

Analysis of Anxiety, Knowledge, and Beliefs Toward E-Learning During Covid-19: The Case of Science Teachers in Aceh, Indonesia

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Abstract

The aim of this research is to analyze anxiety, knowledge, and belief toward e-learning acceptance, especially by science teachers in high schools in Aceh, Indonesia. About 117 teachers were randomly selected for this study. A questionnaire was used to collect data, and analyzed using the Likert scale. The results indicate that most teachers view the use of e-learning in teaching science to be positive. Despite the fact that only half of them are knowledgeable in the use of media and have concerns about some negative effects of e-learning on students, they still believed in the usefulness of e-learning in science education. Hence, more related research is recommended to further corroborate the findings of this study.

Key words: *science teacher; e-learning; anxiety; knowledge; belief; education*

Introduction

The rapid growth of e-learning is due to several benefits, such as providing solutions for easier learning, applying paperless technology, and maintaining high standards and quality of education (Irwandi et al., 2018). The rapid development of information technology today is not separated from the daily teaching and learning activities of teachers and students when using e-learning (i.e., electronic learning) (Srivastava et al., 2014). Information and Communication Technology (ICT) and e-learning offer a chance to improve the quality of education because

communication technology is revolutionizing the way we live, learn, work, and even the way we play today (Halim et al., 2018a; Halim et al., 2018b). Accordingly, Yunis and Kristian (2017) said that the e-learning is a learning source that optimizes electronic media and ICT in the education process to facilitate the explanation and transfer of knowledge from teachers to students in a digital room.

Studies in the field of e-learning have been carried out, mainly related to the acceptance of e-learning technology as a learning medium (Teo, 2010), barriers in using e-learning in learning (Chan, 2019; Muslem et al., 2018), the attitude of education staff towards the use of e-learning (Redmond, Lock, 2019), and the implementation of assessment with e-learning (Resta et al., 2020; Halim et al., 2020). The user's attitude towards the use of e-learning as a medium of learning at schools and in colleges have also been studied, including the attitude of e-learning users as influenced by gender (Chen et al., 2018), by local culture (Chen, Nath, 2016), and by belief (Karim & Nigar, 2014). Based on the results of previous studies it can be understood that the culture and religion of users influence the teachers' attitudes towards media-based IT learning, including e-learning. But there has not been a study of attitudes on the use of technology in the educational environment by users who obey religious teachings and live in an Islamic cultural environment.

Regarding religious freedom, the Aceh government is given the freedom to implement the Syariah law (Islamic religious law) in the world of education, for example, Muslim female teachers and students are required to wear hijab in schools and colleges. For years, Aceh was famous for its closed and conservative lifestyle, but after the 2004 conflict and tsunami that hit the region, and the subsequent Helsinki MoU agreement (Ronnie, 2016), there was a shift in culture, social life, and transformation in the world of education (Grayman, 2016).

Problem of Research

Previous studies on Acehese teachers have focused on the challenges in facing the ICT era in teaching and learning. Nevertheless, studies on how prepared these teachers are, particularly those majoring in science, in accepting e-learning in the classroom have not been fully explored. Therefore, this study intends to fill the gap. Consequently, the research question for this study is formulated as follows:

- What is the level of acceptance of e-learning by high school science teachers in Aceh, Indonesia?

This is essential to investigate because today, science and technology are strongly interrelated. Teachers were chosen as the subjects of this study because they play a role in motivating the students to learn better through e-learning. Presumably, if teachers are known to be well-prepared to implement e-learning in the classroom,

then they have greater potential to provide effective teaching and learning to the students.

Research Focus

This study is focused on (1) the level of teacher anxiety about the use of e-learning in physics learning, (2) the level of teacher belief in the use of e-learning in physics learning, (3) the level of teacher knowledge of the use of e-learning in physics learning, and (4) the relationship between these variables.

Methodology of Research

General Background of Research

During the Covid-19 pandemic, the implementation of learning from primary to secondary schools in Indonesia is generally required to use online media. The same is true in Aceh Province, there are schools where learning is still carried out face-to-face and many schools have used online learning media. Moreover, Aceh is the only province in Indonesia that applies Islamic Syariah law, and so its people strongly adhere to Islamic religious values. As a result, when teachers are required to use online media, various forms of attitudes, perceptions, or views have emerged regarding the acceptance of online media for learning. Therefore, it is important to know in-depth the level of acceptance of online media by science teachers in Aceh in terms of anxiety, belief, and knowledge.

Sample of Research

13 districts out of 23 in Aceh province were chosen as the location of research. Three high schools were selected from the city in each district, making a total of 39 schools involved in this study. The chosen high schools are known to support their teachers and students with the use of e-learning. Furthermore, three science teachers were selected from each high school, making a total of 117 teachers as the respondents of this study.

Instrument of Research

The questionnaire is used as the instrument to collect data. It is adapted from Teo (2010), thus some of the items are modified to suit the context of this research. Therefore, the indicators in this study are modified to anxiety, belief, and knowledge on the use of e-learning. Further references were also used to compose the

items for the anxiety indicator; these items are based on the theories proposed by Parkinson et al. (2008). Meanwhile, for the belief indicators, references from Haste (2004) were applied. Finally, for the knowledge indicator, the references from Tsai (2009) were employed. The initial draft consisted of 25 items. This was given to educational technology experts specializing in the use of e-learning in the teaching and learning process. After the experts' assessment and judgment, seven items were discarded as they did not suit the context of this study. At the end, 18 items were used in the questionnaire. Accordingly, the researchers revised this questionnaire into the Instrument of Science and E-Learning Attitude Scale (ISEAS), with six items related to anxiety, six items related to beliefs, and six items related to knowledge. The ISEAS instrument has been tested for its validity and reliability to 125 high school science teachers in Banda Aceh, Indonesia. The result of the validity index is 0.670 and the reliability index is 0.743; this implies that the instrument is within the category of validity and very good. The response for each item of the ISEAS is classified into 4 categories, which are 1) strongly disagree, 2) disagree, 3) agree, and 4) strongly agree.

Data Analysis

The collected questionnaires were later analyzed using descriptive statistics. The mean was used to determine the highest positive responses for each item. To obtain information about the relationship between the research variables, analysis was carried out using inferential statistics with the Pearson product-moment correlation formula (r).

Results and Discussion

Analysis for Anxiety

Table 1 shows that most science teachers feel the anxiety to teach science subjects through e-learning. This is supported by item A2, which states "I do not enjoy discussing e-learning with colleagues", and this suggests that these teachers are not keen to talk about or learn more about e-learning from each other. In view of that, Gungor and Akdag (2018) state that anxiety plays a role in the implementation of technology. Therefore, lesser anxiety corresponds to a greater positive impact on the use of e-learning in teaching.

Meanwhile, a quarter of the teachers have concerns regarding the use of e-learning. The emergence of these concerns is influenced by the number of increasingly sophisticated technological tools that enable access to a variety of information

Table 1. The anxiety of science teachers to use e-learning

Code	Items of Anxiety Indicator	Response of Teachers (%)			
		4	3	2	1
A1	The use of E-learning in learning will be a new problem for me.	3.39	27.12	47.46	22.03
A2	I do not enjoy discussing e-learning with colleagues.	0.00	5.08	38.98	55.93
A3	Using e-learning will give users a chance to access web pages normally not available to them.	13.6	25.42	40.68	20.34
A4	Using e-learning makes me nervous and requires more thinking in the process.	3.39	18.64	59.32	18.64
A5	The impact of e-learning is that students' social skills will decline.	1.69	27.12	55.93	15.25
A6	The technique of direct or face-to-face interactions through learning will be lost if the learning is merely by e-learning.	3.39	20.34	59.32	16.95
Average Total Score		4.24	20.62	50.28	24.86

throughout the world (Gungor, Akdag, 2018). It can be said that most of the students in Aceh, especially those residing in the cities are familiar with the use of ICT and some can be said to even understand it better than the teachers. It may result from the fact that in the teachers' opinion, e-learning cannot be implemented in the school environment for students. In addition, half of the teachers reported that they feel nervous to learn something new and the process requires doubled effort in thinking about how to utilize e-learning in teaching. The emergence of these concerns is conceivably due to their lack of knowledge on ICT, despite the facilities or software already made available to them in their institutions. Most teachers feel comfortable with the methods that they have utilized for many years, and thus to learn something new requires much effort; this is especially marked in teachers who have aged (Muslem et al., 2018; Yusrizal et al., 2020).

Analysis of Belief

Table 2 shows that most science teachers already have a high level of belief in the use of e-learning to teach their students. They believe that this medium will make teaching easier, more enjoyable, and more meaningful (Dai et al., 2017). In addition, teachers also believe that the government will make the rules needed to control any dangerous developments in e-learning activities. Teachers try to enjoy and motivate their students while studying with e-learning because they

believe that when this happens, new positive values and beliefs can be formed and represent a developing community (Wang, 2014).

Table 2. The belief of science teachers to use e-learning

Code	Items of Belief Indicator	Response of Teachers (%)			
		4	3	2	1
B1	I believe the government will make the rules needed to control any dangerous development in e-learning activities.	22.03	59.32	16.95	1.69
B2	Learning with e-learning makes learning easier, more enjoyable, and more meaningful.	38.98	57.63	3.39	0.00
B3	Western beliefs, values, and thoughts are embedded in the learning system with e-learning.	1.69	45.76	44.07	8.47
B4	When e-learning is enjoyed by all communities (teachers, students, and students), new values and beliefs are formed that represent the community.	15.25	61.02	18.64	5.08
B5	E-learning will progress and develop in the same way, regardless of user cultural intervention because e-learning is universal.	20.34	61.02	15.25	3.39
B6	I will stop using e-learning if I know that e-learning can harm users.	30.51	38.98	25.42	5.08
Average Total Score		21.47	53.95	20.62	3.95

About 29 teachers, or one fourth of the respondents, are reluctant and have doubts on the use of e-learning to their students. The reluctance is based on their belief that this new technology, via the Internet, can instill in their students “Western” beliefs, values, and thoughts, which these teachers believe are against their own religious and cultural beliefs, values, and thoughts of Muslims in general (Twofeek & Jaafar, 2012). The concept of Western beliefs and values is generally perceived by these teachers as against Islamic teaching. This makes them stick to the traditional teaching methods that do not require ICT use in the process because they are afraid that their students can be influenced by these Western ways when they are exposed to IT-based learning. Nevertheless, this condition may be due to their lack of readiness, available infrastructure, and lack of training related to e-learning. Despite the fact that the teachers are provided with e-learning facilities they are not ready to use them as the teachers lack professional training on how to use e-learning facilities. Accordingly, training is essential for teachers so that positive outcome can be achieved to fulfill the goals of teaching (Hameed et al., 2008).

Analysis of Knowledge

Table 3 shows that most science teachers know that the facilities commonly used in e-learning are the internet, intranet, extranet, CDROM, and videotape. They are aware that e-learning can be used anywhere and anytime, and thus time and place are not a problem in conducting the teaching and learning process. Of course, the use of e-learning is inseparable from internet services. If the services are adequate, e-learning can be more flexible because students can study anytime, anywhere, and with different types of learning techniques within this medium.

Table 3. Knowledge of science teachers to use e-learning

Code	Items of Knowledge Indicator	Response of Teachers (%)			
		4	3	2	1
U1	E-learning can be used anywhere and anytime.	23.73	64.41	11.86	0.00
U2	The facilities commonly used in e-learning are the internet, intranet, extranet, CDROM, and videotape.	20.34	77.97	1.69	0.00
U3	Supporting software for running e-learning that is often used is Moodle, Sakai, WebCT, and Claroline.	5.08	25.42	62.71	6.78
U4	E-learning does not require the paper; it is global and very addictive.	15.25	45.76	38.98	0.00
U5	The teacher only includes reading material, sources, and feedback in the e-learning.	15.25	52.54	32.20	0.00
U6	I understand that e-learning can be used for small and large classes.	20.34	66.10	11.86	1.69
Average Total Score		16.67	55.37	26.55	1.41

Table 3 shows that most science teachers know facilities are commonly used in e-learning. First of all, the internet service must be adequate so that e-learning is effective. Second, they are also aware that e-learning can be used without any restrictions to place and time conducting the teaching and learning process. The teachers can also save time during the teaching-learning process and train students to be more independent in learning (Ambusaidi et al., 2018). Besides that, half of the teachers are also familiar with the supporting software that are needed to run e-learning. E-learning electronic circuits are used to convey the contents of learning, interaction, or guidance (Dyson, 2004).

The results further show that only half of the teachers have enough knowledge on the use of e-learning. It can be concluded that the teachers' knowledge, at large, on e-learning is still not optimal. From the knowledge indicator, it can be assumed that only half of the teachers (about 58 teachers) of this study make use of e-learning.

ing facilities that have been provided by their schools. Therefore, there is a need for more training for these teachers to use e-learning in the teaching and learning process. Hence, Keramati et al. (2011) assert that the readiness of teachers and sufficient training are among the most important factors in e-learning to improve teachers' knowledge and motivation to use it.

The Correlation between Indicators

The results from the three indicators that assess the science teachers' e-learning acceptance show that there is a strong correlation between anxiety, belief, and knowledge. Between anxiety and knowledge, the correlation coefficient for the science teachers is -0.67 . This result denotes that the correlation is negative and has a fairly strong relationship, which means that a high level of knowledge will lead to a low level of anxiety. Therefore, in relation to the results of the questionnaire, especially to the knowledge indicator, there is an urgent need for more training for these science teachers on how to use e-learning and be well-informed on its benefits along the process. Once teachers are equipped with enough knowledge, their anxiety will be reduced, and they can even be motivated to use group methods in e-learning networks (Handayani, 2000). Similarly, Alenezi & Karim (2010) reveal that belief and anxiety in e-learning also influence the ICT experience at perceived ease of use. This means that once teachers can use ICT comfortably for teaching and embrace its convenience, their belief will become stronger on its advantages and confidence in its use will increase.

Between belief and anxiety, the correlation coefficient for the science teachers is -0.86 . This result indicates that the higher the belief of teachers in e-learning, the lower the anxiety will be. In relation to this, individuals who have anxiety over the use of the internet will have lower self-confidence and performance results compared to individuals who do not suffer anxiety (Joiner et al., 2005). This study shows that half of the science teachers are accepting the use of e-learning, and meanwhile, the other half are not. The literature notes that several factors hinder the effective use of ICT as a learning medium, and these include the infrastructure problems, the willingness of the school, teachers, and students, satisfaction in using technology, among others (Kharisma, 2013). For the teachers in this study, especially, the main obstacle is their willingness to use the e-learning that is made available by their institutions. Regardless of e-learning to assist teachers in the teaching process (Kusairi et al., 2017), stated that the use of e-learning increases their work, time, and efforts in the teaching process (Park, 2009).

Conclusion and Future Research

Based on the results of this study, it can be concluded that the use of e-learning in science teaching is still challenging for the science teachers in Aceh, Indonesia. Despite the fact that most of the teachers have a high level of belief and low level of anxiety in using e-learning to teach, only half of them are knowledgeable in using this medium. This problem can be mitigated by improving the teachers' knowledge of e-learning. This can be done by providing more training and workshops for the teachers throughout the process. Schools that have been providing teachers to use e-learning should also maintain the facilities. The preparedness, enthusiasm, and sufficient knowledge of teachers can bring about positive effects to students and teachers themselves in using e-learning in the teaching and learning process.

This study has some limitations. As mentioned earlier, there are 23 districts in Aceh, and thus, due to the limitation of this study, it only managed to collect data from 13 districts. Further research is recommended to cover the districts not included in this study. More indicators on the acceptance of e-learning should also be utilized, such as learning style, environment, and assessment. Interviews with teachers should also be considered to gain more in-depth information on anxiety, knowledge, and beliefs toward e-learning. Comparative studies with other teachers from other provinces in Indonesia are also encouraged to obtain more insights into this issue.

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