

E-Learning quality: The role of learning technology utilization effectiveness teacher leadership and curriculum during the pandemic season in Indonesia

Heryanto^{a*}, Sihar Tambun^b, Rudy Pramono^c, Dwi Priyanti^d and Ivo Christiana Siregar^e

^aTheological Department, Lintas Budaya Theological Seminary of Batam, Kepri, Indonesia

^bAccounting Departement Universitas 17 Agustus 1945 Jakarta, Indonesia

^cTheological Pelita Harapan University, Indonesia

^dIndonesian Audi University, Medan, Indonesia

^ePaulus, Theological College Medan, Indonesia

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ABSTRACT

The impact of teacher leadership and curriculum on the effectiveness of learning technology utilization and the quality of e-learning has been proven by research. The study included 165 samples of teachers from Halang Island, Riau, Indonesia. Respondents are certified teachers with a minimum of ten years of experience, as determined by the purposive sampling method. Respondents completed a research questionnaire, which was used to collect data. Data was processed with Smart PLS software, including validity, reliability, and hypothesis testing. The study's findings demonstrated that teacher leadership and curriculum directly impacted the effectiveness of learning technology utilization. The quality of e-learning was directly influenced by teacher leadership, curriculum, and the effectiveness of learning technology utilization. Finally, teacher leadership and curriculum impacted e-learning quality through the effectiveness of learning technology utilization. This study suggests two points. First, if you want to improve the effectiveness of learning technology utilization, the policy priority should be to update and then improve teacher leadership. Second, increasing the effectiveness of learning technology utilization is a policy priority if you want to improve the quality of e-learning. It was followed by curriculum updates and increased teacher leadership.

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1. Introduction

The pandemic of Covid 19 has had a significant impact on Indonesia's state, which has been felt since March 2020. Since then, the learning process has moved away from the classroom and toward the home. As Indonesia's Minister of Education, Nadiem has issued some letters concerning online education implementation. First Regulation No. 36962 / MPK.A / HK / 2020, dated March 17, 2020, about online learning and working from home to prevent the spread of Covid 19. The Minister emphasized that Covid 19-affected areas were required to conduct online learning. Teachers and employees do the same thing, working and teaching from home. Second Regulation No. 4 of 2020 Concerning the Implementation of Education Policies in an Emergency Period of the Spread of Covid 19 dated March 24, 2020, Concerning the National Examination, Implementation of the Learning Process from Home, and Others Third Regulation Letter No. 15 of 2020 concerning Guidelines for Organizing Learning from Home in an Emergency for the Spread of Covid 19, May 18, 2020, namely the confirmation of learning from home during the Covid 19 emergency being carried out while still adhering to the Covid 19 protocol. These regulatory letters demonstrate the Governments or the Minister of Education's seriousness in responding to the threat of Covid 19 in Indonesia, particularly among educators and students. The suggestion to use online learning was made abruptly, and all offline learning

* Corresponding author.

E-mail address: Dr.heryantodth@yahoo.co.id (Heryanto)

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processes at school were immediately halted. Facts from around the world also demonstrated that the ferocity of Covid 19 spread from a local case to the rest of the world in such a short period. For the first time, this Corona entered China. It was confirmed around December 8, 2019, that this new disease was reported to the WHO office in China on December 31, 2019, as a type of "pneumonia" disease with an unknown cause. Infections of the lungs that resulted in acute inhalation were first discovered in a fish market in Hubei province, China. Outside of China, the spread was first reported in Thailand on January 13, 2020, and then spread to the Middle East on January 29, 2020. On January 25, 2020, France became the first country in Europe to be infected with the Covid 19 virus. On February 14, 2020, it will strike the African continent, and it will continue to spread to various countries. President Joko Widodo of Indonesia officially announced the first case of Covid 19 in Indonesia on March 2, 2020. Two Indonesians tested positive for Covid 19 after having physical contact with Japanese citizens visiting Indonesia. For the first time, an Indonesian citizen died from Covid 19 in Solo Regency after attending a seminar in Bogor on February 25-28, 2020. Meanwhile, on March 13, 2020, the first recovery of two Covid 19 patients was reported. The Indonesian Government made day after day of efforts to combat the spread of Covid 19 after the first case occurred.

Changing the learning model from offline to online causes problems. Teachers, students, and all parents face this change without any preparation. This condition confuses everyone. Tensions and conflicts in families and communities are almost inevitable because of this change in learning models. In the researchers' observations about the chaos of the educational process during the Covid 19 pandemic, it can be seen from two sides. First, the teacher's inability to use technology to support the learning process, including in preparing online teaching materials, so that the teacher must bring a companion who understands the use of learning technology. Second, the curriculum being taught is the offline curriculum, but it is used for the online learning process. Both are obstacles faced in the online learning process. The teacher's inability to take advantage of learning technology when delivering learning information becomes a problem. This causes the main problem in e-learning so that the absorption of learning material for students is more diminutive. The next gap is that the offline curriculum is forced and adapted to the material taught online. Here, the teacher's ability to lead the class is needed so that the teaching and learning process goes well. Another difficulty for students living in remote areas is getting an internet network, so they cannot follow e-learning well. The three phenomena of this situation have shown a gap between expectations and reality in realizing good e-learning. This research revealed the importance of teacher leadership and the availability of a contextual curriculum to integrate technology that aims to improve the quality of e-learning. The study was conducted according to the principles of research methods to answer problems in research.

Berg et al. (2014) said that teachers have started to play an increasingly important leadership role in schools, and teachers have become crucial for improving teaching in the last few decades. Akert & Martin (2012) supported this research, which stated that teacher leadership affected student learning and improved the quality of education. Even teacher leadership was a strategy for improving school quality through mobilizing teacher potential (Cheng & Szeto, 2016). Teacher leadership is crucial to empower e-learning facilities and curriculum to support the realization of good E-Learning. All educational processes in schools cannot be separated from the curriculum as a guide and learning direction. The curriculum provides teachers with the understanding to carry out their duties and responsibilities and even teaches more effectively. In essence, the curriculum is a lesson plan. In undergoing the learning process during the Covid 19 pandemic, the national curriculum must change to face challenges and changes. The curriculum must be adapted to the demands of the times by accommodating technological advances. E-learning is an absolute necessity in learning in the Covid 19 pandemic situation. Meyer & Norman (2020) stated that the curriculum must be designed innovatively and track the field's latest developments. The curriculum should provide realistic recommendations that can be adopted as flexible guides into learning. This is in line with Looi et al. (2014)'s research, which stated that curriculum changes had a positive and beneficial impact on implementing innovation. This has an impact on changes in teacher attitudes and behavior, on teaching systems with technological devices called e-learning. McKimm & Barrow (2009) supported this view, which stated that the curriculum's primary function is to provide a framework or design that allows an effective and efficient learning process to take place.

Technology also has the potential to support good e-learning during the Covid 19 pandemic. To ensure that learning precedes properly, this learning must be carried out by competent teachers. One of the competencies of a teacher is a skill in the field of learning technology. The higher the teacher's ability to use technology in learning, the easier it will be for teachers to implement e-learning. Including student interaction with teachers more open and accessible. The use of technology is a valuable skill for managing to teach and learn effectively and efficiently (Gonzalez, 2016). This is confirmed by Scrivner et al. (2017) which stated that our world is changing to a new technology era. Educators must improve skills in the field of technology to reflect on and incorporate them into teaching practice. Optimal use of technology tools will enhance student learning, enabling instructors to tailor their classroom needs, suit individual student needs, and be useful for large numbers of students (Lakshminarayanan & McBride, 2015). Harper (2018) stated that technology is a new avenue for dialogue, as a tool that changes the way teachers and students interact and communicate, from being exclusive to online. This makes an educational or learning process more practical, especially teacher and student interactions. Hernandez & Morales (2019) stated that the critical role of technology for teachers in the learning process strongly supports better learning and develops student activity that contributes to learning success.

This research's strengths and novelty lies in a research model that has never been studied, especially during the Covid 19 pandemic. This research model's uniqueness is the learning technology utilization variable's effectiveness, which is positioned

as a mediating variable, where research like this has never existed. The placement of the effectiveness of learning technology utilization as an intervening variable is expected to prove its essential role between teacher leadership and quality of e-learning and between curriculum with the quality of e-learning. Second, this study also examines teacher leadership's direct impact and the curriculum on effectiveness of learning technology utilization. Furthermore, this study also examines the direct impact of teacher leadership, curriculum, and the point of learning technology utilization on the quality of e-learning, as no previous research had examined this model. For this reason, this study has entitled the effect of teacher leadership and curriculum on the quality of e-learning through the effectiveness of learning technology utilization.

2. Literature Review and Hypothesis

2.1 Theory of Planned Behavior

The theory of planned behavior was used as a grand theory that underlies this study's framework. The theory of planned behavior is a theory developed by Ajzen (1991), which explains that a person's behavior change can be formed. This theory is used as the basis for the study that teacher leadership behavior, adaptation behavior to the use of learning technology, and behavior adjusting the curriculum to technological advances are behaviors that can be planned. This behavior change is needed to support the e-learning process's success as a new learning method in the Covid 19 era. Teachers as leaders of the learning process in class are expected to change teaching patterns from offline to online. Teachers must adapt to learning technology so that the e-learning process can run well and of good quality.

2.2 The Impact of Teacher Leadership on Effectiveness of Learning Technology Utilization

Leadership is a process carried out by a leader in an organization, including educational institutions that need a leader to improve performance by influencing performance determinants (Yukl, 2008). Teacher leadership is a crucial element in the use of learning technology. As a result, encouragement or motivation was born for every educational institution to make serious efforts to reveal teacher leadership to all stakeholders related to education. In an academic environment, teachers' ability to use learning technology is crucial to increase professionalism (Joseph, 2012). This will improve the quality of education and student learning (Seraji et al., 2017). The use of learning technology is suitable for students because it expands knowledge and applies new knowledge (Fisher et al., 2012). Teachers are expected to lead their classes well so that learning technology can be used effectively. Based on the arguments and previous research, the first hypothesis in this study was determined.

H₁: *Teacher leadership impacts on effectiveness of learning technology utilization.*

2.3 The Impact of Curriculum on Effectiveness of Learning Technology Utilization

Digital technology has changed the way you learn and build skills in learning. Technological developments, especially learning technology, must be integrated, and become an essential part of the curriculum (Higgins, 2014). The curriculum must continuously be updated and have a learning model that utilizes technology. This is seen when the learning model changes in the Covid 19 pandemic era. The need for curriculum updates is a must and must be integrated with technology so that positive companies occur in the education system (Mohanasundaram, 2018). Curriculum design and innovation must be linked to technological capabilities. Curriculum updates will provide opportunities for advancement in education or learning (Costa & Harris, 2017). In other words, the curriculum must be in synergy with learning technology so that the effective use of learning technology is created. Based on the arguments and previous research, the second hypothesis was determined.

H₂: *The curriculum impacts on effectiveness of learning technology utilization.*

2.4 The Impact of Teacher Leadership on Quality of E-Learning

The focus of science education today must be the focus of attention to teachers. Teachers must strive to improve student skills in technology (Jeskova et al., 2019). One of the factors supporting the success of learning with the availability of technology is teachers' effectiveness in using e-learning. This is inseparable from the role of the teacher in managing the class. The success of e-learning depends on teacher governance in leading the learning process. Especially in the online learning process, teachers must be creative and so that the learning process is of quality (Nguyen, 2015). For that, every teacher has the responsibility to develop professionalism by updating themselves. Teachers must be committed to learning technological developments regularly and continuously to contribute to better teaching and e-learning (Mohamed et al., 2018). Following previous research results and considering all the previous explanations, the third hypothesis was determined.

H₃: *Teacher leadership impacts on the quality of e-learning.*

2.5 The Impact of Curriculum on Quality of E-Learning

Updating the curriculum in e-learning, if viewed from all parties' needs, is time to make permanent education replace conventional education (Assareh & Hosseini, 2011). In technological advancement, teachers carry out learning using information

technology called e-learning to convey educational information to students. Through these technological advances, teachers, students, and the community are familiar with this educational model as a modern educational paradigm (Sun et al., 2008). The learning method using e-learning has a significant effect on the passion, pleasure, and motivation to learn. This results in good student learning outcomes. Therefore, it is necessary to prepare a curriculum for e-learning based learning (Lee et al., 2014). The curriculum must be adapted to the use of technology for the implementation of e-learning. The e-learning method is a vital part of the curriculum to achieve quality learning (Gotthardt et al., 2006). From the arguments and previous research, the fourth hypothesis is determined in this study.

H4: *The curriculum impacts on the quality of e-learning.*

2.6 The Impact of Effectiveness of learning technology utilization on E-Learning Quality

The application of technology greatly determines the quality of learning in e-learning (Masrom, 2007). Using technology can change learning behavior in e-learning so that the learning process will be better (Park, 2009). The use of learning technology with e-learning is the right solution during the Covid 19 pandemic (Ebner et al., 2020). Learning methods through e-learning must be well managed. If it is not managed correctly, it will hurt student achievement (Sintema, 2020). Therefore, it is vital to take advantage of learning technology for quality e-learning. Based on the above research results and the arguments that have been presented, the fifth research hypothesis is determined.

H5: *The effectiveness of learning technology utilization impacts on quality of e-learning.*

2.7 The Impact of Teacher Leadership on Quality of E-Learning through Effectiveness of Learning Technology Utilization

Teachers have an essential role to play in creating the quality of education in the fast technological era. Teachers must take advantage of technology to change education, including learning patterns. Teachers must be empowered to practice their profession by adjusting the availability of educational support to students' needs (Albion & Tondeur, 2018). Teacher leadership contributes to improving education effectiveness, and teacher quality is an essential element in reviving the teaching profession (Frost & Harris, 2003). Technology is a bridge that strengthens teacher leadership in processing e-learning. Technology is just a tool that won't work without someone operating it. Teachers' preparation of technology should provide teachers with a solid understanding of various media, abilities, and constraints. Such experience can only emerge when teachers are actively involved in the teaching and learning process with technology in multiple disciplines (Vrasidas & McIsaac, 2001). Teacher leadership supported by the effectiveness of information technology will improve the quality of learning (Mumtaz, 2000). Teachers' knowledge of technology plays a vital role in increasing the frequency of learning technology. This will add a lot of teaching technology experience and encourage teachers to develop further teacher pedagogic knowledge (Rohaani et al., 2012). The effectiveness of technology utilization will bridge the influence of teacher quality on the quality of e-learning. From the results of previous research and the explanations above, the sixth hypothesis was determined.

H6: *Teacher leadership impacts on quality of e-learning through effectiveness of learning technology utilization.*

2.8 The Impact of Curriculum on Quality of E-Learning through Effectiveness of Learning Technology Utilization

Belli et al. (2014) stated that the curriculum must be prepared by skilled specialists to adopt the curriculum's adoption relevant to technology use. Research by Arias et al. (2016) stated that there is a need for reforms in educational curriculum materials about the practice of science and information technology. A study by Shahmir et al. (2011) noted that technology is becoming a new transformation trend that requires curriculum changes. The curriculum in the conditions during the Covid 19 pandemic needs to be strengthened by using technology so that the learning process with e-learning is carried out correctly. The teaching and learning process with e-learning will be better if the combination of technology and curriculum can be well integrated. Technology must be utilized effectively so that the designed curriculum can be applied in e-learning. The curriculum needs to keep up with the times by preparing students to be familiar with technology (Anderson & Rogan, 2011). Technology has an essential role in moving the curriculum towards the desired goals or objectives. This is confirmed in Ueltschy's (2001) research that for the use of technology to have a positive impact on students, technology must be integrated into the curriculum. The curriculum becomes an academic action plan, which forms all technical educational activities (Jeganathan et al., 2019). Sandar's (2012) research stated that technology is an essential component in the curriculum to improve teaching and learning. Integrating technology into the curriculum will ensure this curriculum is in line with providing a more immersive, authentic, and relevant learning experience to the current and future needs of students. Furthermore, Staples and Edmister (2014) recommend that the curriculum be integrated into technology so that e-learning can be carried out more effectively. Based on the results of previous research and the explanations above, the seventh hypothesis was determined.

H7: *The curriculum impacts on quality of e-learning through effectiveness of learning technology utilization.*

3. Methods

This study's population were teachers at Indonesian Methodist Christian Schools and several delegated teachers from other private schools on Halang Island, Riau, Indonesia. The method used in determining the number of samples is the Hair method (2015) which states that the respondents' adequacy in the study is calculated using a formula of 5-10 from the number of indicators. The respondents' selection is based on the purposive side to select appropriate respondents to answer the research

questionnaire. The respondent selection technique used is by the research objectives, namely teachers with leadership positions, certified teachers who have worked for over ten years. The data source of this research is data from questionnaires distributed to each teacher as a respondent.

3.1 Types of Research

This research is a quantitative study with a structural equation modeling approach. It is proving the hypothesis using the SmartPLS software. This study examines the relationship between one variable, namely the explained variable, with the explanatory variable. The research aims to test the hypotheses formed from the theory and results of the previous study. Based on the explanation level, this includes descriptive analysis that collects data to test hypotheses so that researchers get a complete and accurate description with an adequate sample size.

3.2 Research Variables

This study has four variables: independent variables, dependent variables, and intervening variables—first, the quality of e-learning is the dependent variable. E-learning is the use of information technology in teaching and learning concepts. E-learning is also education with a flexible and personalized learning method that offers cost-efficient learning (Zhang & Nunamaker, 2003). The quality indicators of e-learning consist of three: e-learning is used based on information technology responsive to needs, e-learning provides ease and freedom of learning or is flexible, and e-learning is an efficient education (Granger & Levine, 2010).

Second, teacher leadership is the first independent variable. Teacher leadership is a process in which teachers individually or collectively influence colleagues and other school community members to improve teaching practices, learners, and student achievement (Shen et al., 2020). Teacher Leadership consists of five measurement indicators, namely: The ability of the teacher to lead learning, the responsibility of the teacher in improving the learning process, the responsibility of the teacher towards the profession, efforts to increase competence in e-learning, and directing professionalism towards the e-learning process (Yukl, 2008 & Frost & Harris, 2003).

Third, the curriculum is the second independent variable. The curriculum collects learning plans, teaching materials, tools, and learning methods programmed in one learning period (Anrig, 2017). The curriculum consists of three indicators, namely: the curriculum must be integrated with technology in realizing e-learning, teachers need to be prepared with the ability to master technology, and curriculum and technology are a unit that transforms the learning model (Arias et al., 2016; Belli et al., 2014; Shahmir et al. 2011).

Fourth the effectiveness of learning technology utilization as an intervening variable. Banta (2009) defines technology as science or knowledge that is applied for specific purposes. The use of technology must be effective in teaching and learning activities (Keengwe & Onchwari, 2009). The effectiveness of the use of technology consists of three indicators, namely: technology can renew offline, and online learning models, technology as the primary tool to make students communicate in learning practical, technology can improve the skills of students and teachers in the learning process (Solviana, 2020).

3.3 Hypothesis Testing Stages

Data from the answers to the research questionnaire were recapitulated and viewed the information on the number of respondents, the gender of the respondents, and the education level of the respondents. The data quality test was done by using the validity test and the reliability test. The validity test is carried out to ensure that the data is valid and that each statement in the questionnaire is appropriate to represent the variable under study. Reliability tests are conducted to ensure that respondents answer consistently, which indicates that the research respondents are serious. Hypothesis testing is carried out in two stages: the direct effect test and the indirect effect test. In this study, five direct effect hypotheses will be tested, and two hypotheses of the indirect effect test. They are proving the hypothesis using the Smart PLS software.

4. Findings

The population used in this study were Methodist College teachers and several delegated teachers from other school teachers on Halang Island, Riau Indonesia, in 2020. The sample of respondents was 165 teachers. Respondents of this study consisted of 65 men and 100 women. A total of 58 respondents had a master's education, and 107 had a bachelor's degree.

4.1 Data Feasibility Test

Test the feasibility of the data in this study using validity and reliability tests. The validity test is a measure that shows the validity or validity of an instrument. The validity test is a test of the ability of a questionnaire to measure what you want to measure. The validity test is seen from the loading factor of each question with each variable. The results of the validity test can be seen in the image below. The loading factor of each variable is above 0.5, which means that all are proven valid.

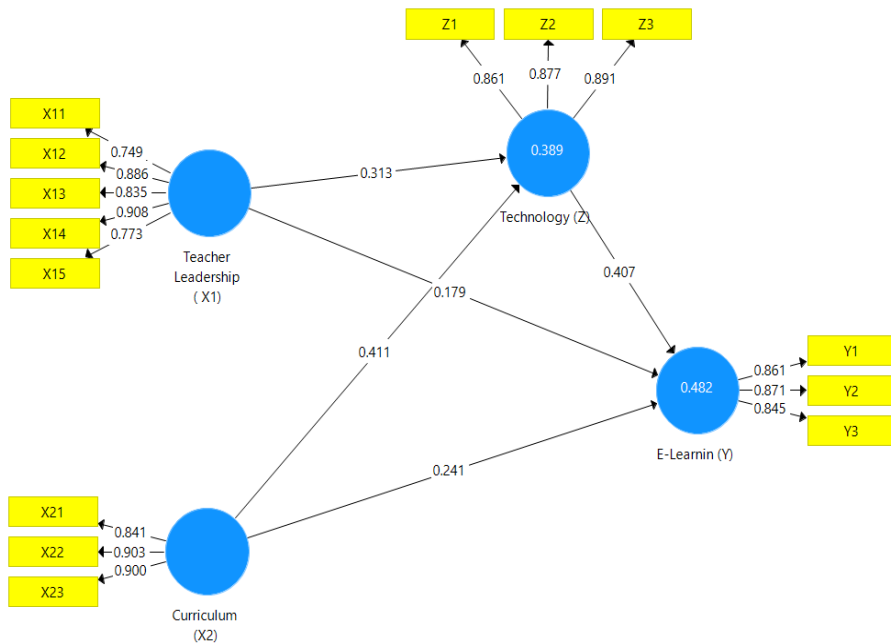


Fig. 1. Validity Test

Source: Smart PLS, 2021

This result means that the statement instrument made in the research questionnaire is valid and feasible to represent the variables studied. Teacher leadership with five indicators has all factor loading above 0.5. Likewise, the curriculum has three indicators, and all of them have a loading factor above 0.5. The effectiveness of technology utilization has three indicators, and all of them have a loading factor above 0.5. Finally, the e-learning quality variable has three indicators, and all of them have a loading factor above 0.5.

The results in Fig. 1 above also provide information that the coefficient of teacher leadership determination and the curriculum on the effectiveness of learning technology utilization is 0.389 or 38.9%. This means that 61.1% of opportunities for other variables can affect effectiveness of learning technology utilization. When compared between teacher leadership and curriculum, the effect of the curriculum on the effectiveness of learning technology utilization is more excellent, namely 0.411. This means that an increase in curriculum implementation by 100% will impact increasing the effectiveness of learning technology utilization by 41.1%. Based on this model, if you want to increase the effectiveness of learning technology utilization, then the curriculum is the priority that must be improved. After that, the capacity building of teachers will be expanded.

While the coefficient of determination of teacher leadership, curriculum, and the effectiveness of learning technology utilization on the quality of e-learning is 0.482 or 48.2%. This means that the opportunity for other variables to influence the quality of e-learning is 51.8%. Among the three variables tested for their influence on the quality of e-learning, the coefficient of the effect of the effectiveness of learning technology utilization on the quality of e-learning was the greatest, namely 0.407. This coefficient means that every time there is an increase in effectiveness of learning technology utilization by 100%, the quality of e-learning will increase by 40.7%. If you want to improve the quality of e-learning, what must be improved is the effectiveness of learning technology utilization, after that the curriculum and teacher leadership. Furthermore, test the reliability of the data on the four variables studied. Reliability test results can be seen in the following table.

Table 1
Reliability Test

Variables	Composite Reliability	Cronbach Alpha	Average Variance Extracted (AVE)
Teacher Leadership (X1)	0.918	0.888	0.693
Curriculum (X2)	0.913	0.857	0.770
E-Learnin (Y)	0.894	0.822	0.738
Technology (Z)	0.909	0.849	0.768

Source: Smart PLS, 2021

Several methods are used to test reliability. The composite reliability test, the Cronbach alpha test, and the average variance extracted test are a few examples. Data is considered reliable if the composite reliability and Cronbach alpha values are more

than 0.7 and the variance extracted average is more than 0.5. According to the data reliability test results, all variables are reliable. This means that the responses to the questionnaire questions were consistent. Consistent data indicates that respondents took their reactions seriously, allowing the data to be used for hypothesis testing.

4.2 Hypothesis testing

Hypothesis testing is divided into two, namely, the direct effect test and the indirect effect test. The direct effect test was conducted to test the five hypotheses in this study. Meanwhile, the indirect effect test was conducted to answer the two hypotheses in this study. The following shows the results of the direct effect test.

Table 2
Direct Effect Test

Variables	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Teacher Leadership (X1) → Technology (Z)	0.313	0.314	0.088	3.553	0.000
Curriculum (X2) → Technology (Z)	0.411	0.412	0.078	5.286	0.000
Teacher Leadership (X1) → E-Learning (Y)	0.179	0.189	0.071	2.509	0.012
Curriculum (X2) → E-Learning (Y)	0.241	0.238	0.101	2.380	0.018
Technology (Z) → E-Learning (Y)	0.407	0.402	0.111	3.664	0.000

Source: Smart PLS, 2021

Based on the table above, the following conclusions can be drawn about the direct effect test. First, teacher leadership has a significant impact on the effectiveness of learning technology use. The T statistical value of $3.553 > 1.96$ and the P-value of $0.000 < 0.05$ support this. As a result, the first hypothesis in this study has been proven and accepted. The findings of this study strengthen and supplement the work of Yukl (2008), Joseph (2012), Fisher et al. (2012), and Seraji et al. (2017). Teacher leadership has a positive impact on the effectiveness of learning technology utilization. This means that any effort to improve teacher quality will significantly impact the effectiveness of learning technology utilization.

Second, the curriculum has a significant impact on the effectiveness of using learning technology. The T statistical value of $5.286 > 1.96$ and the P-value of $0.000 < 0.05$ support this. As a result, the second hypothesis in this study has been proven and accepted. The findings of this study support and supplement the findings of Higgins (2014), Costa & Harris (2017), and Mohanasundaram (2018). The curriculum has a positive impact on the efficiency with which learning technology is used. This means that learning technology utilization will be more effective if supported by a curriculum integrated with technology. The curriculum must be updated, and implementing the curriculum's teaching, and learning processes must be integrated with learning technology.

Third, teacher leadership has a significant impact on e-learning quality. The T statistic value of $2.509 > 1.96$ and the P-value of $0.012 < 0.05$ support this. As a result, the third hypothesis in this study has been proven and accepted. The findings of this study support and supplement the work of Utomo (2023), Mohamed et al. (2018), and Jeskova et al. (2019). In the educational process, the teacher is the driving force. Teacher leadership has a positive impact on e-learning quality. Teachers who effectively lead the teaching and learning process will significantly impact the quality of e-learning. Of course, the teachers here must have a thorough understanding of the teaching and learning processes in e-learning in order to effectively guide and direct students. Teachers play a critical role in achieving high levels of learning quality.

Fourth, the curriculum has a significant impact on e-learning quality. The T statistical value of $2.380 > 1.96$ and the P value of $0.008 < 0.05$ support this. As a result, the fourth hypothesis in this study has been proven and accepted. The findings of this study support and supplement the work of Gotthardt et al. (2006), Asbari et al. (2020), Assareh & Hosseini (2011), and Lee et al (2014). The curriculum has a positive impact on e-learning quality. The higher the quality of e-learning, the higher the quality of the curriculum. The curriculum must be tailored to the e-learning learning needs. The curriculum must be designed to be compatible with the learning technology being used. Learning technology is an essential component of curriculum design for it to be properly used in the teaching and learning process with e-learning.

Fifth, the effectiveness of learning technology utilization has a significant impact on e-learning quality. The T statistical value of $3.664 > 1.96$ and the P-value of $0.000 < 0.05$ support this. As a result, the fifth hypothesis in this study has been proven and accepted. The findings of this study support and supplement the work of Masrom (2007), Park (2009), Ebner et al. (2020), and Purwanto et al. (2023). The efficiency with which learning technology is used has a positive impact on the quality of e-learning. Learning technology is an undeniably important and inseparable component of the e-learning teaching and learning process. Learning technology is a critical component that must be utilized effectively to support the quality of e-learning. If you want to improve the quality of e-learning, you must first improve the effectiveness of learning technology utilization.

Furthermore, below are the indirect effect test results to answer the sixth hypothesis and the seventh hypothesis. The sixth and seventh hypotheses discuss the indirect effect of teacher leadership and the curriculum on the quality of e-learning through the effectiveness of learning technology utilization. Following are the results of the indirect effect test.

Table 3
Indirect Effect Test

Variables	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
Teacher Leadership (X1) → Technology (Z) → E-Learning (Y)	0.127	0.126	0.049	2.600	0.010
Curriculum (X2) → Technology (Z) → E-Learning (Y)	0.168	0.168	0.063	2.645	0.008

Source: Smart PLS, 2021

To demonstrate the sixth hypothesis, it can be seen that teacher leadership influences the quality of e-learning by influencing the effectiveness of learning technology utilization. The T statistic value of $2.600 > 1.96$ and the P-value of $0.0100 < 0.05$ support this. As a result, the sixth hypothesis in this study has been proven and accepted. The findings of this study support and supplement the findings of Mumtaz (2000), Vrasidas & McIsaac (2001), Frost & Harris (2003), Rohaan et al. (2012), and Albion & Tondeur (2018). Between teacher leadership and the quality of e-learning, the effectiveness of learning technology utilization is critical. The effectiveness of learning technology utilization can bridge or mediate well between teacher leadership and e-learning quality. The greater the effectiveness of learning technology utilization, the greater the impact of teacher quality on learning quality. If you want to improve the quality of e-learning, you must go beyond improving teachers' quality. However, improving the effectiveness of learning technology utilization is also important. This study demonstrated that learning technology utilization's effectiveness could significantly mediate teacher leadership's effect on e-learning quality.

To demonstrate the seventh hypothesis, it can be seen that the curriculum influences the quality of e-learning through the effectiveness of learning technology utilization. The T statistical value of $2.645 > 1.96$ and the P-value of $0.0080 < 0.05$ support this. As a result, the seventh hypothesis in this study has been proven and accepted. The findings of this study strengthen and supplement the work of Anderson and Rogan (2011), Shahmir et al. (2011), Sandars (2012), Staples & Edmister (2014), Belli et al. (2014), Arias et al. (2016), and Jeganathan et al., (2019). Between the curriculum and the quality of e-learning, the effectiveness of learning technology utilization is critical. The curriculum has an indirect impact on the quality of e-learning. Through the effective use of learning technology, the curriculum has an indirect impact on the quality of e-learning. If you want to improve the quality of e-learning, this study's findings provide an alternative option. This can be accomplished by increasing the effectiveness of learning technology utilization and improving the curriculum's quality.

5. Conclusion and Discussion

The results of this study were a research question. Research also affects educational managers and educational regulators, particularly both the Ministry of Education and the Government in general. First, this study showed that teachers' leadership and the curriculum both impact the efficiency of use of learning technology. However, the curriculum affects the effectiveness of learning technology more than teacher leadership. It can be stated that the priority to be improved and adjusted is the curriculum if you want to enhance the effectiveness of learning technology utilization. This is important for educational managers and the Government. This is important. A primary national curriculum design, including the use of learning technology, is necessary. The Government can provide educators with training or help in updating the curriculum. The integration of curriculum and learning technology is now and will be a necessity. During the Covid 19 pandemic, it is not just a temporary solution. Despite the acceleration of Covid 19, the application of technology in education has been accelerated. Second, teacher leadership, curriculum, and the effectiveness of the use of learning technology all of which affect e-learning quality. Among the three is the impact on the quality of e-learning by using learning technology. For institutional, educational managers, this study's results recommend that the effectiveness of learning technology be improved first to improve the quality of e-learning. The next step can be enhanced teacher leadership and updating the curriculum once the use of learning technology is efficient. For the Government, attention must be paid to the equal distribution in different corners of Indonesia of the online learning support facilities. Teachers who do not understand the use of learning technology need education. Third, the effectiveness of learning technology utilization has been shown to affect the quality of e-learning that teacher leadership and the curriculum have. Leadership and the curriculum affect the quality of e-learning not only directly but also by effectiveness of learning technology utilization. For managers of educational institutions, this information is helpful. It is not only by improvements to teacher leadership and curriculum that you want to improve the quality of e-learning. It may also be possible to improve the quality of e-learning by enhancing the effectiveness of learning technology utilization. The effectiveness of learning technology utilization mediates the influence on the quality of E-learning of the teacher management and the curriculum.

Given the findings of this study, several things must be discussed and recommended. Curriculum use, then, has the most significant effect on teaching and learning technologies. The e-learning curriculum is also the question, however, is what form of curriculum is relevant to today's Covip pandemic curriculum? Which program is suitable for delivering on-the-the-the-go

learning? It is to be proven. New solutions to the Coventry crisis will be found during the epidemic. Also, teacher leadership affects the effectiveness of learning technology utilization. Teacher leadership has an impact on e-learning. What teachers must have to use e-learning effectively is a well-developed competency in instructional design. This has yet to be proven. More researchers should do this work. Third, in this study, the quality of e-learning is still limited to measuring input and process. Constrained by existing technological infrastructure and effectiveness, however, what about the quality of online learning? This issue still requires further study.

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