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Factors for Successful Implementation of E-Learning Readiness: Harnessing the Potential for Organizational Success

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Abstract. In light of the transformative impact of the COVID-19 pandemic on education, this study focuses on evaluating the readiness of the XYZ Institution in Jakarta to implement e-learning. Technology, now a fundamental requirement in our lives, has become essential for societal progress, particularly in the field of education. The pandemic has compelled institutions and schools to shift to digital platforms, highlighting the significance of online education. This study aims to assess XYZ Institution's preparedness for e-learning implementation by considering previous research-based factors and models. A total of 180 respondents participated in the study, and hypotheses were tested using SMARTPLS version 4. Among the factors examined, only learner control exhibited a significant impact on e-learning readiness, emphasizing the importance of providing learners with a sense of control and autonomy in their online learning experiences. The research findings offer valuable insights into the elements influencing preparedness for e-learning, laying a solid foundation for further investigation and the development of effective approaches to enhance the integration of e-learning in XYZ Institution and similar educational institutions.

Keywords: e-learning readiness; digital platforms; online education; research-based factors; learner control; sense of autonomy; educational institutions.

1. Introduction

Technology has become a basic human necessity with its integration into every aspect of human life. The advancement of information technology is crucial for societal progress (Cholik, 2021). Various disciplines, including education, play a vital role in the growth of technology and its impact on a country's development. The adoption and use of internet technology led to the development of competitive advantages (Aguila-Obra et al., 2006). Currently, the internet has become a necessity for human existence. It broadens people's perspectives and knowledge about a limitless world. Besides connecting computers, the internet also connects individuals from different parts of the globe. Access to information is not limited by distance, and physical boundaries do not restrict staying connected (Sardjono et al., 2021).

Teaching and learning methods worldwide have undergone significant transformations due to the COVID-19 pandemic. The widespread use of the original teaching plan and the extensive implementation of non-face-to-face teaching have resulted in a substantial focus on online learning platforms (Zhang et al., 2021). Since the onset of the pandemic, XYZ Institutions in Jakarta have shifted to an online format for their tax brevet training program, starting in April 2020, using the online learning platform. While online learning is expected to provide practical benefits for participants, there are several disruptions that need to be addressed. The use of Microsoft Teams in education faces significant constraints. These constraints include unstable internet connections, technical issues with hardware and software, participants' lack of technological skills, and limited interaction and communication in the online format.

To examine the dynamics within the context of "e-learning," the authors use the VOS Viewer. The analysis focused on co-occurrence references within the text-based analysis. The database used for this analysis was Scopus, covering the last five years (2017–2022). This approach allowed for a comprehensive examination of the e-learning readiness landscape. Result in the VOS Viewer seen in Figure 1.

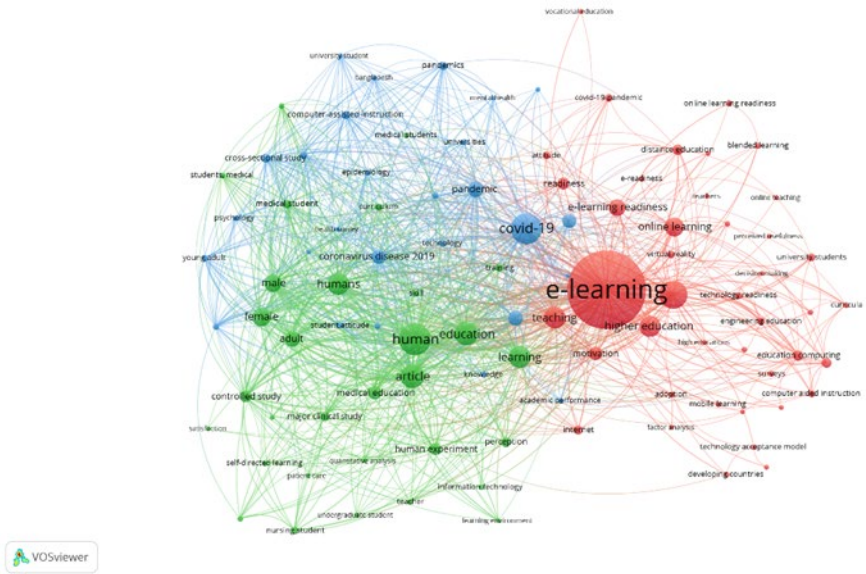

Fig. 1: Keyword Visualization on VOS Viewer

The network also illustrates how one research topic is related to another and connected through specific variables. Keyword analysis using the association method in the cluster shows that e-learning readiness is directly associated with motivation, while self-directed learning, computer self-efficacy, controlled study, interpersonal communication, learning environment, organization, and management

are not directly related. This implies that the research topic of e-learning readiness, based on the findings in the VOS viewer, can be used as a research innovation by utilizing those findings as research variables.

Although XYZ institution has been using online platforms for the learning process, a comprehensive implementation of e-learning systems requires deeper readiness. In this context, it is necessary to understand the factors that can influence XYZ institution's readiness to adopt online learning technologies more extensively. The ELR (E-Learning Readiness) Model was used by Saintika et al. (2021) to investigate readiness at public and private universities in Central Java, Indonesia. While this study focused on the student perspective, the model was modified. Participation by students is also crucial to the success of e-learning implementation. Recent studies by previous researchers stated that factors such as computer/internet self-efficacy, self-directed learning, learner control, motivation for learning, and online communication self-efficacy can impact participants' level of engagement and success in the online learning process (Hung et al., 2010; Taipjutorus et al., 2012; Dwiyanti et al., 2020; Tang et al., 2021; Belhaj et al., 2022; Hamzah et al., 2022; Kalogiannidis et al., 2022). Therefore, this study aims to identify factors for successful e-learning implementation in education institutions, especially the XYZ Institution in Jakarta, and acknowledge the potential factors of preparedness.

2. Literature Review

2.1. Learning Technology

In recent years, there has been a remarkable and extensive development of technology due to the increasing interest in digital media (Docke & Marie, 2019). The authors emphasize the importance of educators adopting the latest technology and engaging students in innovative ways to enhance their enthusiasm for learning. Rafi et al. (2020) highlight how technology in education enables online or remote learning, facilitating effective assessments, evaluations, and administrative tasks. However, the integration of modern technology in educational institutions can be intimidating for educators, as they face challenges such as a wide range of technological devices, steep learning curves, limited incentives, and competing time demands (Sutton & DeSantis, 2016). These obstacles may impede students from fully leveraging emerging technological tools. Nonetheless, educators are encouraged to embrace technology, overcome challenges, and create engaging learning environments to adapt to dynamic trends in education.

2.2. E-Learning

E-learning refers to the integration of information and communication technology (ICT) into the learning environment, with the main goal of facilitating education (Rosenberg & Foshay, 2002). The term "e-learning" is commonly used as a broad term encompassing various forms of digital learning environments, such as online platforms and virtual learning environments, as well as social learning technologies. The emergence of digitization has posed significant challenges to many business models within organizations, prompting critical reflection on the nature and implementation of learning and development (Dignen and Burmeister, 2020). E-learning has rapidly become the norm, but the expected success rates of online classes vary significantly (Uppal et al., 2017). The virtual classroom model, also known as e-learning, represents a recent innovation in the field of education and learning. This is because users of this platform can differentiate between various teaching strategies and materials, resulting in higher quality and more reliable education. An e-learning system is a crucial requirement for any organization that wants to stay at the forefront of information technology. This is because everything is moving toward the digital era, including its mechanisms and content (Elyas, A. H., 2018).

2.3. Computer/Internet Self-Efficacy

The notion of self-efficacy, which has its roots in social cognitive theory, provides a conceptual framework for comprehending the impact of self-efficacy beliefs on human performance across cognitive, motivational, emotional, and decision-making processes (Hung et al., 2010). This impact

may be demonstrated in a range of domains, including cognition, motivation, and decision-making. Computer or network self-efficacy evaluation is critical to providing online learning through networks (Dwiyanti et al., 2020).
H1: Computer/Internet Self-Efficacy has a significant impact on Readiness Levels for e-Learning.

2.4. Self-Directed Learning

Self-directed learning in the context of online learning involves learners taking initiative and responsibility for setting personal learning goals, understanding their own needs, identifying learning resources, selecting and implementing learning strategies, and monitoring their own performance. Personal attributes play a crucial role in online learning (Hung et al., 2010). Independent learners are likely to utilize online resources and information in their pursuit of knowledge. The study revealed that students' perceptions of collaborative learning and their use of technology can enhance their ability to take charge of their own learning process. (Tang et al., 2021).
H2: Self-directed learning has a significant impact on Readiness Levels for e-Learning.

2.5. Learner Control

Students can exert more agency over their own education through the use of online learning. According to Simsek (2012), giving students control over their learning gives them the authority to govern instructional components. These aspects include the order, speed, flow, amount, and review of learning instructions. Students are given the authority to make decisions about their own learning, such as the amount of time spent studying or completing designated activities. This is referred to as "learning control." In addition to this, regulating the learning environment and improving communication that takes place throughout the process of learning are also aspects of learning control that are discussed in Taipjutorus et al.'s (2012) research. It is vital to match the design and implementation of online learning programs with the preferences of the students enrolled in these programs to achieve a satisfying reaction and level of engagement from the students. Positive learning attitudes may be established by adapting the preferences of the learner, which leads to improved participation in the learning activities connected with online learning. (Tang et al., 2021).
H3: Learner Control has a significant impact on Readiness Levels for e-Learning.

2.6. Motivation for Learning

The orientation of the student's motivation, whether it comes from inside or outside the student, has a substantial impact on the student's learning performance. Learners' efforts to align with their own wants may be considerably facilitated by the "motivation in learning" component, which can also improve the learning process as well as the learner's ability to retain and recall knowledge. Students with low learning motivation often exhibit a tendency toward laziness, which can ultimately lead to their failure in the learning process (Hamzah et al., 2022). Belhaj et al. (2022) found in their study that the shift to online learning has encountered difficulties due to the challenge of motivating students. According to Hung et al. (2010), it is essential to have a better understanding of the perspectives and preferences of students on their educational experiences to improve the design, production, and implementation of educational materials.
H4: Motivation for Learning has a significant impact on Readiness Levels for e-Learning.

2.7. Online Communication Self-Efficacy

Asynchronous text-based online conversations provide students greater freedom of time and location and have been shown to improve knowledge production at higher-order cognitive levels (Yilmaz, 2016). According to Kalogiannidis et al. (2022), online interactions between people who live far apart can serve as a substitute for face-to-face contact. The importance of knowing how students interact with their online teachers and classmates grows. To be successful in online courses, students must be confident in their ability to communicate successfully online and possess the appropriate online

communication skills. Students' confidence in their own abilities to study in a digital environment hinge in large part on their level of self-efficacy regarding online communication. It is projected that by the year 2020 (Dwiyanti).
H5: Online Communication Self-Efficacy has a significant impact on Readiness Levels for e-Learning.

3. Research Methodology

This research employs a literature review approach to gather information and gain insights on the research topics by examining the theories presented in books, articles, journals, online sources, and other references. Subsequently, data collection is conducted through mixed methods, in which online questionnaires with a Likert scale are distributed to the research participants. The participants are individuals who are learning the tax brevet program. An online questionnaire will be utilized, employing a Likert scale that enables calculations based on 6-point intervals.
Based on the overall reliability value, the Likert scale with 6 points demonstrated a higher Cronbach's Alpha Coefficient reliability compared to the Likert scale with 5 points (Chomeya, 2010).

3.1. Research Model

Preparation is a critical success aspect for the adoption of an e-learning model to gain knowledge, and this is true regardless of the other variables at play (Albarrak, 2010). Thus, the author plans to investigate what factors significantly affect the successful implementation of e-learning readiness. Previous studies by Saintika et al. (2021) created the model that was employed and modified in this study from the student's perspective. The model shown in Figure 2

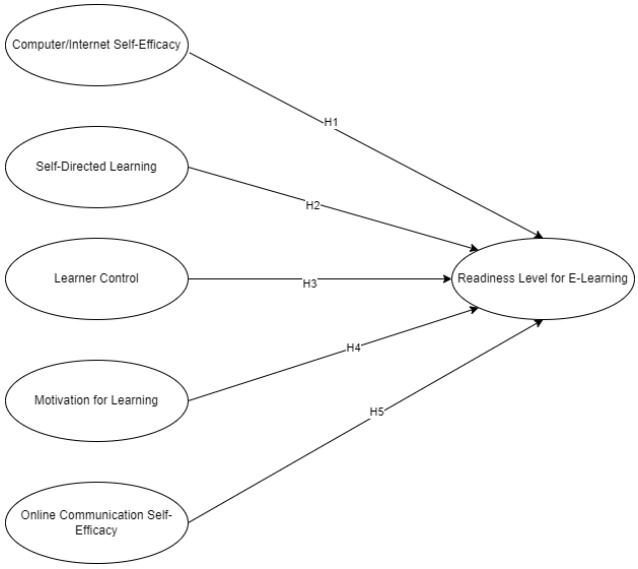

Fig. 2: Research Framework

3.2. Survey Design and Analysis Method

The questionnaire was distributed to students who participated in the online tax brevet program. The participants in the study completed a self-administered questionnaire, which was distributed through various social media platforms. A total of 180 respondents actively participated and provided their responses to the questionnaire. The questionnaire is divided into three sections. The first section focuses on gathering demographic information about the respondents. The second section consists of statements or items that measure independent variables, namely computer/internet self-efficacy, self-directed learning, learner control, motivation for learning, and online communication self-efficacy. In the third section, open-ended questions are asked about factors that are obstacles and challenges to learning with online learning, according to the five factors previously mentioned.

Partial least squares (PLS) are a collection of iterative algorithms that use least squares principles to perform various multivariate techniques. These techniques encompass both explanatory and exploratory analyses, including regression, path modeling, principal component analysis, and multiblock data analysis. PLS algorithms are known for their versatility and ability to handle complex data structures while providing valuable insights into the relationships between variables. (Esposito Vinzi & Russolillo, 2012).

The statistical analysis of this study was conducted using SmartPLS 4 software. The analysis was conducted with a 95% level of confidence, a 5% margin of error, and a maximal variance proportion (p) of 0.5. The analysis process included descriptive statistics, tests of validity and reliability, and testing of hypotheses via regression analysis.

4. Results and Discussion

4.1. Demographic Student Profile

Based on demographic data analysis, it was discovered that a considerable majority of the participants (39%), followed by the age group of 17–24 years old (37%), belonged to the age group of 25–34 years old. There were also individuals aged 35–44 years old (17%), 45–54 years old (6%), and 55–65 years old (1%). According to the study of respondent domicile, 63% of the participants live in the Jakarta region, while 37% live outside of Jakarta. In terms of employment, the statistics show that 35% of respondents work in private enterprises, while 29% are university students. Furthermore, 11% of respondents work in state-owned enterprises, 9% are self-employed, 8% are affiliated with non-governmental organizations, 7% work for the government, and 1% are either retired or not actively employed.

4.2. Validity and Reliability Testing

The findings of the validity and reliability study are shown in Table 1. The results show that all variables have Cronbach's Alpha and Composite Reliability values of 0.7 or higher, indicating a high level of internal consistency. Furthermore, the average variance extracted (AVE) values for all variables are greater than 0.5, indicating sufficient convergent validity. These findings support the study's-built in items' reliability and validity.

Table 1: Validity and Reliability Test

Variables	Cronbach's Alpha	Composite Reliability	AVE
Computer/internet Self-Efficacy	0.784	0.825	0.608
Self-Directed Learning	0.825	0.849	0.592
Learner Control	0.74	0.786	0.57
Motivation for Learning	0.82	0.836	0.65
Online Communication Self-Efficacy	0.728	0.776	0.644
Readiness Level for E-Learning	0.823	0.826	0.739

4.3. Hypothesis Testing

The study utilized significance testing or hypothesis testing to assess the extent of the influence of an independent variable on explaining the dependent variable. A two-sided (two-tailed) significance level of 5% was employed. Therefore, if the p-value is less than 0.05, it can be considered statistically significant. The summarized model used in the study is presented in Table 2.

Table 2: R-Square

Variable	R-square
Readiness Level for E-Learning	0.513

Chin (1998) categorizes R-square values as strong when they exceed 0.67, moderate when they are above 0.33 but below 0.67, and weak when they exceed 0.19 but fall below 0.33. Based on the findings in Table 2, it can be interpreted that the R-Square value is 0.513, indicating a strong relationship. This suggests that the Readiness Level for E-Learning variable has a moderate or substantial influence, accounting for approximately 51% of the variance.

Subsequently, the analysis will be conducted using bootstrapping in the SmartPLS application, employing a total of 5,000 subsamples and applying complete bootstrapping. Through this process, T-Statistics and P-Values will be obtained to evaluate the significance of the variables and assess their impact.

Table 3: Hypotheses Test Summary

Variables	T statistics (|O/STDEV|)	P values	Result
Computer/Internet Self-Efficacy → Readiness Levels for E-Learning	0.301	0.763	Not Significant
Self-Directed Learning → Readiness Levels for E-Learning	1.57	0.116	Not Significant
Learner Control → Readiness Levels for E-Learning	2.097	0.036	Significant
Motivation for Learning → Readiness Levels for E-Learning	0.061	0.951	Not Significant
Online Communication Self-Efficacy → Readiness Levels for E-Learning	1.533	0.125	Not Significant

The results of the hypothesis testing presented in Table 3 indicate that out of the five initially proposed hypotheses, only one was accepted. This includes H3, which states that Learner Control has a significant impact on the Readiness Level for E-Learning. On the other hand, four hypotheses were rejected: H1 (Computer/Internet Self-Efficacy → Readiness Level for E-Learning), H2 (Self-Directed Learning → Readiness Level for E-Learning), H4 (Motivation for Learning → Readiness Level for E-Learning), and H5 (Online Communication Self-Efficacy → Readiness Level for E-Learning). According to the accepted hypothesis, it can be theoretically implied that learner control has a significant effect on the readiness level for e-learning. Learner control, as stated by Taipjutorus et al. (2012) and Tang et al. (2021), Encompasses the ability to regulate the learning environment and improve communication during the learning process.

However, the new findings show that computer/internet self-efficacy, self-directed learning, and online communication self-efficacy do not have a significant impact on the readiness level for e-learning. This contrasts with previous research by Tang et al. (2021); Dwiyanti et al. (2020); Kalogiannidis et al. (2022). On the other hand, motivation for learning is supported by previous research conducted by Belhaj et al. (2022) The transition to online learning has encountered challenges in motivating students, which contradicts the findings of Hung et al. (2010). Gaining a deeper understanding of students' perspectives and preferences regarding their educational experiences remains crucial for improving the

design, production, and implementation of educational materials.

Open-ended questions are presented to understand the obstacles and challenges in implementing online learning. Results in Table 4

Table 4: Open question result

Variables	Respondent
Computer/Internet Self Efficacy	58
Learner Control	45
Self-Directed Learning	38
Motivation for Learning	23
Online Communication Self-Efficacy	16

Table 4 shows the responses from the survey's participants, which may be summarized as follows: maintaining a consistent study routine can present challenges for individuals as they contend with factors such as work-related fatigue and a lack of self-motivation to review learning materials. The initiation of the learning process necessitates dedicated time and a strong internal drive. The motivation to study is greatly influenced by an individual's willingness and efforts to enhance their own abilities. Independently comprehending the material and overcoming feelings of laziness when studying alone can further impede one's motivation for self-learning. The reliance on external assistance and struggles with maintaining consistency in studying can lead to confusion and make independent learning difficult. Moreover, the desire for interaction and peer discussion can intensify confusion and hinder self-learning. The instability of internet connections and the absence of hands-on practice in online learning can also hinder the process of self-directed learning.

Learner control has a notable impact on the level of readiness for e-learning, as evidenced by the findings of an open-ended question where learner control emerged as one of the top two challenges in online learning. This practical implication is that the degree of learner control significantly influences the preparedness of participants to engage in electronic learning. As the level of learner control increases, participants become more equipped to actively participate in e-learning. The ability of participants to regulate the learning process, encompassing tasks such as time management, goal setting, and strategy selection, empowers them to learn more effectively through digital platforms.

An institution can use a robust Learning Management System (LMS) that provides user-friendly interfaces, tutorials, and technical support. The LMS serves as a centralized platform where participants can access course materials, engage in discussions, submit assignments, and receive feedback. Personalized learning paths can be implemented using adaptive learning systems, allowing participants to tailor their learning experiences to their specific needs and goals, fostering self-directed learning. To enhance motivation for learning, institutions can incorporate gamification elements such as badges, leaderboards, and rewards, creating a sense of achievement and healthy competition.

Interactive learning activities such as simulations, virtual labs, and multimedia presentations make the learning experience more engaging and hands-on, promoting the development of computer and internet self-efficacy and online communication skills. Discussion forums and collaboration tools within the e-learning platform encourage online communication and collaboration, enabling participants to interact with peers, exchange ideas, and engage in collaborative problem-solving. Implementing progress tracking features and providing timely feedback on participants' performance helps maintain motivation and offers guidance for improvement, supporting self-directed learning. Finally, institutions can establish online support systems, including chat support and monitored discussion boards, to build a sense of community and provide real-time guidance and support to participants.

5. Conclusion

According to the study, learner control emerged as the sole factor that significantly influenced readiness for e-learning, highlighting the importance of providing learners with autonomy and control in their online learning experiences. However, factors such as computer/internet self-efficacy, self-directed learning, motivation for learning, and online communication self-efficacy were found to have no significant impact on e-learning readiness. It is still crucial to encourage active participation and engagement in online learning activities, as well as enhance computer and internet self-efficacy and online communication self-efficacy, to facilitate effective interaction and collaboration within the e-learning environment. The cultivation of self-directed learning abilities and the exertion of control over the learning process remain essential for participants to optimize the benefits of e-learning. Active involvement in online learning activities, such as engaging in discussions and collaborating with peers, continues to be necessary.

Various strategies can help institutions improve the self-efficacy, motivation, and online communication of e-learning participants. (1) A comprehensive Learning Management System (LMS) can offer intuitive interfaces, tutorials, and technical support. (2) Personalized learning paths, (3) adaptive learning systems, (4) gamification, (5) interactive learning activities, (6) discussion forums, and collaboration tools can encourage self-directed learning and boost motivation. Progress monitoring and timely performance feedback also facilitate self-directed learning. The establishment of an online support system fosters community and real-time direction.

6. Limitations and Future Study

The current study has several limitations. First, the study sample consisted of only 180 participants from the tax brevet program, which may limit the generalizability of the findings. Second, the geographical scope was restricted to Jakarta and its surrounding areas, which may not represent the diversity of e-learning readiness in other regions. Third, the factors examined in the study included computer and internet self-efficacy, self-directed learning, learner control, motivation for learning, and online communication self-efficacy.

Future studies should expand the scope of the research by including larger samples or incorporating educational institutions from various levels and diverse contexts to enhance the depth of understanding regarding the factors that impact readiness for e-learning implementation. By including a broader range of participants, researchers can gather more comprehensive data that captures a wider array of perspectives and experiences.

Additionally, investigating factors such as instructors' aspects and institutional policy support, which refers to the level of administrative backing and resources allocated to e-learning initiatives, can shed light on the role of organizational structures in facilitating successful implementation. Examining perceptions of technology's usefulness and ease of use can provide insights into how individuals perceive and interact with e-learning tools, potentially identifying barriers or areas for improvement. Furthermore, exploring the influence of social and cultural factors on e-learning adoption can help uncover contextual nuances and inform strategies for effective implementation across diverse educational settings. By addressing these aspects in further research, a more nuanced and comprehensive understanding of e-learning readiness can be achieved, supporting the development of tailored approaches to maximize the potential of online learning in educational institutions.

References

Belhaj, Alothman, Hilal, & Jibai. (2022). An Empirical Study on the Factors Affecting Students' Motivation Toward Online Learning During Covid-19 Pandemic Belhaj. *Journal of Logistics, Informatics and Service Science*, *Vol. 9 (2022)* (No.4), 149–168. https://doi.org/10.33168/LISS.2022.0411.

Zhang, Zhang, & Kim. (2021). The Effect of UTAUT2 on Use Intention and Use Behavior in Online Learning Platform. *Journal of Logistics, Informatics and Service Science*, *8*(1), 67–81. https://doi.org/10.33168/LISS.2021.0105.

Hamzah, Purwati, Hamzah, & Deli. (2022). Measurement of Website Functionality and Perceived Usefulness in Increasing User Satisfaction through the Role of Technology Readiness for E-Learning Users. *Journal of System and Management Sciences*, *12*(5), 252–267. https://doi.org/10.33168/JSMS.2022.0515.

Kalogiannidis, Chatzitheodoridis, Savvidou, & Kagioglou. (2022). The Impact of Online Communications on Different Users' Social, Emotional, and Moral Competence as a Potential Business Communication Tool. *Journal of System and Management Sciences, 12*(5), 359–373. https://doi.org/10.33168/JSMS.2022.0521.

Aguila-Obra, D., Padilla-Meléndez, A. R., and A (2006). 'Organizational factors affecting Internet technology adoption'. Internet research, Vol 16, No 1, pp. 94–110.

Albarrak, A. I., Aboalsamh, H. A., & Abouzahra, M. (2010, November). Evaluating learning management systems for university medical education. In 2010 International conference on education and management technology (pp. 672-677). IEEE.

Ayu, M. (2020). Online learning: Leading e-learningat higher education. TheJournal of English Literacy and Education, 7(1), 47-54.

Chin, W. W. (1998). Commentary: Issues and opinion on structural equation modeling. MIS quarterly, vii-xvi.

Cholik, C. A. (2021). PERKEMBANGAN TEKNOLOGI INFORMASI KOMUNIKASI / ICT DALAM BERBAGAI BIDANG. 2(2), 6.

Doecke, E., & Maire, Q. (2019, August 05). Key skills for the 21st century: An evidence-based review [Paper presentation]. Research Conference 2019 - Preparing students for life in the 21st century: Identifying, developing, and accessing what matters.

Dwiyanti, K. T., Pratama, I. P. Y., & Manik, N. P. a. S. (2020). Online Learning Readiness of Junior High School Students in Denpasar. Indonesian.

Elyas, A. H. (2018). Penggunaan model pembelajaran e-learning dalam meningkatkan kualitas pembelajaran. Warta Dharmawangsa, (56).

Esposito Vinzi, V., & Russolillo, G. (2013). Partial least squares algorithms and methods. Wiley Interdisciplinary Reviews: Computational Statistics, 5(1), 1-19.

Haron, H., Natrah Aziz, N. H., & Harun, A. (2017). A Conceptual Model Participatory Engagement Within E-learning Community. Procedia Computer Science, 116, 242–250.

Hung, M., Chou, C., Chen, C., & Own, Z. (2010). Learner readiness for online learning: Scale development and student perceptions. Computers & Education, 55(3), 1080–1090. https://doi.org/10.1016/j.compedu.2010.05.004

Rafi, I., Nurjannah, F. F., Fabella, I. R., & Andayani, S. (2020). Peluang dan Tantangan Pengintegrasian Learning Management System (LMS) dalam Pembelajaran Matematika di Indonesia. Jurnal Tadris Matematika, 3(2), 229–248.

Saintika, Y., Astiti, S., Kusuma, D. H., & Muhammad, A. W. (2021). Analysis of e-learning readiness level of public and private universities in Central Java, Indonesia. Jurnal Ilmiah Teknologi Sistem Informasi, 7(1), 16. https://doi.org/10.26594/register.v7i1.2042.

Sardjono, W., Selviyanti, E., Hobri, & Azizah, R. (2021). The relationship between internet growth and implementation of the internet of things. Journal of Physics: Conference Series, 1836(1), 012030.

Simsek, A. (2012). Learner control. Encyclopedia of the Sciences of Learning, 1748-1750.

Sutton, K. K., & DeSantis, J. (2016). Beyond change blindness: embracing the technology revolution in higher education. Innovations in Education and Teaching International, 54(3), 223–228.

Taipjutorus, W., Hansen, S., & Brown, M. (2012). Investigating a relationship between learner control and self-efficacy in an online learning environment. Journal of Open, Flexible and Distance Learning, 16(1), 56–69. http://files.eric.ed.gov/fulltext/EJ1079899.pdf.

Tang, Y. M., Chen, P. C., Law, K. M., Wu, C. H., Lau, Y. Y., Guan, J., ... & Ho, G. T. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. Computers & education, 168, 104211.

Uppal, M. A., Ali, S., & Gulliver, S. R. (2017). Factors determining e-learning service quality. British Journal of Educational Technology, 49(3), 412–426.

Yilmaz, R. (2016). Knowledge sharing behaviors in e-learning community: Exploring the role of academic self-efficacy and sense of community. Computers in Human Behavior, 63, 373-382.

Chomeya, R. (2010). Quality of Psychology Test Between Likert Scale 5 and 6 Points. *Journal of Social Sciences*, *6*(3), 399–403. https://doi.org/10.3844/jssp.2010.399.403

Rosenberg, M. J., & Foshay, R. (2002). E-learning: Strategies for delivering knowledge in the digital age.