluded there was a significant influence in a positive direction on the use of QR code-based e-job-sheet on the psychomotor learning outcomes of XI TTTL class students in the subject of electrical lighting installation at SMK Negeri 1 Driyorejo. This could be proven through a simple linear regression test conducted using

SPSS. Hypothesis testing using simple linear regression showed the t-count of 4.359 and the t-table value of 2.034. So, it could be seen that the value of the t-count> t-table. Not only that, the effect of using QR code-based e-job-sheet could also be seen from the calculation of the N-Gain value which showed a value of 0.53 and was included in the moderate category. Thus, it could be concluded that there was a significant effect of using QR code-based e-job-sheet on the psychomotor learning outcomes of XI TITL class students at SMK Negeri 1 Driyorejo.

References

Abdullah, K., Jannah, M., Aiman, U., Hasda, S., Fadilla, Z., Taqwin, Masita, Ardiawan, K. N., & Sari., M. E. (2022). Metodologi Penelitian Kuantitatif. In *Metodologi Penelitian Kuantitatif* (Nomor May).

Alfia, A., Siahaan, S. M., Wiyono, K., Raharjo, M., & Safitri, E. R. (2023). Pengembangan E-jobsheet dengan liveworksheet pada keterampilan perakitan produk barang untuk meningkatkan efektivitas praktik siswa SMK. *Jurnal Muara Pendidikan*, *8*(1), 108–117. http://repository.unsri.ac.id/id/eprint/93484

Angga, Abidin, Y., & Iskandar, S. (2022). Penerapan pendidikan karakter dengan model pembelajaran berbasis keterampilan abad 21. *Jurnal Basicedu*, *6*(1), 1046–1054. https://doi.org/10.31004/basicedu.v6i1.2084.

Durak, G., Ozkeskin, E. E., & Ataizi, M. (2016). QR codes in education and communication. *Turkish Online Journal of Distance Education*, *17*(2), 42–58. https://doi.org/10.17718/tojde.89156

Firmansyah, R., Komalasari, Y., Dewi, S. W. K., Mauliana, P., Sulastriningsih, R. D., & Hunaifi, N. (2023). Digitalisasi sekolah sebagai metode pembelajaran di era pendidikan 4.0. *Jurnal Sosial Humanoria dan Pendidikan*, *2*(3), 49–55. https://doi.org/10.56127/jushpen.v2i3.1052

Ibrahim, F., Hendrawan, B., & Sunanih, S. (2023). Pengembangan Media Pembelajaran PACAS Untuk Meningkatkan Hasil Belajar Siswa. *JLEB: Journal of Law, Education and Business*, *1*(2), 102–108. https://doi.org/10.57235/jleb.v1i2.1192

Iskandar, S., Rosmana, P. S., Fadillah, A. R., Ayuni, F., Nur'Ani, F. D., Apriliya, M., & Realistiya, R. (2023). Efektivitas Media Pembelajaran Interaktif Terhadap Hasil Belajar Siswa Kelas 5 Sekolah Dasar. *Jurnal Guru Kita PGSD*, *7*(3), 557. https://doi.org/10.24114/jgk.v7i3.41630

Khikmiyah, F. (2020). Implementasi web live worksheet berbasis problem based learning dalam pembelajaran matematika. *Jurnal Pedagogy*, *6*(1), 1–12. https://doi.org/10.30605/pedagogy.v6i1.1193.

Kusuma, D. W., & Julianto. (2023). Pengaruh model pembelajaran kooperatif think pair share berbantuan PPT terhadap hasil belajar IPA sistem tata surya kelas VI SDN Milangasri 1 Magetan. JPGSD: Jurnal Pendidikan Sekolah Dasar, 11(1), 192–206. https://doi.org/10.23887/ijee.v1i4.12962

Rosalina, L., Oktarina, R., Rahmiati, & Saputra, I. (2023). Buku ajar ststistika. Padang: Muharnika

rumah ilmiah.

Salsabilah, A. S., Dewi, D. A., & Furnamasari, Y. F. (2021). Peran guru dalam mewujudkan pendidikan karakter. *Jurnal Pendidikan Tambusai*, *5*(3), 7158–7163.

Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D.*

Suharsimi, A. (2020). *Prosedur penelitian suatu pendekatan praktik.* Jakarta: Rineka Cipta.

Tawe, A., & Bado, B. (2022). *Analisis statistik parametrik.* Makassar: Yayasan khalifah Cendekia Mandiri.

Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). Pentingnya Media Pembelajaran dalam Proses Belajar Mengajar. *Journal on Education*, *5*(2), 3928–3936. https://doi.org/10.31004/joe.v5i2.1074

Yahya, A., & Bakri, N. W. (2019). Pengaruh model pembelajaran kooperatif tipe team games tournament (TGT) dengan aplikasi QR code terhadap hasil belajar matematika. *JMEN: Jurnal Math Educator Nusantara*, *5*(1), 90–100. https://doi.org/10.29407/jmen.v5i01.12023