

Examining Readiness of E-Learning Implementation Using Aydin and Tasci Model: A Rural University Case Study in Indonesia

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Abstract. Humankind throughout the world are currently in a state of collapse due to the outbreak of Corona Virus Disease (COVID-19) which began in Wuhan, China. Later on, it was announced as the pandemic situation according to WHO. Overall countries have implemented social distancing, while Indonesia has implemented a policy of learning from home, working from home, and worship at home or better known as work from home (WFH). This study aimed to determine the level of readiness to implement e-learning during WFH due to the pandemic COVID-19 spreads along with the challenges in the 4.0 revolution in millennials. The model that used was the Aydin & Tasci model which measures four main factors namely technology, innovation, people, and self-development. Data collection was conducted online using Google Form, while data processing uses a descriptive statistical method mapped based on the Aydin & Tasci version of the e-learning readiness index. The results showed that the overall e-learning readiness index might indicate that the system was ready to be implemented, but required a slight increase in several factors, namely innovation increase, human, and self-development factors. The results and discussion of the study showed the readiness of e-learning to follow the demands of Revolution 4.0, even though it was done during WFH because of the COVID-19 pandemic outbreak.

INTRODUCTION

There is no denying that the spreads of Coronavirus (COVID-19) so quickly throughout the world, causing human unrest and sorrow to mourn. Starting from Wuhan China since the end of January 2020. So that the World Health Organization (WHO) has set the phenomenon of the incident as a pandemic [1]. A pandemic occurs when an infectious disease spreads easily from human to human in various places throughout the world. Until the last two weeks, COVID-19 cases outside China have increased thirteen-fold, causing anxiety for the community all over the world. The spreads of COVID-19 continues to experience massive spikes, in several countries. COVID-19 can attack the respiratory system. Word O Meters records no less than one and a half (1.5) million cases in almost all countries in the world, and these cases are still increasing every day. Based on their data last Thursday 9 April 2020, Word O Meters, recorded no less than 1.508.925, positive cases COVID-19 [2]. The Indonesian government is faced

with a great challenge to manage and prevent the effects of the co-19 distribution, which affects all aspects of life, including the education sector. This has forced all policies regarding social distancing as well as physical distancing, to be carried out as an effort to minimize and prevent co-19 distribution. In general, the policy is made as an effort to slow down the rate of distribution of COVID-19 in the community. On the other hand, WHO uses several terms namely social distancing, physical distancing, quarantine, and isolation. One of the attempts to prevent the distribution of COVID-19 in the educational environment, the Ministry of Education and Culture, responds with this policy named "learning from home", through learning in the network and issuing a policy of eliminating the National Computer-Based Exams for this year [3].

The concept of information technology-based learning has an influence on conventional educational processes into digital form. Utilization of information technology in the world of education provides advantages in the form of effectiveness and flexibility in learning this is due to the many learning resources that can be found, and the learning process is not limited by time and place. It turns out that information technology-based learning can make students more active in learning. One use of information technology in learning is known as e-learning. E-learning can be interpreted as learning using electronic devices. Learning to use e-learning gives flexibility to lecturers and students [4]. Besides having advantages, e-learning also has disadvantages, such as lack of interaction between lecturers and students. Less interaction while learning using e-learning that can be done anywhere caused by no face to face directly in class (online) [5].

E-learning does not necessarily apply in the school environment, to achieve the success of educational goals depends on the learning process experienced by students. The learning process to achieve educational goals has many factors, one of which psychological factors in it is readiness [6]. Readiness is a condition when someone ready to be given certain actions. E-learning readiness is defined as the degree to which the community is eligible to participate in world networks. This is measured by assessing the relative progress of an area that adopts information technology and its application [7]. The application of e-learning requires readiness in both infrastructure and organizational culture. This readiness is known as e-learning Readiness. Measurement of e-learning Readiness is carried out so that the organization can know the level of readiness. By knowing the level of readiness, the organization can determine the policy or strategy to be determined [8,9]. Moodle is one of the applications that are widely used in e-learning, in which it can combine several features of the Learning Management System (LMS) and some features of Social Networking, this makes media learning more interesting and easier to use, which later is better known as Social Learning Network. Some features contain in the LMS to support e-learning such as assignments, quizzes, and assessments [10].

In its application, e-learning requires readiness in terms of infrastructure and organization, in addition it is also necessary to measure the level of readiness. Measurement of e-learning readiness is based on the model used, so the selection of components of e-learning Readiness is used as a reference in shaping the model into its benchmarks. The e-learning readiness model is not limited concerning the preparation before being implemented, but can also be done for organizations that have implemented e-learning, this is an evaluation that can be used as a reference in making further improvements. The following factors can be used as benchmarks for readiness, which are: technological factors, innovation factors, human factors, and self-development factors [11]. These factors measure how much resource they owned, not only the equipment factor but also measure the skills and attitudes of users and managers.

In this paper, the researchers try to see the level of e-learning readiness using the Aydin & Tasci model which measures four main factors. The data was collected online using Google Form, which then processed using descriptive statistical methods mapped based on the Aydin & Tasci Model.

LITERATURE REVIEW

There are some of literature that can support to conduct this research, including the Aydin & Tasci model, as well as several previous studies that conducted research regarding the implementation of E-learning readiness in higher education [12] in Indonesia generally. The type of research conducted in this study is E-Learning Readiness. E-Learning itself can be defined as learning activity or learning experiences that are delivered or activated electronically. While e-learning readiness is a research conducted by a surveying of several users based their e-learning experiences, descriptive analysis method. Descriptive research is research conducted by comparing one variable with another so that it can know the value of that variable. The data was obtained from a population sample of research conducted and analyzed according to the statistical methods used.

Readiness in the implementation of e-Learning (e-Learning Readiness) is the physical and mental readiness of an organization to carry out, take action, and create e-Learning experiences. E-Learning Readiness illustrates how ready an organization is in several aspects to implement e-Learning. Readiness is not only for teachers or students but the readiness of the organization itself. One background why e-Learning readiness adaptation and implementation become necessary is the existence of obstacles or barriers in this adaptation and implementation. Specifically, there are seven main barriers in the adaptation and implementation of e-Learning [13]: (1) Barriers, time, language and attitude (2) Barriers in learning (3) Situational barriers (e.g. duration of learning and disruption in learning.) (4) Organizational Obstacles (e.g. organizational culture, lack of time to study, interpersonal barriers, limited availability of courses, problems in registration, failure to involve employees in planning or decision making.) (5) Technology barriers (e.g. the quality of Learning Management Systems (LMS), connectivity, training, navigation, technical support, data loss, and the inability to transfer data.) (6) Obstacles to e-Learning Content (e.g. student expectations of the subject, the relevance of the lesson, the specific content, the quality of the content and the assessment system.) (7) Instructional barriers (e.g. lack of progress reports and feedback, limited student involvement, limited teaching design, limited reference material, access and navigation, use of multimedia, inconsistent instructions, excessive information, lack of interaction and coordination.)

METHOD

The model used in this study is the ELR Aydin & Tasci model to examine the readiness of e-learning implementation, where the ELR Aydin & Tasci Model with four readiness variables factors (e.g. technology, innovation, human, and self-development.) Furthermore, a questionnaire instrument is used to obtain relevant information to the purpose of research and obtain information about a problem simultaneously. The questionnaire was distributed to respondents with the aim of getting data that would become relevant information. The questionnaire used in this study used a Likert scale of 1 to 5 with respondents who were students. The research procedure is the stages carried out in research to obtain information. The research procedure is carried out to be able to reveal fully related to the issues raised in the study. The procedure of this research is as follows:

There are several factors, which influence in measuring the readiness of e-learning implementation which then affect into the questionnaire making. In general, the questionnaire is divided into four main sections, demographic data from respondents, gender, education level, school year and majors chosen by the respondent. In addition, researchers can also actually add other several questions. The next section is measuring the level of preparedness of the respondents, the next part is a statement of the extent to which respondents can answer the usefulness of e-learning so that they can trust that e-learning will facilitate and improve the quality of learning activity. The last part is an evaluation for respondents whether the need for assistance to be implemented in the e-learning. The first part of the questionnaire is a statement form with alternative responses to find out the characteristics of the respondents. It consists of four items aimed at gathering respondents' demographic data on characteristic statements (age, level of education, and position at university).

The second part, presents an alternative form of assessment in the form of a five-point Likert scale. The second part includes 36 items that collect data about respondents' perceptions about the university's readiness towards e-learning. The data needed in this study is grouped into 4 variables, according to the e-learning readiness component. Then for the framework developed in conducting research in this research can be seen in the following Table 1:

TABLE 1. Adapted ELR factors [11]

No	Variable	Resources	Skills	Attitudes
1.	Technology	Access to computer and internet (Q3, Q4,Q5)	The ability to use a computer and the internet (Q7,Q8,Q9)	A positive attitude towards the use of e-learning technology (Q10,Q15,Q18,Q19,Q34)
2.	Innovation	Obstacles (Q30)	The ability to adapt innovation (Q6,Q28)	Openness to Innovation (Q11,Q12,Q17,Q35)
3.	People	- Educated employees (Q1,Q2) - Experienced resource experts (Q24) - Pioneer of e-learning (Q25) - Service providers and external parties (Q29)	Ability to learn with technology (Q26,Q27)	
4.	Infrastructur	Anggaran (Q20,Q21,Q22)	The ability to manage time (Q14, Q36)	Trust in self-development (Q13,Q16,Q23,Q31,Q32,Q33)

For the category of readiness level, this research uses an index model adapted from Aydin & Tasci: Not Ready, a lot of preparation is needed to implement e-Learning (Index 1 ± 2.59); Not Ready, but only a few preparations are needed to implement e-Learning (Index 2.6 ± 3.39); Ready but needs improvement in implementing e-Learning (Index 3.4 ± 4.19); and Ready to implement e-Learning (Index 4.2 ± 5).

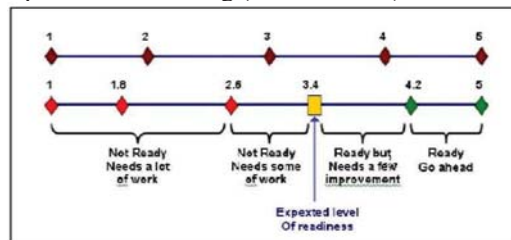


FIGURE 1. Aydin and Tasci Measurement Scale [11]

The questionnaire needs to be tested beforehand, whether its validity can be trusted or not. After that, it will be distributed to respondents, after the survey results are obtained in the validity and reliability test using statistical methods. In the analysis phase, this study uses an assessment model from the Aydin and Tasci models, where the average score is obtained from the Likert questionnaire. The scale starts with number 1 as the lowest score means strongly disagreeing to the highest score 5 means strongly agreeing. According to the assessment of Aydin and Tasci, the model that being declared truly ready to implement e-learning has an average score of 3.4. Hence, it means that if the average score is below 3.4, it is not ready yet to be implemented. Figure for model measurements from Aydin and Tasci as in Fig. 3. After the average score is obtained by carrying out a statistical process, the next percentage is to compare the average score, which obtained from respondents' demographic data, make suggestions and recommendations for improvement, and make conclusions. Respondents in this study consist of students, lecturers, and alumni for various scientific fields. The data processing is done by grouping the results of the questionnaire data according to the research variables, looking for the average value in each group of research variables, determine the level of readiness for each group of variables, and the level of readiness for implementing e-learning at the institutional level.

The questionnaire was distributed to 77 respondents by giving 36 items about e-learning questions exclude the questions about the respondent's background. The research instruments were interviews and questionnaires. The questionnaire was adopted from previous similar studies and added some questions, which customized to the characteristics of Indonesian tertiary institutions as an educational institution. The questionnaire consists of two parts, the first part is in the form of questions about self-identity and the second part is closed questions covering all research variables. A questionnaire rating scale that uses a Likert scale (1-5). Examples of questionnaire questions can be seen in Table 2 below:

TABLE 2. A List of Questions

No	Question	Factor
Q1	I understand what e-learning	People
Q2	Students understand what e-learning	People
Q3	The campus has an information technology infrastructure that supports e-learning	Technology
Q4	The campus provides internet access in the school environment	Technology
Q5	The speed of internet access in campus is sufficient to support e-learning	Technology
Q6	Students can adapt changes / innovations easily	Innovation
Q7	Students have basic computer skills (typing, accessing the internet, editing files, etc.)	Technology
Q8	Students have basic internet skills (email, searching, downloading, etc.)	Technology
Q9	Students have the ability to follow instructions on a computer screen to complete an assignment	Technology
Q10	Students want to use e-learning to complete their assignments	Technology
Q11	Students receive every technological update (using digital documents rather than hardcopy)	Innovation
Q12	Students accept changes in the learning process by implementing e-learning	Innovation
Q13	Students enjoy in learning by accepting changes in the learning process by implementing e-learning	Self-development
Q14	Students take time to learn to accept changes in the learning process by implementing e-learning	Self-development
Q15	Lecturers positively welcomed the application of e-learning in learning and giving daily tasks	Technology
Q16	The college senate believes that e-learning can help and improve the learning process	Self-development
Q17	Changes the learning process by implementing e-learning can be accepted by the majority of campus members	Innovation
Q18	Agree if e-learning becomes the flagship program on campus	Technology
Q19	Students accept changes that require the use of technology in e-learning to complete daily assignments	Technology
Q20	There are funding sources to make a budget in implementing e-learning on campus	Self-development
Q21	The college senate has time to discuss e-learning budget funds	Self-development
Q22	Campus held e-learning training	Self-development
Q23	Campus has the potential to implement e-learning	Self-development
Q24	Lecturers have experience managing and evaluating e-learning based learning	People
Q25	There are lecturers who pioneered the use of e-learning on campus	People
Q26	Students can use e-learning	People
Q27	Lecturers can use e-learning	People
Q28	Lecturers can adapt changes / innovations easily	Innovation
Q29	There are offers of assistance from outside parties who are experts in the e-learning field	People
Q30	There are internal / external campus problems that hamper the implementation of e-learning	Innovation
Q31	Campus is ready to implement e-learning	Self-development
Q32	Lecturers are ready to implement e-learning	Self-development
Q33	Students are ready to apply e-learning	Self-development
Q34	The lecturer receives every technological update (using digital documents rather than hardcopy)	Technology
Q35	Lecturers accept changes in the learning process by implementing e-learning	Innovation
Q36	Lecturers take time to learn to accept changes in the learning process by implementing e-learning	Self-development

The next step is processing the data collected from the results of the questionnaire. Data processing is carried out by grouping questionnaire [14] result data based on research variables according to the research mind set. Using descriptive statistics, which is looking for the average value of all questionnaire answers for each group of research variables, which then, determine the e-Learning Readiness index for each group of research variables according to

the index criteria used the Aydin & Tasci version. Next, determine the College's e-Learning Readiness index and analyse the e-Learning Readiness index obtained, comparison of measurement results using another framework, and the e-Learning Readiness (ELR) toolkit. Comparisons discussion include comparison of research dimensions, comparison of results on research dimensions and comparison of overall readiness measurement results.

The collected data is then analysed to produce the desired information. Data analysis method used is descriptive statistics that will explain the research variables and will produce an index of readiness. From each indicator and research variable, the average value will be searched. The questionnaire rating scale that uses a Likert scale (1-5) is the same as the scale of the readiness index which is used as an assessment of the measurement of e-Learning Readiness in this study so that no data conversion is performed. The average results obtained are then mapped against Aydin Tasci's version of the e-Learning Readiness index. The mapping results show the e-Learning Readiness index and will illustrate the level of organizational readiness in implementing e-Learning. Calculation of the average value for each variable of this study shows the e-Learning Readiness index for each of these variables. To determine the overall organizational index, an average calculation of all research variables is performed. Furthermore, for the sake of validation of the proposed framework in the study, a measurement of the level of readiness for implementing e-Learning with the proposed framework is compared, with the level of readiness using the ELR (E-Learning Readiness) calculation.

RESULT AND DISCUSSION

Tested the level of readiness for the application of e-learning in rural universities with the ELR Aydin & Tasci model was conducted on 77 students, data obtained in the form of questionnaire results used Google Form. Tested instruments in this study used a validity test and a reliability test. The study was conducted on April 17, 2020 until June 6, 2020 STMIK Sumedang. In this study the validity test used was the construct validity test by correlating the score of each item statement with the total score of the item in question using the product moment correlation formula with the number of 36 questions on the form. Validity test calculations used SPSS. Furthermore, after the correlation coefficient was obtained, then test the significance to determine the validity of each item by using r_{table} . If the calculated value is greater than r_{table} , the item concerned is valid and vice versa. From the results of the calculation of the validity test found that from 36 questions on the questionnaire found no invalid questions. While the reliability test in this study obtained a value of 0.749 included in the category of high reliability in accordance with the category of research instruments. It can be concluded that the questionnaire instrument test in this study was reliable.

Respondents who filled in the forms were 77, then analyzed using the Aydin & Tasci ELR model. This form of research consist of 36 questions with alternative answers "Strongly Agree" with a score of 5, "Agree" with a score of 4, "Neutral" with a score of 3, "Disagree" with a score of 2, and "Strongly Disagree" with a score of 1. Then it was categorized according to the ELR assessment submitted by Aydin & Tasci. The measurement of the level of readiness for the application of ELR on technological factors was assessed from 3 sides namely resources, skills and attitudes. The number of questions for this technological factor was 11 items showed in the following table.

TABLE 3. ELR Calculation of Technology Factors

	Question	Total	Average	Average
Resource	Q3	345	4.48	
	Q4	363	4.71	4.57
	Q5	349	4.53	
Skills	Q7	335	4.35	
	Q8	336	4.36	4.38
	Q9	340	4.42	
Attitudes	Q10	316	4.10	
	Q15	335	4.35	
	Q18	320	4.16	4.14
	Q19	306	3.97	
	Q34	318	4.13	
AVERAGE SCORE OF FACTORS				4.36

Based on Table 3. that the readiness score for technological factors includes 3 aspects, which are: resources with a score of 4.57; skills with a score of 4.38; Attitude with a score of 4.14. Then the ELR calculation results from all aspects for technological factors obtained a score of 4.36, this reflects that the technological factors are ready so that the application of e-learning can be continued. The measurement of the level of readiness for the application of ELR on innovation factors is assessed in terms of resources, skills and attitudes. The number of questions for the innovation factor is 7 items shown in Table 4.

TABLE 4. ELR Calculation of Innovation Factors

	Question	Total	Average	Average
Resource	Q30	285	3.70	3.70
Skills	Q6	330	4.29	4.14
	Q28	307	3.99	
Attitudes	Q11	305	3.96	4.03
	Q12	308	4.00	
	Q17	307	3.99	
	Q35	321	4.17	
AVERAGE SCORE OF FACTORS				3.96

Based on Table 4. that the innovation factor for resources has a score of 3.70; then the skills have a score of 4.14; and attitudes have a score of 4.03, therefore the innovation factor has a value of 3.96 included in the ready category. The measurement of the level of readiness for the application of ELR on human factors is assessed from 2 aspects, namely resources and skills. The number of questions for the human factor is 7 items shown in Table 5.

TABLE 5. ELR Calculation of People Factors

	Question	Total	Average	Average
Resource	Q1	330	4.29	3.95
	Q2	309	4.01	
	Q24	284	3.69	
	Q25	313	4.06	
	Q29	286	3.71	
Skills	Q26	322	4.18	4.12
	Q27	313	4.06	
AVERAGE SCORE OF FACTORS				4.04

Based on Table 5. Calculation of readiness for the application of E-learning human factors includes 2 aspects of measurement, which are: resources, where the value is 3.95; then the aspect of skills, has a value of 4.12. Then the calculation results for human factors obtained a score of 4.04, therefore it can be said that the human factor is ready, although it still needs a slight increase. The measurement of the level of readiness for the application of ELR on self-development factors is assessed from 3 aspects namely resources, skills, and attitudes. The number of questions for the human factor is 11 items shown in Table 6.

TABLE 6. ELR Calculation of Self Development Factors

	Question	Total	Average	Average
Resource	Q20	330	3.90	4.01
	Q21	292	3.79	
	Q22	334	4.34	
Skills	Q14	315	4.09	4.09
	Q36	314	4.08	
Attitudes	Q13	327	4.25	4.19
	Q16	314	4.08	
	Q23	336	4.36	
	Q31	318	4.13	
	Q32	325	4.22	
	Q33	314	4.08	
AVERAGE SCORE OF FACTORS				4.09

Based on Table 6. Calculation of readiness for the application of E-learning self-development factors include 3 aspects of measurement, which are: in the form of an internal budget for e-learning getting a score of 4.0, the aspects of skills in the form of measurement of the ability to manage time reach to score 4.09, and while the attitude aspect in the form of Confidence in self-development scores 4.19. Therefore, the self-development factor is included in the ready category, although it still requires a slight increase.

CONCLUSION

The results of this study can be concluded that the level of readiness to implement e-learning has a score of 4.11, which reflects that e-learning is ready to be implemented even though it still requires an increase in several factors, such as innovation factors with a score of 3.96, and human factors with a value of 4.04, and a factor of self-development with a value of 4.09. While the technology factor has a value of 4.36.

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