

Self-Confidence: Electronic Based Assessment

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Technological sophistication can be used in education, especially in the assessment process such as e-assessment. E-assessment is an online (electronic) system that will make assessments more efficient in terms of time and cost. The methodology of this research discusses the development, planning, use, and evaluation of e-assessment. The number of samples used was 14 teachers and 108 students from two junior high schools in Muaro Jambi, Indonesia. This study is descriptive, therefore describing the use of self-confidence e-assessment originally developed from The MySQL software. This software is easy to use because it only requires a small memory capacity and the application can also be used simultaneously. The results show that students' responses to the use of self-confidence e-assessment are good, as well as the responses from the teacher participants. It is evident that e-assessment can help teachers assess students' achievement more effectively and efficiently.

Key words: *E-Assessment, Technology, Self-Confidence.*

Introduction

Human resources (HR) have an essential role in the development of the advancement of science and technology. This fact shows that the development of HR occurs a lot in the field of education following up on global progress and trends in teaching approaches (Servant et al., 2015). Discussion of industrial revolution 4.0 resources are already very adequate in the education sector. Therefore it is fitting to use technology to improve human quality and improve the quality of HR. Education is considered to provide a solid foundation for tackling poverty and increasing social development (Richter, 2019). The four 21st century domains are the era of digital literacy, inventive thinking, interpersonal and social skills, and productivity in production (Turiman, 2012). Advances in information and communication technology have changed the learning process towards a portable, student-centered, and multi-platform environment (Idris, 2017). Changes and progress within technology has been added to various

fields, for example, communication and information technology (Ambiyar, 2019). Therefore, the development of information and communication technology in the education sector is needed. The ease of applying technology and information systems can be used to develop children's cognitive, affective, and social skills (Kraleva & Kraleov, 2018); one example is the use of e-learning. E-learning is one form of application of information technology in the field of education in the way of virtual learning (Islamiyah & Widayanti, 2016). The utilisation of e-learning requires good design so that the learning process can be done effectively to improve student learning outcomes. (Sulistyo, 2013). Learning is done digitally or online; there must be a discussion about the research system and there is a need to calculate online-based or e-assessment in particular education methods. The use of information technology and computers in the world of education is used as a medium of learning (Sahidu et al., 2017).

Assessment is a core activity in higher education (Stodberg, 2002) because, in addition to teaching activities, measurement of learning outcomes is the most important thing to do. Assessment is used to assess learning outcomes conducted by students. Assessment is not only of the cognitive aspect, but also can be done through the development of students when providing feedback when learning takes place. Indonesia, which generally uses conventional methods, results in average student learning outcomes from paper-based tests (Sahidu et al., 2017). Traditional assessment based on Blom's taxonomy is used as a consideration in the field of the cognitive aspect at a low level, namely to know and to understand (Robles & Braathen, 2002). The conventional method, in terms of valuation, still uses paper and stationery; therefore, the assessment process takes a long time in and has high costs. Following Sahidu et al., (2017), because learning is conventional, it is considered more expensive and less effective in the evaluation process because this would requires more time in the learning process. This weakness can be overcome by using information technology and computers. This can change a system that is still conventional into a system that supports computers or computerisation in the form of e-assessment (Sahidu et al., 2017). In e-assessment, not only teachers but also students act as evaluators. Students can act as writers and evaluators in electronic discussions (Gogoulou et al., 2007). In addition, Sorensen (2013) stated an online assessment system (e-assessment) could make judgments more efficiently in terms of time, agreement, and goal achievement. When online, an assessment system can reduce the level of cheating when conducting examinations and reduce the level of compliance in processing data.

Electronic assessments are often used to assess learning outcomes in the cognitive domain; besides, electronic assessments can also be used in affective domain assessments. The affective domain must also be understood because the era of industrial revolution 4.0 requires exploration participation, which can also be done by students. Self-confidence and belief are needed by students in the development of student learning (Maison, Syahrial, Syamsurizal, & Tanti, 2019; Tanti et al., 2018). Alternative measures, including affective domains and team activities, self and peer assessment, and reflection through logs and portfolios are necessary.

This type of evaluation tolerates character traits of students (Robles & Braathen, 2002). Confidence is one crucial aspect of the learning process. The higher the student's confidence, the higher the desire to learn, which will change students' attitudes in science subjects. Students are more confident when studying science, which changes attitudes toward science (Seba et al., 2013). This proves that to improve student attitudes in science; it is necessary for students to have. If students' self-confidence increases, then students' attitudes toward science will also increase. Research in America (Jebson & Hena, 2015) and in Indonesia (Maison et al., 2020) also states that attitudes toward science and self-confidence are essential and relatively high. This means that there is a similar tendency; the higher the confidence, the higher the attitudes towards science.

E-assessment is used to measure the affective domain of students using the MySQL application. (Yank, 2009). The database server (MySQL) is a program that can store much information in an organised format that is easily accessed through the PHP programming language. There are various SQL and NoSQL database management systems available to choose from and therefore the most appropriate system for using e-Update (Niyizamwiyitira & Lundberg, 2017). One of the databases that is mostly used is SQL (Structured Query Language). The most appropriate database is determined according to the needs of the application to be made. SQL is the only programming language supported by the procedure, but there are plans to support work to support other languages in the future. (Chen & Hsu, 2014); "A Data-Continuous Structured Query Language (SQL) Process is an automated enterprise information process that processes continuous incoming data streams." Several servers can input data into a database, including MYSQL (My Structured Query Language).

MySQL is one of the servers that can be used to enter basic data; in this case, it is the server of preference in junior high school students in Muaro Jambi, Indonesia. (Welling & Thomson, 2004). MySQL is a remarkable tool because it can be accessed easily since the installation process only requires a small memory footprint. MySQL and other relational databases are multi-threaded, which means they can process referrals from several clients simultaneously (Bulger et al, 2004; Gilmore, 2006). Caching query is one of the highest additional MySQL speeds. A simple and very effective way to activate, save cache, save MySQL, SELECT queries, along with corresponding results, in memory. MySQL currently has three commercial licenses called standard, enterprise, and cloud, which will provide a combination of additional features and support, along with product enhancements (Kromann, 2018). In the development of media, the score must be stored in a database so that evaluation of students' scores can be obtained. For scores to be stored in a database, PHP scripts are needed to save scores to a MySQL database on the server (Sutopo, 2012).

This study aims to describe the use of e-assessment in the form of self-confidence assessment implemented in two Junior high schools in Muaro Jambi, Indonesia. Data is collected from

student participants' responses, as well as describing and identifying students' confidence assessment generated from the teachers' perspectives.

Methodology

This study was adapted from Branch's (2009) research, which was carried out in stages, namely development, implication, and evaluation. The development stage is where the steps of developing and making e-assessments are undertaken through a questionnaire based on flowcharts and storyboards (Ivers & Barron, 2002). This questionnaire includes five indicators, namely: believing in one's own abilities and being objective, optimistic, responsible, rational, and realistic (Rahayuningdyah, 2016).

The e-confidence assessment instrument is derived from a questionnaire that has been changed and developed into a SESKA confidence system, using a MySQL database. The development and creation of e-confidence assessments is based on flowcharts and storyboards. This instrument was then validated to be suitable for use as an electronic assessment of self-confidence. Finally, the final step in the development process of e-assessment was to do a trial before it was implemented in the next process.

At the implementation stage, an e-confidence assessment was prepared and implemented. The use of "SESKA" based e-confidence assessment can facilitate students or teachers in terms of mobile-based use and can be carried everywhere without having to take printed assessment modules. The final result of the implementation process is a SESKA assessment model that can help the assessment process in the classroom.

In the evaluation stage, an overall evaluation is carried out. Every process that has been through was evaluated, involving the designers of the assessment and users. By utilising formative evaluation, the product evaluations are developed based on student confidence questionnaires and teacher responses obtained.

The participants of this study included 14 teachers and student participants in total, of 108 respondents from two Junior High Schools in Muaro Jambi, Indonesia. The sampling technique used was the purposive sampling technique. Purposive sampling is a sampling technique that is based on criteria determined by the researcher (Creswell, 2012). The sample criteria of this study were junior high school students who were in the top 10 of each class.

Results and Discussion

Students' attitudes can be seen in their self-confidence. The teachers can see when their students feel happy, sad, upset, or even confused. The students also feel unmotivated with their

learning sometimes. Attitude is about pleasure, displeasure, or a person's normal feelings towards an object (Oba & Lawrence, 2014). The novelty of this research was reviewed from the e-assessment, which was used to measure students' confidence. (Garrison & Vaughan, 2008). Online learning and assessment (electronic assessment) has several advantages, namely making learning more interesting and enjoyable, so students feel refreshed. Therefore, online assessment or electronic assessment is essential.

Confidence

The results of e-confidence appear in Table 1.

Table 1: Results of Student E-Confidence in Junior High School

Category			Mean	Mode	Min	Max	%
Interval	Attitude	Total					
22,0 – 39,6	Very bad	0	79.42	82.0	60.0	99.0	0
39,7 – 57,2	Bad	0					0
57,3 – 74,8	Average	30					27.8
74,9 – 92,4	Good	75					69.4
92,5 – 110,0	Very good	3					2.8
Total		108					100

Data in Table 1 was obtained from 108 respondents of junior high schools and processed using the SPSS program. Self-confidence is an integral part of someone's life. Confidence is a primary tool in moving forward. In the school environment, students are expected to cultivate confidence through school learning. Table 1 shows that most students are in a good category, with a percentage of 69.4%. Then in the average group, there were 30 participants with a rate reaching 27.8% and only three participants in the 'very good' category with a percentage of 2.8%. The table also shows that no one is in a bad category. Based on the categories from the results of the data above, the mean value is 79.31, and the mode value is 82.

Teacher Response

The results of the teacher response questionnaire appear in Table 2.

Table 2: Results in teacher's response to e-confidence questionnaire of students in junior high schools

Category			Mean	Mode	Min	Max	%
Interval	Attitude	Total					
15.0 – 27.0	Very bad	0	58.49	63	28	72	0
27.1 – 39.0	Bad	1					3.1
39.1 – 51.0	Average	3					21.4
51.1 – 63.0	Good	7					50.0
63.1 – 75.0	Very good	4					26.5
Total		14					100

Data in Table 2 was obtained from 14 respondents from middle school and had been processed using the SPSS program, with the following results: Standard Deviation 7.08, Mean 58.49, Mode 63, Median 60, Minimum Value 28, and Maximum Value 72. The data shows the teacher participant's attitude had a very good category of 26.5%, good at 50.0%, with a total of 7 out of 14 teachers. The average category was at 21.4%, and the bad category was at 3.1%.

The program system developed is SESKA that uses language programming made on Macromedia Dreamweaver MX 2004 applications in the form of PHP. PHP uses a scripting language that embeds HTML from web pages. When evaluators want to return to the destination, the webserver executes the PHP script and replaces the results to the page (Willia & Lane, 2009).

The work system in this e-assessment is the start page, and there are three main menus, namely the homepage, physics, and the science menu. The home page menu contains images of researchers while observing a junior high school in Muaro Jambi. The science menu contains three menus, namely the home menu to return to the start menu, a self-confidence menu that includes students' self-confidence questionnaires for science, and a science attitude menu that contains students' IPA attitude questionnaires. After students or teachers enter the data on each questionnaire, the data is stored automatically on the database provided in MySQL. The information is displayed on MySQL in ordinary data and graphical form as in figure 4.

Online assessment or e-assessment is a new way of taking an assessment. E-assessment replaces conventional assessment into a computer-based assessment (Sahidu et al., 2017). Self-confidence e-assessment can be seen initially in Figure 1 and 2:

Figure 1. The initial appearance of a confidence e-assessment



Figure 2. Display of biodata of confidence e-assessment

ANGKET PERCAYA DIRI SISWA

A. Tujuan

Angket ini bertujuan untuk mengetahui gambaran percaya diri siswa terhadap mata pelajaran IPA.

B. Petunjuk

1. Bacalah setiap pertanyaan/ pernyataan dengan cermat dan teliti
2. Isilah angket percaya diri ini dengan jujur.
3. Pilihlah jawaban yang paling sesuai menurut kalian dengan cara klik pada kolom jawaban, dengan keterangan sebagai berikut:

STS : Sangat Tidak Setuju

TS : Tidak Setuju

N : Netral

S : Setuju

SS : Sangat Setuju

4. Hanya boleh menjawab satu pilihan saja.

C. Identitas Responden

Nama :

Kelas :

D. Daftar Pernyataan

Figure 3. Display of results from a confidence e-assessment

DATA HASIL PERCAYA DIRI SISWA

Masukan Data Baru Grafik

Nama	Kelas	Nilai	Update
Zela Novianti	VIII A	104	Edit
mayselly Adilla Putri	VIII A	103	Edit
Utari Prisma Dewi	VIII A	105	Edit
Fitriani	VIII A	112	Edit
Hikma Ramadani	VIII A	113	Edit

Figure 3 shows the results of the e-assessment confidence of students who have completed the self-confidence questionnaire in the MySQL program.

Figure 4. Graph of results from a confidence e-assessment

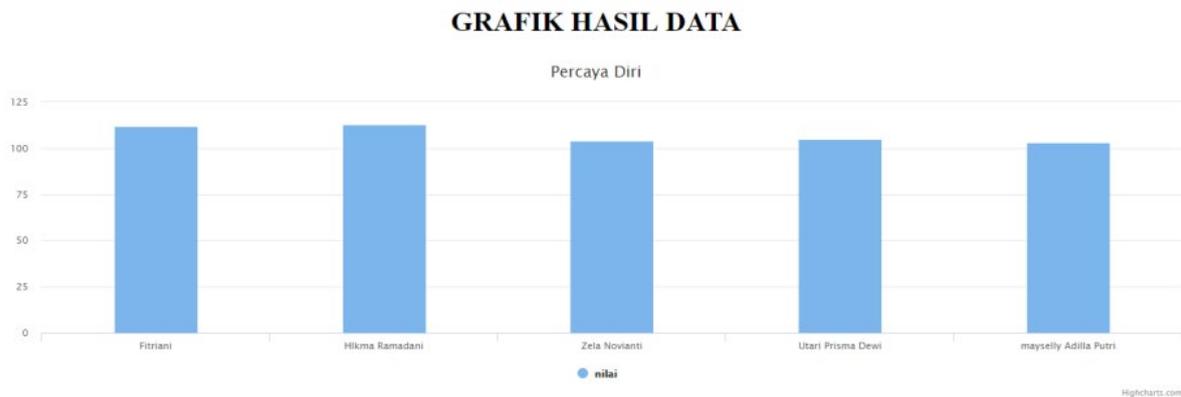


Figure 4 shows a graph of the results of the self-confidence e-assessment of students who have filled out the student confidence questionnaire in the MySQL program.

The use of information and communication technology can provide us with updates in the world of education, in this case, e-assessment. E-assessment is the use of ICT for assessment procedures in learning and can provide comfort for its users (lecturers and students). It is useful from various discussions and has a positive influence on the development of student attitudes and conceptual learning skills (Bhukuvhani et al., 2010; Nguyen & Mahundi, 2019). The ICT system includes policies, strategies, processes, information, technology, applications, and stakeholders that come together to create a technological environment in a country, government, or company (Garrison & Vaughan, 2008; Astaini et al., 2019; Elsakova et al.,



2019). On online learning and assessment (e-assessment) has several advantages, namely learning is more refreshing (fresh) and skills in managing more content. Therefore, an online assessment or e-assessment is needed (Wang et al., 2019; chemise et al., 2019; Chorfi & Al-Hudhud, 2019).

Evaluation is carried out with a series of empirical tests involving users (students and teachers) of the models that have been developed. The results of the teacher's questionnaire responses to students' self-confidence have been processed using the SPSS program, with the following results: e-confidence has the dominant results in the good category with a percentage of 69.4%. The enough category has a result of 30 people (27.8%) and only three people in the excellent category with a percentage of 2.8%. The table also shows that no one is in a bad category. While based on the categories from the results of the data above, the data obtained is the mean value of 79.31, a mode is 82. The teacher responses using e-assessment are 50.0% in the good category, which means the teacher's response to student self-confidence is very good in the assessment. Therefore e-assessment is essential because it can make it easier for teachers to assess directly, according to the era of the industrial revolution 4.0.

Conclusion

Based on the results of the system description, confidence e-assessment is made from MySQL software, because of the ease of installation and use, only a small hard drive is needed, and memory traces. This application can be multi-threaded, so that processing instructions from several students can be used simultaneously. Exploration results show that affective assessment using an e-assessment of confidence has a good category with a percentage of 69.4%. The average category was nominated by 30 participants with a percentage of 27.8% and there are only three participants in the very good category, with a percentage of 2.8%. The table also shows that no one is in a bad category. Based on the categories from the results of the data above, the data obtained the mean value of 79.31, and the mode value is 82. 50% of teacher responses, using e-assessment confidence are in either category, with a total of 7 teachers out of 14 teachers. This means the teacher's response to student motivation is very good in the assessment. The use of e-assessment for assessing students' confidence is highly recommended because it is easier for the teachers to evaluate on their own. This innovation is needed for education in the era of the Industrial Revolution 4.0.

Acknowledgment

Thanks to the Rector of Jambi University and the Dean of the Faculty of Education and Teacher Training of Jambi University for granting research grants in 2019. Thanks to the principals of Muaro Jambi state junior high schools for providing permission. The authors also would like



to thank all respondents - teachers and students - who were willing to participate in this research.

REFERENCES

- Ambiyar., Yondri, S., Irfan, D., Putri, M, U., Zaus, M, A., Islami, S. (2019). Evaluation of Packet Tracer Application Effectiveness in Computer Design Networking Subject. *International Journal on Advance Science Engineering information Technology*. 9(1), 54-59
- Astalini, A., Kurniawan, D. A., Sulistiyo, U., Perdana, R., & Susbiyanto, S. (2019). E-Assessment Motivation in Physics subjects for Senior High School. *International Journal of Online and Biomedical Engineering (iJOE)*, 15(11), 4-15.
- Bhukuvhani, C., Kusure, L., Munodawafa, V., Sana, A., & Gwizangwe, I. (2010). Pre-service Teachers' Use of Improvised and Virtual Laboratory Experimentation in Science Teaching. *International Journal of Education and Development using Information and Communication Technology*, 6(4), 27-38
- Bulger, B., Greenspan, J., & Wall, D. (2004). *MySQL/PHP Database Applications, Second Edition*. Indiana: Wiley Publishing
- Branch, M, B. (2009). *Instructional Design: The ADDIE Approach*. USA: University Of Georgia
- Chen, Q., & Hsu, M. (2014). *Data Continuous Sql Process*. United States Patent. (US 8,725,707 B2). 1-18
- Chemsi, G., Sadiq, M., Radid, M., & Talbi, M. (2019). [Formative E-Assessment and Behavioral Commitment of Students: Case of the Faculty of Science Ben M'sik](#). *International Journal of Emerging Technologies in Learning (iJET)*. 14(13), 4-14.
- Chorfi, H. Q., & Al-hudhud, G. (2019). [Optimizing E-Learning Cognitive Ergonomics Based on Structural Analysis of Dynamic Responses](#). *International Journal of Emerging Technologies in Learning (iJET)*. 14(10), 150-160.
- Creswell, J. W. (2012). Educational Research: Planning, conducting, and evaluating quantitative and qualitative research. In P. A. Smith (Ed.), *Pearson* (4th ed.). 501 Boylston Street, Boston: Pearson Education.
- Elsakova, R., Kuzmina, N., & Kochkina. [Smart Technology Integration in the System of Bachelors' Language Training](#). *International Journal of Emerging Technologies in Learning (iJET)*. 14(15), 25-39.



- Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. John Wiley & Sons
- Gilmore, J. W. (2006). *Beginning PHP and MySQL 5 From Novice to Professional, Second Edition*. United States of America: Springer
- Gogoulou, A., Gouli, E., Grigoriadou, M., Samarakou, M., & Chinou, D. A. (2007) Web-Based Educational Setting Supporting Individualized Learning, Collaborative Learning and Assessment. *Journal of Educational Technology & Society*, 10(4)
- Idris, N., Hashim, S. T. Z., Samsudin, R., & Ahmad. N. B. (2017). Intelligent Learning Model based on Significant Weight of Domain Knowledge Concept for Adaptive E-Learning. *International Journal on Advanced Science, Engineering Information Technology*. 7(4-2), 1486-1491
- Islamiyah, M., Widayanti, L. (2016). Efektifitas Pemanfaatan E-Learning Berbasis Website Terhadap Hasil Belajar Mahasiswa STMIK Asia Malang Pada Mata Kuliah Fisika Dasar (Effectiveness of Website-Based E-Learning Utilization of Student Learning Outcomes of STMIK Asia Malang Students in Basic Physics Subjects) *Jurnal Ilmiah Teknologi dan Informasi Asia (JITIKA)*. Vol. 10 No. 1, 41-46
- Jebson, S, R., & Hena, A, Z. (2015). Students' Attitude Towards Science Subjects In Senior Secondary Schools In Adamawa State Nigeria. *IMPACT: International Journal of Research in Applied, Natural, and Social Science*, 3(3)
- Kraleva, R., & Kralev, V. (2018). An Evaluation of The Mobile Apps for Children with Special Education Needs Based on The Utility Function Metrics. *International Journal on Advanced Science Engineering Information Technology*. Vol. 8, No. 6. 2269-2277
- Kromann, F, M. (2018). *Beginning PHP and MySQL: From Novice to Professional*. Appres
- Maison, Syahrial, Syamsurizal, & Tanti. (2019). Learning environment, students' beliefs, and self-regulation in learning physics: Structural equation modeling. *Journal of Baltic Science Education*, 18(3), 389–403. <https://doi.org/10.33225/jbse/19.18.389>
- Maison, Haryanto, Ernawati, M. D. W., Ningsih, Y., Jannah, N., Puspitasari, T. O., & Putra, D. S. (2020). Comparison of Student Attitudes Towards Natural Sciences. *International Journal of Evaluation and Research in Education*, 9(1).
- Nguyen SP, Mahundi MH. (2019). The dynamics of national ICT ecosystems. *E J Info Sys Dev Countries*;85:e12058. <https://doi.org/10.1002/isd2.12058>



- Ivers, K. S., & Barron, A. E. (2002). *Multimedia Project in Education: Designing, Producing, and Assessing*. USA: Libraries Unlimited
- Niyizamwiyitira, C.dan Lundberg, L. (2017). Performance Evaluation Of Sql And Nosql Database Management Systems In A Cluster. *International Journal of Database Management Systems (IJDMS)*. 6(9). 1-24
- Oba, Fatoba, J & Lawrence, Aladejana, A. (2014). Effects Of Gender On Student' Attitude To Physics In Secondary Schools In Oyo State, Nigeria. 10(7), 399-404
- Rahayuningdyah, E. (2016). Upaya Meningkatkan Kepercayaan Diri melalui Layanan Konseling Kelompok Pada Siswa Kelas VIII D di SMPN 3 Ngrambe (Efforts to Increase Confidence through Group Counseling Services for Class VIII D Students at SMPN 3 Ngrambe). *Journal of Issue and Practice in Education*. 1(2)
- Richter, S. (2019). A system dynamics study of Pakistan's education system: Consequences for governance. *E J Info Sys Dev Countries* DOI: 10.1002/isd2. 12065
- Robles, M., and Braathen, S. Online Assessment Techniques. *Delta Pi Epsilon Journal*, Vol. 44 No.1, pp: 39-49, 2002.
- Sahidu, H., Gunawan., Indriatulrahmi., Astutik, F. (2017). Desain Sistem E-Assessment pada pembelajaran fisika di LPTIK (E-Assessment System Design in learning physics at LPTIK). *Jurnal Pendidikan Fisika dan Teknologi*. Vol. 3, No. 2, 265-270
- Seba, J. M., Ndunguru, P. A., & Mkoma, S. L. (2013). Secondary school students' attitudes towards chemistry and physics subjects in Tarime-Mara, Tanzania. *TaJONAS: Tanzania Journal of Natural and Applied Sciences*, 4(2), 642-647
- Servant, V.F.C., Noordzij, Gera., Spierenburg, E.J., Frens, M.A. (2015). Thinking in Possibilities: Unleashing Cognitive Creativity Through Assessment in a Problem-Based Learning Environment. *Journal of Problem Based Learning in Higher Education*. 1-17
- Sorensen, E. (2013). Implementation and student perceptions of e-assessment in a Chemical Engineering Module. *European Journal of Engineering Education*, 38(2), 172-185.
- Stodberg, U. (2012). A Research review of e-assesment. *Assessment & Evaluation in Higher Education*, Vol. 37 No. 5, 591-604
- Sulistyo, H. (2013). Keefektifan E-Learning Sebagai Media Pembelajaran (Studi Evaluasi Model Pembelajaran E-Learning Smk Telkom Sandhy Putra Purwokerto), Program Studi Pendidikan Teknologi dan Kejuruan PPs Universitas Negri Yogyakarta



- Sutopo, H. (2012). Pengembangan Evaluasi Pembelajaran Berbasis Multimedia Dengan Flash, Php, Dan Mysql. *Jurnal Informatika*. 1(11), 1-7
- Tanti, Maison, Mukminin, A., Syahrial, Habibi, A., & Syamsurizal. (2018). Exploring the relationship between preservice science teachers ' beliefs and self-regulated strategies of studying physics : A structural equation model. *Journal of Turkish Science Education*, 15(4), 79–92. <https://doi.org/10.12973/tused.10247a>
- Turiman, P., Omar, J., Daud, A. M., & Osman, K. (2012). Fostering the 21st century skills through scientific literacy and science process skills. *Procedia-Social and Behavioral Sciences*, 59, 110-116, doi: 10.1016/j. sbspro. 2012.09.253
- Wang, X., Sun, H., & Li, L. (2019). [An Innovative Preschool Education Method Based on Computer Multimedia Technology](#). *International Journal of Emerging Technologies in Learning (iJET)*. 14(14), 57-68.
- Welling, L. & Thomson, L. (2004) *MySQL Tutorial*. United States of America: Pearson Education
- William, H, E., & Lane, D. (2009). *Web Database Application With PHP and MySQL, 2nd Edition*. America: O'Reilly.
- Yank, k. (2009). *Build Your Own Database Driven Web Site Using Php & Mysql*. Australia: Sitepoint.