

Influence of e-learning media on the quality of information systems student grades

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ABSTRACT

The purpose of this study was to determine the effect of e-learning learning media on the quality of information systems student grades; to provide exposure to e-learning learning media in information systems department; it is known the quality of student scores both the acquisition of the final score of each course and the GPA assessment of each semester as well as the presentation of attendance and the value of activeness in student learning. The type or method of this research is quantitative research with the SEM model which is a process of processing data previously obtained from respondents in the field or from quotations from trusted sources. In this study, statistical analysis will be used with the SmartPLS test. The research benefits obtained include exposure to effective and efficient e-learning learning media, so that it can be input in efforts to increase a high academic culture in the information systems department. The sample in the study was 20 students from the Information Systems Department. The analysis technique used is in the form of data from the results of giving questionnaires with descriptive analysis techniques to see tendencies, using a research and development approach. Results from research on e-learning learning media in the information systems department where e-learning can support the quality of student grades. The quality of grades here is not solely on the acquisition of the number of grade points from the course, but from all aspects, behavior, activity (fulfillment of assignments) that have been given.

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1. INTRODUCTION

The most needed thing for every human being is education, where educated people will have more knowledge in developing the potential of themselves, the environment and society so that they can build the quality of a nation. Various challenges in the world of education require a broad view and a critical mind towards the development of information and communication technology, to provide creative and innovative changes. Various efforts to improve student achievement must always be carried out and of course supported by various facilities that can improve the quality of student learning by higher education institutions. For more effective and innovative learning and teaching activities can be by utilizing information technology devices, communication and internet-based. Tuban Institute of Technology and Business is one of the educational institutions that follows the development of technological globalization, especially in the Information Systems department, which is a combined study program of information technology and business science that studies, designs a system that can be used by companies for business management, where teaching and learning activities utilize technology, one of which is the use of e learning as a teaching and

learning medium. The specific goal of this research is to determine whether there is an effect of using E-learning on the quality of grades for information systems students, so that we can understand whether E-learning plays an important role in the quality of grades for information systems students or not.

E-learning is a medium using electronic circuits in the form of the internet to deliver content, interaction or teaching of educational materials that keep up with developments in this technological era. Online learning that uses information and communication technology to transfer learning between teachers and students. Thus e-learning learning media is something that cannot be avoided in the world of education, because to improve the quality of student grades must follow the flow of the times especially during the globalization of technology s at this time. In addition, educators are also obliged to be able to create a conducive and effective learning atmosphere. So that students who take part in the teaching and learning process become more focused which ultimately fosters character independence, where students are active to ask questions and can develop the potential in each other. A quality learning process can be obtained from several prospects that influence, from (Astuti & Bhakti, 2018); teaching, the use of interesting and varied learning methods from the behavior of students, conducive learning conditions and atmosphere and the use of innovative learning media in supporting the learning and teaching process itself.

E-learning media is one of the uses of internet-based learning media that can help improve learning on the quality of student grades because the delivery of learning provides a broad range with three basic criteria, namely (1) With e-learning it is possible to update, store, share and share various educational materials or information, (2) Delivery can be made to all users using a computer equipped with standard Internet technology, which reduces sharing time (3) (Rosenberg 2021) Focusing on the broadest view of learning behind the traditional paradigm, so that the urgency of information technology can optimize the world of education. This means that e-learning media can bring new innovations so that students not only hear the material delivered by the teacher but also can see, hear and do something related to teaching material through technology from various sources that provide a broader view. This situation makes students feel lighter to improve the quality of grades, both the value of each course, the GPA value per semester and the value of activeness during teaching and learning activities, and makes students more motivated to further increase knowledge because e-learning media presents a more focused and easy understanding supported by broader information on teaching materials so that it can facilitate understanding of understanding and conclusions in the teaching results that have been delivered.

Changes that exist in learners or students in the form of behavior or others that arise from a learning process that includes cognitive, affective and psychomotor domains are the result of learning. Various factors that influence the learning process include physical factors and psychological factors that exist in each individual student, environmental factors, family factors, school factors, and factors supporting learning activities. For this reason, as a lecturer, you must be able to see and understand the behavior and characteristics of each individual student in order to achieve quality learning and obtain maximum learning outcomes. With students achieving maximum learning outcomes, student achievement will be obtained the best results. Based on the description of the learning process above, an understanding of achievement is obtained. Learning outcomes are the level of student success in learning a lesson at school which is expressed based on points obtained from test results using a number of materials that have previously been given through oral or written questions. (Ghosusanto, 2020)

2. RESEARCH METHOD

SEM (Structural Equation Modeling) includes a multivariate statistical analysis method. SEM is built with measurement and structural models. In it, there are 3 functions of activity at once, namely testing the validity and reliability of the instrument, testing the relationship model between variables and obtaining a model that is suitable for prediction (structural and regression model analysis). Based on the statement of (Hair 2019), proposed the stages of modeling analysis and structural equations into 6 stages of the flow.

The following is a model and explanation of the stages of the SEM methodology from Hair used in this study:

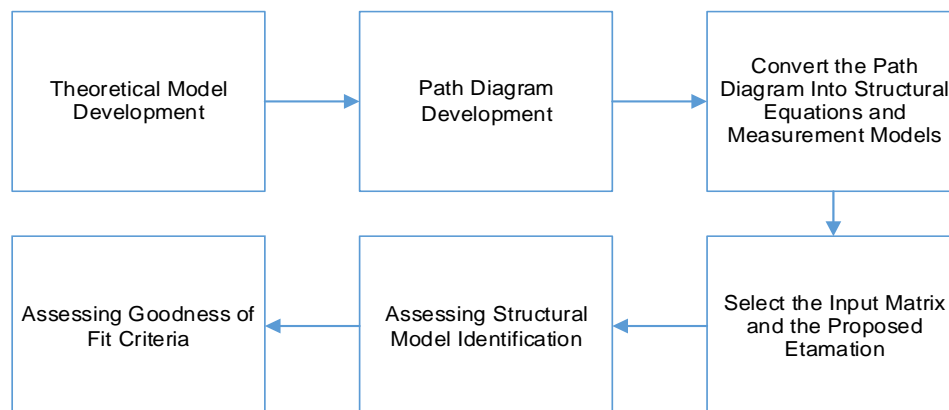


Figure 1. SEM model

1. Theoretical Model Development, the first step in SEM is to theoretically identify the problems in a study. This is the process of examining the relationship between variables that will be hypothesized. So in terms of elearning learning media on the quality of student grades, must understand the things that affect the improvement of the quality of grades from learning media (elearning). Which is an absolute step that must be taken, and every relationship described in the next step must have a strong theory. According to Gudono (2006), statements in the relationship between variables in the model must meet quality requirements. In the relationship, the Effect of Elearning Learning Media on the quality of Information Systems Student Grades, where the SEM depiction will have a reflective relationship, measurements based on Constructs to Indicators.
2. Path Diagram Development, the theoretical development based on stage one is depicted in a path diagram.
3. Convert the path diagram into structural equations and measurement models. From the relationship, The Effect of Elearning Learning Media on the Quality of Information Systems Student grades, it is known that the variables are elearning learning media and student grades. With the construct Media, the indicator Value has a direction of flow from left to right, then the acquisition of SEM is Reflective.
4. Select the input matrix and the proposed estimation, Initially, the structural equation mode was formulated with a covariance matrix input. Ghozali, 2007 says that the covariance matrix has advantages over the correlation matrix because it allows comparison of the validity of different populations or different samples.
5. Assessing structural model identification, this section is the interpretation stage of the research model data. Which structure model is made capable of producing good estimates.
6. Assessing Goodness of Fit Criteria, fulfillment of some assumptions using SEM. Model Interpretation and Model Modification. Please note the following: sample size of at least 100 units; data is normally distributed and has a linear pattern; estimation of deviations using univariate and multivariate methods. Once the prerequisites for SEM use are met, the next step is the statistical fit test.dika

The final step is to interpret and modify the model, i.e. whether the assessment has a high prognosis or not. Based on the fit modeling criteria of (goodness of fit index).

Validity Test

The measure used for validity testing with Smart PLS software is: a) Convergent Validity, Convergent validity refers to the measurement principle that construct values must be strongly correlated (Ghozali, 2021). Therefore, this research uses reflective indicators. The convergence validity test in Smart PLS software is indicated by the load factor value for each building indicator. The following usual rule of thumb according to (Ghozali, 2021) is used: 1) Loading factor, it can be said that factor values between 0.60 and 0.70 are sufficient to fulfill convergent validity, 2) Average Variance Extracted (AVE) > 0.50. b) Discriminant Validity, related to the procedural principle, the

numerators of different constructs should not be highly correlated. Discrimination qualification with reflective indicators that appear on each cross-load variable must be > 0.70 (Ghazali, 2021).

Reliability Test

Reliability test is a test that measures a questionnaire with variable or construct indicators. The reliability test shows the accuracy, consistency and accuracy of the instrument in measuring constructs (Ghozali, 2021). The measure of reliability in PLS-SEM using Smart PLS software is done by looking: a) Composite Reliability, used to measure internal consistency. CR values between 0.60 and 0.70 are still acceptable for exploratory research (Ghozali, 2021); b) Cronbach's Alfa, used to diagnose the consistency of the entire scale looking at the reliability coefficient. Cronbach's alpha value is always > 0.60 which is acceptable for exploratory research.

3. RESULTS AND DISCUSSIONS

This research aims to identify the effect of using e-learning media on increasing student grades using SEM, SMART PLS, quantitative analysis.

Measurement Model Analysis (Outer Model)

Outer model analysis is defining the relationship between the evaluated indicators or parameters and their latent variables. The initial stage is to test the measurement model or outer model (Partial Least Square analysis). The outer model analysis technique is a PLS algorithm that uses convergent validity test, discriminant validity test, reliability validity test, and construct validity test. The percentage of validity in this study is 80% of all respondents' answers from the results of distributing questionnaires.

1. Convergent validity test, Convergent validity measurement has several measurement criteria, namely looking at external loading and mean extract variance values. The first known convergent validity test is the external loading test and the indicator is said to be valid if the external loading indicator value is greater than 0.7.

	M	N
X3	0.708	
X4	0.877	
X5	0.903	
X6	0.808	
X7	0.760	
X8	0.748	
X9	0.843	
Y1		0.898
Y10		0.786
Y2		0.810
Y3		0.820
Y4		0.639
Y5		0.581
Y6		0.528
Y7		0.615
Y8		0.749
Y9		0.846

Figure 2. Outer loading

Outer loading from the Figure above, which has a value above the rule of thumb 0.7 is X1, X2, X3, X4, X5, X6, X7, X8, X9, X10, Y1, Y2, Y3, Y8, Y9, Y10 Because it meets the minimum value specified, the indicator is declared valid. While those below the rule of thumb 0.7 are Y4, Y5, Y6, Y7 indicators are declared invalid.

The next convergent validity test is to determine the average variance extracted (AVE) value. AVE is a measure of the amount of variance captured by the construct compared to the variance due to measurement error in the PLS algorithm calculation technique. Variables are said to be valid if the AVE value is > 0.5. The results of the AVE calculation are in the figure below.

	Cronbach's Alpha	rho_A	Reliabilitas Komposit	Rata-rata Varians Diekstrak (AVE)
M	0.940	0.949	0.949	0.652
N	0.902	0.912	0.921	0.543

Figure 3. Construct validity and reliability

From the figure above, the AVE of variable M = 0.652 and the AVE of variable N = 0.543 have AVE values both above 0.5, so it can be said to be valid. Because variable M affects variable N, the pattern of the relationship between variable M and variable N is reflective.

2. Discriminant Validity Test, discriminant validity testing can be done with two different modes of calculation. The first can be checked by comparing the root value of the AVE with the latent variable correlations. The root of the AVE should show a higher correlation score than the construction in the model. Quoted from (Hidayat, www.statiskian.com) simply put, this AVE root must be greater than the R-Square value of the model. The R-Square value used is the last endogenous latent variable in the model. The AVE root can be calculated manually or seen in the Fornell-Larcker figure. The results of the model calculation using the PLS algorithm technique.

	R Square	Adjusted R Square
N	0.660	0.641

Figure 4. R square

From the picture above, it is known that the R Square value is 0.660 and the Adjusted square value is 0.641. The figure below shows the root AVE value of each construct or variable shown in the final value of each figure.² The AVE root value is then compared with the model's R-squared value. It is known that the R-squared value of the model is contained in Figure 3 of 4, so it can be seen that the AVE root score of each variable is greater than the R-squared value.

	M	N
M	0.807	
N	0.813	0.737

	M	N
X3	0.708	0.458
X4	0.877	0.751
X5	0.903	0.705
X6	0.808	0.663
X7	0.760	0.616
X8	0.748	0.742
X9	0.843	0.809
Y1	0.574	0.898
Y10	0.740	0.786
Y2	0.719	0.810
Y3	0.604	0.820
Y4	0.572	0.639
Y5	0.457	0.581
Y6	0.516	0.528
Y7	0.571	0.615
Y8	0.451	0.749
Y9	0.643	0.846

Figure 5. Discriminant validity

Thus, from the information and figures above, all variables are declared valid and can then be used in subsequent tests there. In addition, Discriminant Validity can also be learned from cross-loading points, or cross-validity, where the indicator value of the variable itself must be greater than the correlation of the indicator with other indicators.

From the results of the cross loading calculation above, it is known that the indicators of all variables are valid. Where the value of each indicator loading against the construct, the value is greater than the cross loading. As in the picture above, where the loading value is $0.708 > 0.458$ construct on X3 and also seen in Y3 the loading value is $0.820 > 0.604$ construct.

3. Cronbach Alpha and Composite Reability Tests, reliability test can be known from Cronbach's alpha and Composite reliability scores. A minimum Cronbach's alpha score of 0.6 is required, while the minimum convergent reliability score is 0.7 Reliability testing is also carried out using the PLS algorithm technique. The results of the Cronbach's Alpha and Composite reliability calculations are in the same figure as the AVE and rho-A figure.

That the composite reliability value must be > 0.70 , although a value of 0.60 is still acceptable. A construct can be said to have a high reliability value if the value of the combined reliability is > 0.70 .

	Cronbach's Alpha	rho_A	Reliabilitas Komposit
M	0.940	0.949	0.949
N	0.902	0.912	0.921

Figure 6. Matrix

It is known that the Cronbach's alpha score M is 0.940 and N is 0.902 which is greater than 0.60. Composite reliability score M is 0.949 and N is 0.912, which is greater than 0.70, it can be seen that the model of this study has a high reliability value.

Structural Model Analysis (Inner Model)

The Inner Model defines the causal relationship between latent variables (structural model). In SMART PLS, the Inner Model Test uses Bootstrapping and Blindfolding procedures.

1. Path Coefficient Value, the path coefficient value is the path whose variable moves from the exogenous variable to the endogenous variable. In other words, the standardized regression coefficient shows the direct effect of the dependent variable on the dependent variable in a particular path model. The effect of the value is based on the significant value. The value of the path coefficient ranges between 1 and -1, the closer to 1 or -1, the stronger the relationship.

	Sampel Asli (O)	Rata-rata Sam...	Standar Devias...	T Statistik (O /STDEV)	P Values
M -> N	0.813	0.855	0.060	13.533	0.000

Figure 7. Direct influence

The hypothesis test is H_0 Variable M has no direct effect on Variable N. H_1 Variable Y has a direct effect on Variable X and in the P Values column the results show an effect (0.00). Judging from the significant value, it has a strong path coefficient value effect.

	Sampel Asli (O)	Rata-rata Sampel (M)	Standar Deviasi (STDEV)	T Statistik (O /STDEV)	P Values
M -> N					

Figure 8. Indirect effect

The indirect effect does not appear because it only has 2 variables, namely variable M (media) and variable N (Quality Value).

2. R Square Value (R Value)² the R Square value is a value to determine how much influence the exogenous (independent) variable has on the indogenous (dependent) variable. The criteria for determining the coefficient of determination are 0.75 is as good, 0.50 is moderate and 0.25 is weak.

	R Square
N	0.660

Figure 9. R square

Judging from the results in the figure above which shows that the R Square of variable N = 0.660 is to have moderate detirmination.

3. Adjusted R Square, adjusted R Square is the adjusted R Square value based on the standard error value. The adjusted R-squared value provides a stronger picture than R-squared, assessing the ability of exogenous constructs to explain endogenous constructs. RmSquare value of the

simultaneous effect of M on N is 0.660 with an adjusted R Square value of 0.641, it can be explained that all exogenous constructs are good / strong.

4. Stone Geisser Value (Q^2), predictive Relevance (Q-Squared) or Stone-Giesser is performed to determine predictive power using the blindfolding procedure in smartpls. In the book A Primer on Partial least Squares Structural Equations Modeling, Joseph F., G. Thomas M. Ringle, Marko Sarstedt. Stating, Q^2 calculation uses two approaches, namely, the cross-validated redundancy approach and the cross-validated community approach. However, these researchers prefer to use the redundant cross-validation approach. That is, the value of $Q^2 > 0$, which indicates that the exogenous construct variable has predictive relevance for the endogenous construct variable: a) $0.02 \leq Q^2 < 0.15$ relevance classified as SMALL, b) $0.15 \leq Q^2 < 0.35$ relevance classified as MEDIUM, c) $Q^2 \geq 0.35$ relevance classified as GREAT. Here are the results of Q^2 with the blindfolding approach.

➤ Q^2

Total	Kasus1	Kasus2	Kasus3	Kasus4	Kasus
		SSO	SSE	$Q^2 (=1-SSE/SSO)$	
M		200.000	200.000		
N		200.000	140.883	0.296	

Figure 10. Redundancy of construct cross validation

From the results it is known that the value of Q^2 for N is 0.296, because $Q^2 = 0.296 > 0$, it is concluded that N has predictive relevance for M. It is known that the value of $Q^2 = 0.296$, which is greater than 0.35, it can be concluded that the predictive relevance is strong.

5. Goodness of Fit Index (GoF Index), goodness of Fit, which refers to how well the statistical fit model with, a set of observations in the task of measuring the accuracy of the sample regression function in statistically estimating the true value The statistical model describes an approximate fit with a series of such observations:

Ringkasan Fit	rms Theta	
	Model Saturated	Model Estimasi
SRMR	0.152	0.152
d_ULS	4.856	4.856
d_G	Tidak digunak...	Tidak digunak...
Chi-Square	5249.825	5249.825
NFI	0.045	0.045

Figure 11. Model fit

The figure in the fit model is data from my SRMR value, with a value of 0.152 which indicates that there is no fit according to where the SRMR value is < 0.10 . Because the SRMR value ranges from 0 to 1, the conclusion is $SRMR = 0.152 \geq 0.10$ the result is not suitable

6. Partial Test (T Test), T test is a test on each independent variable and can affect the dependent variable, which is considered constant, its own function is to test the average difference between two samples T-test which is a statistical test needed to test whether the hypothesis is true or false that there is no significant difference between two randomly selected averages from the same population

T Statistik (O/STDEV)	P Values
13.533	0.000

Figure 12. T-test

4. CONCLUSION

Based on the results of research and method above, conclusions can be drawn, Research on e-learning learning media in the information systems department at where e-learning can support the quality of student grades. The quality of grades here is not solely on the acquisition of the number of points of value from the course, but from all aspects, behavior, activeness (fulfillment of

assignments) that have been given. E-learning Learning Media affects the quality of student grades which in the P Values column shows that the results are influential with hypothesis testing $H_0 =$ variable M (E-learning Learning Media) has no direct effect on variable N (Grade Quality). $H_1 =$ variable M (E-learning Learning Media) has a direct effect on variable N (Grade Quality). E-learning Learning Media can affect the quality of student grades because if they are carried out with smartPLS, most of the test results show a significant value > 0.7 with a valid and reliable prestage of 80% of the overall significant value.

Impact of e-learning on the quality of information systems students' grades has significant implications. E-learning allows for broader and more flexible access to educational resources, enabling students to learn at their own pace and review materials as needed, which can enhance understanding and retention. Additionally, the use of various interactive media in e-learning, such as videos, animations, and interactive quizzes, can increase student engagement and motivation, potentially improving their learning outcomes and grades. However, the effectiveness of e-learning also depends on factors such as the availability of adequate technology, the digital skills of both students and teachers, and the proper design and implementation of the curriculum. If these factors are not met, e-learning can lead to unequal access and quality of education, which in turn can negatively affect the quality of students' grades. I hope this research will be useful for future researchers, especially in the utilization of e-learning.

REFERENCES

- Karwati, E. (2019). The impact of e-learning on the quality of student learning. *Journal of Communication Science*, 17.
- Suprayogie, D. R. and Hakim, L. (2021). The effect of e-learning on learning quality with learning quality and learning process as intervention variables in Islamic banking courses. *Journal of Education*.
- Nuswantoro, M. A. (2021). The Effect of the Use of Learning Media (e-Learning) and Motivation on Academic Achievement of Undergraduate Accounting Students at Semarang University.
- Alimuddin, A. and Nadjib, M. (2019). Intensity of e-learning use to support student learning (S1) at Hasanuddin University. *KAREBA: Journal of communication science*
- Seri, W. F. and Kurniawati, T. (2020). The effect of learning motivation and the use of online learning on the academic outcomes of economics students. *Ecogen Journal*.
- Ridwan, M. (2011). The Effect of Online Learning on Learning Achievement of Class XII Accounting Students of SMK YPM 3 Taman Sidoarjo (Dissertation, IAIN Sunan Ampel Surabaya).
- Mohzana, M., Fahrurrozi, M., et al (2021). The impact of using e-learning on students. *JOEAI Journal of Education and Teaching*.
- Suparman, A. (2019). The effect of technology acceptance in e-learning on increasing student interest (case study at SMK Pasundan Subang). *International Demo Magazine*
- Triama, R.A. (2021). The Effect of Online Learning on Motivation and Academic Achievement of Students of the Department of Social Studies Education Maulana Malik Ibrahim Malang
- Qin, J., Zheng, Q., & Li, H. (2014). A study of learner-oriented negative emotion compensation in e-learning. *Educational Technology and Society*.
- Rabinowitz, M., Blumberg, F. C., & Everson, H. T. (2014). The design of instruction and evaluation: Affordances of using media and technology. In *The Design of Instruction and Evaluation: Affordances of Using Media and Technology*.
- Shrivastava, R., Jain, Y. K., & Sachan, A. K. (2018). Designing and Developing e-Learning Solution: Study of Moodle 2.0. *International Journal of Machine Learning and Computing*.
- Smaldino, Sharon E. ; Russel, James D.; Heinich, Robert; Molenda, M. (1997). *Instructional Technology and Media for Learning*. Pearson Merrill Prentice Hall.
- Syamsuddin, I. A. (2014). Assessing Moodle as Learning Management System Platform for English Course Based TOEFL. *International Journal of Computer Trends and Technology*.
- Yaman, S., & Ph, D. (2020). Technology Supported Learning Platform: Moodle Integrated Academic Course. *Turkish Online Journal of Distance Education-TOJDE*.
- Andersson, A., & Grönlund, Å. (2019). A Conceptual Framework for E-Learning in Developing Countries: A Critical Review of Research Challenges. *The Electronic Journal of Information Systems in Developing Countries*.
- Axelsson, J. (2017). *6 Reasons Why eLearning Development Costs Less Than Traditional Training - eLearning Industry*. ELearning Industry.
- Clark, R.C. & Mayer, R. E. (2018). Learning by Viewing Versus Learning by Doing: Evidence-Based Guidelines for Principled Learning Environments. *Performance Improvement*.
- Clark, R. C., & Mayer, R. E. (2018). e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning.
- Ferdiánová, V. (2017). GeoGebra Materials for LMS Moodle Focused Monge on Projection. *The Electronic*

- Journal of E-Learning*,
- Ghareb, M. I., & Mohammed, S. A. (2016). The Effect of E-Learning and the Role of New Technology at University of Research Article The Effect of E-Learning and the Role of New Technology at University of Human Development. *International Journal of Primatology*.
- Harandi, S. R. (2015). Effects of e-learning on Students' Motivation. *Procedia - Social and Behavioral Sciences*,
- Heinich, R., Molenda, M., Russel, J. D., & Smaldino, S. E. (2002). *Instructional Media and Technologies for Learning* (Seventh).
- Islam, M. S., Chowdhury, S., & Islam, M. A. (2019). Lis Education in E-Learning Environment : Problems and Proposal for Bangladesh. *Asia-Pacific Conference on Library & Information Education & Practice*.
- Kamsin, A. (2015). Is E-Learning the Solution and Substitute for Conventional Learning? *International Journal of The Computer*.
- Khan, A. M., & Ahmad, S. (2016). Role of E-Learning in Library and Information Science. *NCIMDiL 2016, December*.
- Kumbhar, R. (2019). Use of E-learning in Library and Information Science Education. *DESIDOC Journal of Library & Information Technology*.
- Mehta, A., Morris, N. P., Swinnerton, B., & Homer, M. (2019). The Influence of Values on E-learning Adoption. *Computers and Education*.
- Moule, P. (2017). Challenging the five-stage model for e-learning: a new approach.
- Naidu, S. (2016). E-Learning: A Guidebook of Principles, Procedures and Practices. In *E-learning*. Commonwealth Educational Media Center for Asia.
- Prasetyo, S. E. (2019). Pengaruh E-Learning sebagai Pelengkap Pembelajaran terhadap Kepuasan Belajar Mahasiswa di Kota Batam. *Journal of Informatics and Telecommunication Engineering*.