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An Analysis on the Needs Assessment of Online Learning Program in Faculty of Engineering, Universitas Negeri Padang

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Abstract

The current learning paradigm is oriented to the XXI century learning and the development of the 4.0 Industrial Revolution. It is relevant to the emergence of the COVID-19 outbreak and the new normal era where the learning is held online. Conducting online learning needs a good readiness from educational institutions, teaching, e-learning quality, infrastructure, and many more to support the online learning implementation. The significance of this study was to analyze the needs for indicators of online learning instruments, to know the weakness and the strength levels of each required indicator as well as the accuracy of instruments for online learning assessment conducted later. This study aimed to analyze the needs assessment for the online learning program during the COVID-19 pandemic. This study was carried out by conducting a survey. A total of 128 samples were selected for this study consisted of 115 students and 13 lecturers from 6 study programs in the Faculty of Engineering, Universitas Negeri Padang. The data collection instrument was questionnaire adapted from Al-Shagran (2017), the need analysis of the evaluation of online learning programs. Data analysis was conducted descriptively. The result showed that the required indicators for assessment started from the design of the e-learning management system technology provider and then followed by teaching staff.

Keywords: Needs Assessment, Vocational Education, E-learning, COVID-19

Introduction

Technology development brings changes in the transformation of digital learning. Digital transformation is not new, and it has been assisting higher educational institutions (Kopp et al., 2019; Leszczyński et al., 2018). The digital learning transformation opens the opportunity to have flexible learning held everywhere and every time. The freedom of learning affects the preparation of excellent or high-quality young generations to complete the educational opportunity in the 4.0 industrial era to establish the nation and country (Yamin & Syahrir, 2020). The 4.0 Industry is the fourth industrial revolution era that fulfills special needs during the COVID-19 crisis. This revolution has been started with the implementation of sophisticated manufacturing and digital information technology (Yamin & Syahrir, 2020; Javaid et al., 2020).

The current phenomenon has entered the COVID-19 outbreak, and it also has negative impacts on conventional educational activities in most countries in the world, including Indonesia (Legowati et al., 2021; Karani & Waiganjo, 2022). Similarly, the COVID-19 forces the academic experts to consider face-to-face learning and consider conducting remote learning to decrease the infection risk in students (Kaur, 2020). The effects of the coronavirus (COVID-19) are the government makes a regulation on the implementation of remote learning; the teachers teach their students from home; face-to-face teaching has been stopped; the students do not go to school, and the teachers work from home. The solution for that incidence is remote learning held online (Octaberlina & Muslimin, 2020).

Electronic online learning using e-learning has been considered the ideal way to mitigate the teaching and learning process during the pandemic (Octaberlina & Muslimin, 2020). Online learning is conducted electronically and can be held outside the class using the Internet (Verawardina et al., 2020). Therefore, learning is not only learning that can be done in the class but can also be held everywhere. Moreover, e-learning is introduced as a fundamental part of students' learning experience in higher education (Ellis et al., 2009). With e-learning, universities try to achieve their goals and

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impacts, such as high satisfaction, motivation, effectiveness, and efficiency. Nevertheless, many e-learning systems do not achieve the desired goals due to the non-compliance and lacking knowledge related to the technique and method for online information system development (Clegg et al., 2003).

The problem that occurred was that the online learning program held during the COVID-19 and new normal era was not effective yet (Febrianto et al., 2020; Hamid et al., 2020). According to (Haron et al., 2019), the importance of digitalizing learning content and assessment is crucial. Consolidating e-learning into traditional teaching is a troublesome duty with many complexities and challenges (Octaberlina & Muslimin, 2020).

Assessing e-learning is important (Al-Shagran, 2017). Further, according to (Basilaia & Kvavadze, 2020), it also suggested that online learning quality should be investigated in future studies. Therefore, before conducting an assessment, a need analysis for the indicators of the required assessment instrument should be performed first to get a relevant result (Novaliendy et al., 2015).

This study aimed at analyzing the needs for online learning programs comprising the assessment instrument indicators, such as the dimension consisting of Stakeholders, Organization, Technology, Environment, Pedagogic and curricular, and the e-learning system quality. The significance of this study was to analyze the required indicators for online learning to know the weakness and the strength levels of each required indicator and the accuracy of instruments for conducting online learning assessment later (Novaliendry et al., 2020).

Theoretical Online Learning

E-Learning utilizes the internet and web technology to create a learning experience. E-learning can be seen as an innovative approach used as a good delivery media design, user-centered, interactive, and learning environment with various facilities for anyone, anywhere, and anytime. By utilizing multiple attributes and sources of digital technology with other forms of appropriate learning materials and materials to be applied to an open, flexible, and distributed learning environment (Yang et al., 2020).

E-Learning is learning that uses ICT to transform the learning process between educators and students. This technology increases learning efficiency, effectiveness, transparency, and accountability. In addition, an E-Learning must also have the convenience of professional assistance on online course content (Pratama et al., 2020). From the description, it is clear that E-Learning uses information and communication technology to increase efficiency, effectiveness, transparency, accountability, and learning convenience; with the object is a learning service that is better, more interesting interactive, and attractive. The expected final result is an increase in students' academic achievement and skills and a reduction in costs, time, and energy for the learning process (Murtiyasa, 2012).

Definition of e-learning

The development of computer systems through networks is increasing. The Internet is a public network. Its existence is necessary both as a medium of information and communication carried out freely. One internets uses the distance learning system through electronic learning, better known as E-Learning. In general, there are two basic perceptions about E-Learning, namely:

- Electronic-based e-learning is learning that utilizes information and communication technology, especially in the form of electronics. That is, not only the internet, but all electronic devices such as films, videos, cassettes, OHP, Slides, LCDs, projectors, and others.
- Internet-Based is learning uses internet facilities that are online as the main instrument. That is, have the perception that e-learning must use the online internet, namely computer facilities connected to the internet (Mohd Idriki & Tan, 2021). This means that learners accessing learning materials are not limited by distance, space, and time. They can be anywhere and anytime (anywhere and any time).

Different opinions of different experts support both perceptions. Some experts who support the idea of e-learning as electronic-based include Hastungkara & Triastuti (2019), explaining e-learning is learning where learning materials are delivered through electronic media such as the internet, intranet, satellite, TV, CD-ROM, and others. So, you don't have to have the internet because the internet is a part of e-learning. This opinion is supported by Jenkins and Hanson (2003), that e-learning is a learning process facilitated and funded through information and communication technology (Novaliendry et al., 2020).

Experts who support the understanding of e-learning as a medium that uses the internet, including e-learning, is "the use of internet technology to deliver a series of solutions that can increase knowledge and skills". Rosenberg (2001) E-learning or internet enable learning uses teaching methods. And technology as a means of learning (Dr. Jo Hamilton-Jones).

E-learning is composed of two parts: 'e', which means 'electronica', and 'learning', which means 'learning'. So, e-learning means learning by using electronic device assistance services. So, in its implementation, e-learning uses audio, video, computer equipment, or a combination of the three.[9] In other words, e-learning is learning which in its implementation, is supported by technology services such as telephone, audio, videotape, satellite, or computer transmission (Tafiardi, 2005) In line with that, Onno W. Purbo (in Amin et al., 2021) explains that the term " e" in e-learning is all technology used to support teaching efforts through internet electronic technology. Internet, satellite, audio/videotapes, interactive tv, and CD-ROM are electronic media used. Teaching may be delivered simultaneously (synchronously) or at different times (asynchronously).

In brief, William Horton argued that (in Sembel, 2004) e-learning is a web-based learning activity (which can be accessed from the internet). Not much different from that Feasey (2001) (in Siahaan, 2008) and Brown (2008) and simply say that e-learning is a learning activity that utilizes networks (internet, LAN, WAN) as a method of delivery, interaction, and facilities supported by various other forms of learning services. In addition, some describe the meaning of e-learning more broadly. E-learning materials do not have to be distributed online through local networks or the internet (Novaliendry et al., 2021). Interaction using the internet can be done online and real-time or offline or archived. Offline distribution using CD/DVD media is also an e-learning pattern. In this case, applications and learning materials are developed as needed and distributed through CD/DVD media, and then the learner can take advantage of the CD/DVD and learn where he is (Lukmana, 2006). The characteristics of this e-learning include:

- Utilize electronic technology services to obtain information and communicate easily and quickly, both between teachers and students or between students and students.
- Utilizing computer media, such as computer networks (computer networks) or (digital media).
- Using learning materials to be studied independently (self-learning materials).
- Learning materials can be stored on a computer so that they can be accessed by teachers and students anytime and anywhere if they need it
- Utilizing computers for the learning process and to find out the results of learning progress, or educational administration and to obtain a lot of information from various sources of information.

E-learning facilitates interaction between students and subject matter. Students can share information or opinions on various issues relating to lessons or the needs of students' self-development. In addition, teachers can place learning materials and assignments that students must do in specific places on the web for students to access. According to needs, teachers can also provide opportunities for students to access certain learning materials and exam questions that can only be accessed by students once and within a specific time span (Kudos Website, 2002 in Siahaan, 2008).

E-Learning Function

There are at least 3 (three) functions of electronic learning for learning activities in the classroom (classroom instruction), namely (Siahaan, 2008):

- **Supplements (additional)**

It is said to function as a supplement if students have the freedom to choose whether to use electronic learning materials or not. There is no obligation/requirement for students to access electronic learning materials in this case. Even though it is optional, students who use it will undoubtedly have additional knowledge or insight.

- **Complement (complementary)**

It is said to function as a compliment if the e-learning material is programmed to complement the learning materials students receive in the classroom (Lewis, 2002). As a complement, e-learning materials are programmed to become enrichment or remedial materials for students participating in conventional learning activities.

As an enrichment, if students can quickly master/ understand the subject matter delivered by the teacher face-to-face, they are allowed to access e-learning materials that were specifically developed for them. The goal is to strengthen further student mastery of the subject matter presented by the teacher in class.

As a remedial, students have difficulty understanding the teacher's teaching material face-to-face in class. The goal is for students to more easily understand the subject matter presented by the teacher in class.

- **Substitution (substitute)**

The purpose of e-learning as a substitute for conventional classes is to flexibly manage lecture activities according to time and other daily activities. There are 3 (three) alternative models of learning activities that students can follow: 1) Completely face-to-face (conventional); 2) Partly face-to-face and partly via the internet, or even; 3) Completely via the internet.

E-learning in the implementation of learning, there are e-learning application models that can be used, namely:

Selective Model; This model is used if the number of computers in the school is minimal (for example, there is only one computer unit). In this model, the teacher must choose one of the available tools or media appropriate for delivering learning materials. If the teacher finds quality e-learning material from the internet, then the teacher is forced only to show the lesson material to students as demonstration material. If there is more than one computer in the school/classroom, students should be allowed to gain hands-on experience.

Sequential Model; This model is used if the number of computers in the school/class is limited (for example, only two or three computers). Students in small groups take turns using the computer to find the learning resources needed. Students use e-learning materials as reference material or to find new information.

Static Station; Model This model is used if the number of computers in the school/class is limited, as is the case in the sequential model. In this model, the teacher has several learning resources to achieve the same learning objectives.

One or two groups of students use e-learning materials to achieve the learning objectives set. Other students use other learning resources to achieve the same learning objectives.

Laboratory Model; This model is used if several computers in the school/laboratory are equipped with an internet network, where students can use it more freely (one student per computer). In this case, e-learning materials can be used as independent learning materials.

Method

This study was descriptive quantitative. This study used a survey method to know the need analysis of the assessment of online learning program in Faculty of Engineering, Universitas Negeri Padang (UNP). The instrument used in this study was the need analysis of the evaluation of online learning programs adapted from a study by Al-Shagran (2017) and in line with online learning theories. Besides, this study aimed to see the needs assessment indicators for online learning programs. A total of 128 samples were selected for this study consisted of 115 students, and 13 lecturers from 6 study programs in the Faculty of Engineering, Universitas Negeri Padang. Data collected were analyzed descriptively using mean and were ranked accordingly.

The population in this study consisted of 6 majors and 20 study programs in the architectural environment of UNP. The research sample used the purposive sampling technique by taking 2 study programs in each of the existing majors. The sample selected was 128 respondents.

Reliability to measure the consistency of measuring instruments (Sugiyono, 2013). If the measuring instrument is reliable, then the tool can be trusted. The instrument reliability test is carried out by testing the instrument. This reliability test uses Cronbach alpha. The results of the reliable test of the instrument are 0.852, with very high criteria so that the instrument can be used for testing.

Results and Discussion

The needs assessment was performed to identify the needs, goals, contents, implementations, targeted population, and intervention result (Cohen et al., 2002; Verawardina et al., 2020). It is essential to seek information about specific needs. The needs assessment is performed to know the need to assess an online learning program in the Faculty of Engineering, Universitas Negeri Padang, that is intended to evaluate online learning expected by the students and lecturers. Therefore, an e-learning assessment is needed to be done. The followings are the e-learning assessment indicators consisting of several dimensions. It can be seen in Table 1.

Based on Table 1, it is known that the needs for an assessment of online learning program, starting from the indicator of the design of e-learning management system, namely user friendly and user security; the technology provider, namely, Technical support training (Hardware & Software), followed by the teaching staff indicator with teaching effectiveness, and so on can be seen in Table 1. Based on the result of the study, it is shown that the needs assessment indicators for online learning put the e-learning management system as the most required indicator. In contrast, the minor crucial indicators are student tracking, time management, learning track, and the use of e-portfolio.

Table 1: Needs Assessment for E-learning Indicators.

Dimension	*Factors*	*Items*	*Mean*	*Rank*
Stakeholders	Teaching Staff	Teaching Effectiveness	3.76	4
		Level of interaction	3.76	5
		Satisfaction level	3.55	16
	Students	Students' Characteristics; Achievement level; familiarity with technology interaction level	3.55	17
	Content Provider	Multimedia learning source; complying with the relevant content standards	3.59	13
	Technology Provider	Technical Support Training (Hardware & Software)	3.79	3
	Developer	Website Design Assistance Service, Communication tools, Website usability tools	3.69	7
Organization	Accreditation Agency	Requirement guideline	3.28	26
	Department	The assessment of Administrative Affairs, Academic Affairs, the learning outcome of virtual class	3.31	25
	Students' Learning Management	Student tracking; time management, learning track, The use of e-portfolio	3.21	27
	Technology infrastructure Policy; e-learning specific funding	-	3.48	22

Dimension	*Factors*	*Items*	*Mean*	*Rank*
Technology	Funds Support Readiness Infrastructures	Hardware and Software	3.72	6
Environment	Geographic Location	-	3.52	20
	Social Factors	Cultural ethics of information access	3.62	9
	Learning styles	Asynchronous, synchronous, and independent learning	3.45	23
	Culture awareness	Learning culture to change habits	3.62	10
Pedagogic and Curricular	Relevant to the effective learning curriculum	-	3.55	18
E-learning System Quality	The design of E-learning Management System	The adaptation of the platform to the course module	3.52	21
		Ease of navigation	3.66	8
		The consistency of the platform to the course module	3.62	11
		User friendly	3.83	1
		Attracting multiculturalism	3.62	12
		Accessibility of the content of the course module	3.55	19
		Topic setting	3.45	24
		User setting	3.59	14
		User's data and security	3.83	2
		Collaborative and interactive learning	3.59	15

(Al-Shagran, 2017)

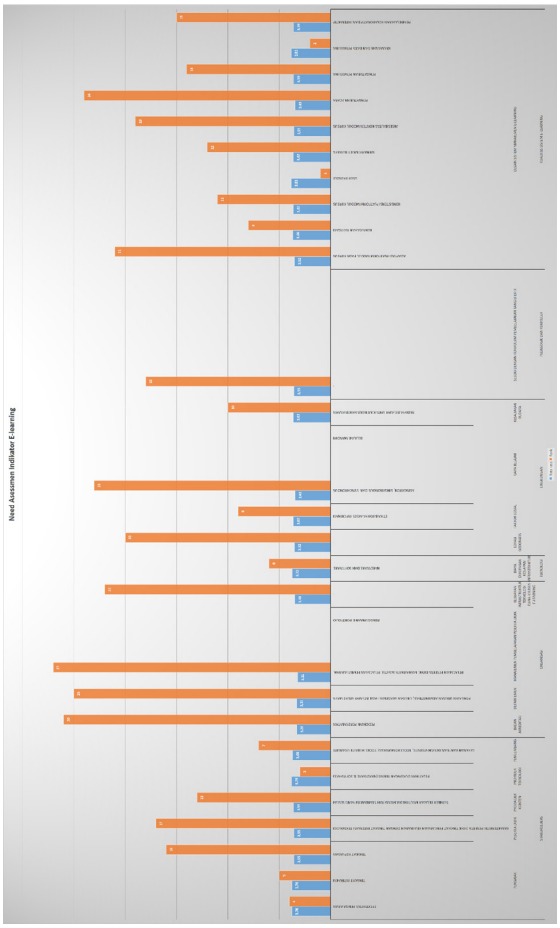

Fig. 1: Summary of articles within this issue

From the result of the needs assessment in the online learning program, whereby the instrument indicators had been analyzed first to know the necessity level; therefore, the result found from this study showed that the instrument indicators were generally required and they were pretty important as the measurement in conducting an assessment of online learning program (Harun, et al., 2021).

The result of the needs assessment can be seen in the graphic as mentioned in Fig, 1.:

Conclusion

Based on the findings in this study, the students and lecturers in the Faculty of Engineering, Universitas Negeri Padang, can design and conduct the required assessment for an online learning program to know the accuracy between the expectation and the reality in online learning, whether it is effective or not. Besides, in conducting online learning, the readiness and the establishment of indicators supporting the online learning, such as the dimensions consisting of Stakeholders, organization, technology, Environment, Pedagogic and curricular, and E-learning system quality. The overall result shows that the assessment of online learning programs needs to be performed. The assessment indicators need to be adjusted to be more accurate in conducting learning. The indicators for the required assessment start from the design of the e-learning management system technology provider, followed by teaching staff. This finding suggests that the educational institutions design and provide education to conduct an online learning program relevant to the assessment indicators. It can also increase

student acceptance towards online learning. The lecturers can implement the technique in online learning. It also prepares the required indicators for online learning.

Limitations and Future Research Suggestions

Firstly, this study was carried out among the students and lecturers in the Faculty of Engineering, Universitas Negeri Padang. Thus, more studies may be carried out to a larger population, different faculties in Universitas Negeri Padang as well as different universities. Secondly, this study used cross-sectional data, hence, longitudinal data design may be considered for future research.

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