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The Relationship Between Teacher Self-Efficacy and the Ability to Integrate Technology Literacy in Civics Learning in Banda Aceh

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ABSTRACT

An essential element that must be considered, especially by the teacher, is the integration between technology and the teaching-learning process. The study's problem formulation, as well as its purpose is to investigate whether there is a relationship between teacher self-efficacy and technology integration in Civics learning. The hypothesis of this study is that there is a substantial association between teacher self-efficacy and the ability to integrate technology into the civics learning process. This is demonstrated by the technique, results, and implications. This study used quantitative research and correlational analysis to examine the relationship between teacher self-efficacy and the ability to integrate technology into the Civics curriculum. The instrument used consisted of a self-efficacy questionnaire and technology integration. The study's results showed a positive relationship indicated by the correlation coefficient value of 0.839 > 0.254 with the Sig. (2-tailed) of 0.000 <0.05 that showed a relationship between teacher self-efficacy and the ability to incorporate technology into civics education. It is better if the learning process continues to be carried out by integrating technology into learning. So that children can have the ability to use technology following current developments. Besides that, teachers or educators must continuously learn and participate in training to improve the ability to use technology in the learning process.

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1. INTRODUCTION

ICT (Information and Communication Technology) is critical in many public policies, including education. Our relationship with information and knowledge is evolving as ICT becomes more prevalent in our daily lives. For example, two people can transmit information directly with digital help without needing to be physically or physiologically present in the same place or at the same time. The

digitalisation of information and the widespread use of artificial intelligence in all aspects of human life, including education, signals the beginning of the Industrial Revolution 4.0 (Scawab, 2016).

The evolution of digital technology in the contemporary Industry 4.0 era has brought about changes and has had an impact on many facets of human existence, including education (Borowski, 2021; Mian et al., 2020). According to Hoyles and Lagrange (2010), digital technology has the greatest influence on today's education system. This is because digital technology-based learning is effective, efficient, and appealing. Therefore, the domination of visualising with abstract concepts since the 1980s is currently shifted to digital visualisation (Bygstad et al., 2022; Stopar & Bartol, 2019).

The teacher is the most important and influential person in the educational process. All aspects, such as curriculum, infrastructure, and legal standing, will have no effect without the readiness of teachers. (Palmer, 1998). As a result, the Indonesian government should pay special attention to efforts to professionalise educators during the previous ten years, particularly after the passage of Law 14/2005 governing teachers and lecturers. After that, becoming a professional teacher became mandatory for all stakeholders in Indonesian education.

Currently, teachers face society's high demands for the quality of learning and the rapid development of technology in the world around them due to Industrial Revolution 4.0 with the massive digital revolution. Enormous use of computers, as well as artificial intelligence in all fields, has led to disruption in terms of job competition and the industrial world.

Today's world is evolving and changing at a quick pace. As a result, teachers must stay current and knowledgeable with every advancement in information and communication technology (ICT). This familiarity will help teachers to employ technology to improve their classroom instruction. This is also because the issues that instructors encounter today may vastly differ from those they faced in the past (Afrianto, 2018; Isjoni et al., 2019; Yusuf et al., 2019). For example, student demands and behaviors towards technology use differ from what teachers observed years ago. As a result, today's teachers cannot approach their students in the same way that their predecessors did. According to Chamberlain (2012) and Neumann (2014), education is fast expanding as a result of the Internet creating different situations in teaching. Therefore, a different strategy is needed.

Chamberlain's anxiety is understandable, given that the technological revolution in education has presented educators worldwide with new difficulties and opportunities. This technology not only allows teachers to expedite student learning, but also challenges teachers to use students as an important learning resource. Because of their familiarity with high-tech equipment, some students nowadays may be able to access certain lessons before their teachers arrive. Children today are amazing in their capacity to investigate technology. This relates to a term coined and popularised by an educational consultant, Prensky (2001), who stated that most pupils today are considered "digital natives" (digital native generation). This refers to the fact that they have grown up with any type of electronic gadget, including cell phones and the Internet. As a result, teachers should not fall behind their students in terms of adopting modern technology.

Aside from that, two main ideas why an educator should use digital technology in the classroom will be explained as follows. Firstly, there are instances wherein educators encounter physical limitations that prevent them from being present in their customary educational environments. (Beardsley et al., 2021; Scherer, Siddiq, & Tondeur, 2019; Siyam, 2019; Stevenson, 2004) and because of the demands of the times, students must master various kinds of skills in the 21st century (Fajri, 2021; Fajri, Yusuf & Azhari, 2020; Fajri et al., 2020; Fajri et al., 2021). Due to high mobility or environmental conditions that make it impossible to carry out teaching assignments in an interesting way due to health emergencies such as COVID-19 (Azhari & Fajri, 2022; Bansah & Darko, 2022; Phelps et al., 2021). Some university instructors, for example, may be quite active outside of campus, such as attending conferences in foreign countries or doing assignments or other academic activities outside of the city (Li et al., 2022; Moja, 2021). As a result, they were forced to leave their classes, and the students were forced to wait until they returned to school. This is unfair to students, especially if the instructor must be absent for an extended period of time.

Theoretically, adding online or virtual classrooms will bring various benefits in terms of the learning process. Several studies showed that online learning is able to increase the awareness of students and inspire them to learn more independently, which can, therefore, improve their learning results. (e.g., Bradley & Lomicka, 2000; Carnevale et al., 2011; Roed, 2003; Lewandowski, 2015). As an implementation of blended learning, virtual class activity can be used (Whittaker & Tomlinson, 2013). 'Blended learning' is the phrase most generally used in English Language Education (ELT) to refer to face-to-face teaching combined with computer technology (online and offline activities/materials). As a result, having virtual classrooms as an addition or variation to their usual teaching style during the academic calendar would be a fantastic idea for teachers. Aside from the practical considerations described above, teachers must plan to have numerous virtual classrooms using various available tools in order to carry out this blended learning. Variety is an excellent way to maintain students' interest and allow them to have new learning experiences. It is crucial for teachers to master specific applications so they can maintain students' interest in wanting to learn through Internet media. They also need to master how to create exciting content, convey messages both in verbal language and images, and use audio that has been produced to become teaching materials. A compelling message is when the teacher can convey the message correctly and can be adequately understood by students.

Bandura (as cited in Adirestuty, 2017: 56) posits that in order to facilitate effective learning, educators must be capable of providing influential models that foster a sense of mastery, self-efficacy, and reinforcement for the learners. The concept of self-efficacy plays a crucial role in influencing the level of achievement in the process of learning (Boulden et al., 2021; Gomez et al., 2022; Kiel et al., 2020; Pumptow & Brahm, 2021). The significance of this matter extends across several situations, encompassing diverse educational levels and disciplinary domains (Zimmerman, 2010). Self-efficacy plays a crucial role in the context of online distance learning by serving as a mechanism to counteract the negative impacts of isolation and facilitate effective autonomous learning (Chu and Chu, 2010; Wu et al., 2010). Therefore, self-efficacy emerges as a crucial element in the attainment of success in the context of online learning.

In education, teacher self-efficacy can positively impact both the teacher and his students (Marti & Mulvihil, 2019; Zheng, Yin & Liu, 2021). Omrod claims in his book "*Educational Psychology*" that a teacher with strong self-efficacy has a good impact on student accomplishment in a variety of ways (Wilson & Kim, 2016). These include a greater willingness to experiment with new teaching tactics, stronger expectations for student learning outcomes, and increased effort in the teaching process. They persevere in supporting the learning process, influencing teacher behavior in making decisions, exerting effort and defence under adverse settings, and enhancing the ability to engage with kids who require assistance for extended periods of time.

The main issue discussed is the impact of self-efficacy on online learning behavior (Kundu, 2020; Kuo, Tsai, & Wang, 2021; Malureanu, Panisoara, & Lazar, 2021; Mohd Yusoff et al., 2022). The consensus among educational experts has stated that student learning behaviour has an important role in the learning process. One example that can be done is to use social media as a tool in a more relaxed learning process (Dabbagh & Kitsantas, 2012). Although many studies have focused on teachers' efforts to encourage learning behavior, several studies have also examined the psychological factors that influence students' online learning behavior. Therefore, this study examines how teachers' ability to integrate technology in the teaching process can shape fun learning behaviors and processes, such as involvement with peers, interactions with LMS, and interactions between teachers and students.

According to Bandura, a rise in teacher knowledge leads to an increase in self-efficacy beliefs and potentially an increase in the use of technology in the classroom, as well as possibly an increase in the use of technology based on topic knowledge and pedagogy (Abbitt, 2011). Thus, the study's problem formulation as well as its purpose, is to investigate whether there is a relationship between teacher self-efficacy and technology integration in Civics learning, especially in Banda Aceh City.

2. METHODS

Because the data acquired were numerical, this study used a quantitative approach and statistical analysis to show the effect of X variables on Y variable. It aligns with Arikunto (2010: 12) that quantitative research is a study approach that requires many numbers, beginning with data collection, data interpretation, and the presentation of conclusions. There are two variables in this case: teachers' self-efficacy and technology integration. The research sample for this study will include all civic instructors in junior and senior high schools/equivalents within Banda Aceh City.

Table. 1. Research Respondents

No	School level	Number of Civic Education Teachers
1	Junior high school	32
2	Senior High School	34
	Amount	66

Furthermore, the instrument in this study uses a Likert scale to measure variables that will be broken down into dimensions, dimensions that will be broken down into sub-variables, and sub-variables that can be measured. Finally, these measurable indicators can be used to develop an instrument comprised of questions or statements that respondents must answer. (Riduwan, 2009:27).

Table 2. Use of the Likert Scale

No.	Answer Choices	Code	Positive Score	Negative Score
1	Strongly agree	SS	5	1
2	Agree	S	4	2
3	Fairly Disagree	KS	3	3
4	Disagree	TS	2	4
5	Strongly Disagree	STS	1	5

While preparing the research questionnaire, the researcher will create a preliminary draft called the 'grid'. The grid for the research instrument is as follows.

Table 3. Grid of Teacher Self-Efficacy Instruments

Variable	Indicator	Item Number	Number of items
Self Efficacy Teacher	Self-Efficacy in Student Engagement	5,6,8,9,16	5
	Self-Efficacy in Learning Strategies	1,2,3,4,7,	5
	Self-Efficacy in Classroom Management	10,11,12,13,14,15	6

Table 4. Grid of Technology Integration Instruments

Variable	Indicator	item number	Number of items
Technology Integration	Teacher Use of Technology	1,2,3,4,5	5
	Teacher Technology Knowledge	6,7,8,9,10	5
	Curriculum Design	11,12,13,14,15	5
	Teacher Perceptions of Technology	16,17,18,19,20	5

Researchers will not obtain data that meets established standards unless they are familiar with previous data collection approaches. According to Sugiyono (2013: 24), data collection procedures are the most important phase in research because the primary goal of research is to get data. The researchers

employed questionnaires to collect data in this investigation. The questionnaire is one way of data collection through questions or providing them with written remarks.

In research, data analysis is critical. Data analysis can provide meaning and meaning that is useful in solving research difficulties. The data collected with research tools is then analysed with SPSS version 22 to reach a conclusion on the subject under investigation. According to Sugiyono (2014: 147), data analysis is used to address problem formulations or test hypotheses that have been proposed.

3. FINDINGS AND DISCUSSION

This study was carried out in junior and senior high schools with all Civics teachers in Banda Aceh City as respondents, totalling 66 teachers. The taking of teacher respondents used a proportional random sampling technique, which determined the number of respondents according to the number of groups from each school level.

Variable descriptive statistical measurements were carried out to provide an overview of the number of respondents, the highest and lowest values, mean, and the standard deviation of each variable, namely self-efficacy and school climate, which are explained in Table 5.

Table 5. Descriptive Statistics of Self-efficacy

	N	Range	Min	Max	Means	std. Deviation	Variances
Self-Efficacy	66	1.55	3,15	4.70	3.7129	,31352	,098

From the output of the SPSS application on the self-efficacy data of PPKn SMP and SMA teachers, we see that the highest score was 4.70 and the lowest score was 3.15. These results also found that the average score (mean) achieved by Civics teachers was 3.71, Std. The deviation is 0.31, and the variance value is 0.098.

Furthermore, the formula 1+3.3 log n was used to calculate the number of classes, where n is the number of research samples and the results showed that n = 66, many classes 1 + 3.3 are obtained. Log 66 = 7 class intervals. The data range is calculated with the maximum-minimum value so that a data range of 4.70-3.15 = 1.55 is obtained. A class length of 0.19 can be obtained by knowing the data range. The Self-Efficacy frequency distribution table as seen in table 6.

Table 6. Distribution of Self-Efficacy Intervals

		frequency	**percent**	**Valid Percent**	**Cumulative Percent**
Valid	3.15-3.34	7	10,6	10,6	10,6
	3.35-3.54	13	19,7	19,7	19,7
	3.55-3.74	9	13,6	13,6	13,6
	3.75-3.94	20	30,3	30,3	30,3
	3.95-4.14	10	15,2	15,2	15,2
	4.15-4.34	6	9,1	9,1	9,1
	4.55-4.75	1	1.5	1.5	1.5
	Total	66	100.0	100.0	100.0

The self-efficacy of civic teachers in Banda Aceh City is the largest in the interval 3.75-3.94, with 20 teachers (30.3%). The rest are in the interval 3.35-3.54 with 13 teachers (19.7%), intervals 3.15-3.34 and 3.35-3.54 each with 7 (10.6%), 9 (13.6%), interval 3.95-4.14 with 10 teachers (13.2%), interval 4.15-4.34 with 6 teachers (9.1%) and 4.55-4.75 with 1 teacher (1.7%).

The self-efficacy of civics teachers in Banda Aceh was calculated using average score. To categorise and classify the respondents' tendencies into a scalar, the formula is as follows:

Minimum score = 1
Maximum score = 5 Width scale = $\frac{5-1}{5} = 0,8$
Thus, the scale categories can be determined as follows:

Table. 7. Categories of Self-efficacy Tendency Scale

Intervals	Criteria
1.00 – 1.80	Very Poor/Very Low
1.81 – 2.60	Not good/Low
2.61 – 3.40	Fair/Moderate
3.41 – 4.20	Good/High
4.21 – 5.00	Very Good/Very Good

Source: Husein Umar (2011:130)

The following is the distribution of data on the tendency of self-efficacy data for Civics SMP and SMA teachers in Banda Aceh City, which can be explained in the table below:

Table 8. Distribution of Self-Efficacy Tendency Data

No.	Score	Frequency	Percentage (%)	Category
1	1.00 – 1.80	0	0 %	Very not Good/Very Low
2	1.81 – 2.60	0	0 %	Not good/Low
3	2.61 – 3.40	15	22.7 %	Fair/Moderate
4	3.41 – 4.20	50	75.0 %	Good/High
5	4.21 – 5.00	1	1.5 %	Very Good/Very Good
Total		66	100.0 %	

The table showed that on the self-efficacy of Civics teachers in Banda Aceh City, as many as 75% of teachers are in the Good/Very Low category, as many as 22% are in the Fair/Moderate category, 1.5% are in a Very Good category, and there are no Very not Good and Low categories. Thus, the tendency of Civics teacher self-efficacy is mainly in the Good/High category.

Variable descriptive statistical measurements were carried out to provide an overview of the number of respondents, the highest and lowest values, the mean, and the standard deviation of each variable, namely the integration of technology and school climate, which is explained in the following table:

Table 9. Descriptive Statistics of Technology Integration

	N	Range	Min	Max	Means	std. Deviation	Variances
Technology Integration	66	1.80	3,15	4.95	4,010 3	,46072	,212

From the output of the SPSS application on technology integration data for PPKn SMP and SMA teachers, we can see that the highest score was 4.95, and the lowest score was 3.15. These results also found that the average score (mean) achieved by Civics teachers was 4.01, Std. The deviation is 0.46, and the variance value is 0.212.

Further,The formula 1+3.3 log n, where n is the number of study samples, can be used to calculate the number of classes. The calculation revealed that n = 66, resulting in a total of 1 + 3.3 log 66 = 7 interval classes. To find the range, the maximum score (4.95) is then subtracted by the minimum score (3.15), resulting in 1.8. As a result, the length of the class may be calculated using the known range of data as 0.22. The frequency distribution of Self-Efficacy is shown in the table below.

Table 10. Distribution of Technology Integration Intervals

		frequency	per cent	Valid Percent	Cumulative Percent
Valid	3.15-3.37	4	6,1	6,1	6,1
	3.38-3.60	10	15,2	15,2	15,2
	3.61-3.83	5	7,6	7,6	7,6
	3.84-4.06	18	27,3	27,3	27,3
	4.07-4.29	9	13,6	13,6	13,6
	4.30-4.52	10	15,2	15,2	15,2
	4.53-4.75	7	10,6	10,6	10,6

Based on this table, the technology integration of PPKn teachers in Banda Aceh City is the largest in the interval 3.84-4.06, with 18 teachers (27.3%). The rest are in the interval 3.38-3.60 with 10 teachers (15.2%), intervals 4.30-4.52 with 10 (15.2), intervals 4.53-4.75 with 7 (10, 6 %), interval 4.07-4.29 9 teachers (13.6 %), interval 3.61-3.84 5 teachers (7.6 %), interval 3.15-3.37 4 teachers (6.1 %) and 4.76-4.98 as many as 3 teachers (4.5%).

The technology integration by civics teachers in Banda Aceh can be calculated to the be categorised with the formula described as follows:

Minimum score = 1

Maximum score = 5 Width scale $= \frac{5-1}{5} = 0{,}8$

Thus, the scale categories can be determined as follows:

Table 11. Categories of Technology Integration Tendency Scale

Intervals	Criteria
1.00 – 1.80	Very Poor/Very Low
1.81 – 2.60	Not good/Low
2.61 – 3.40	Fair/Moderate
3.41 – 4.20	Good/High
4.21 – 5.00	Very Good/Very Good

Source: Husein Umar (2011:130)

The following is the distribution of data on technology integration trends for Civics SMP and SMA teachers in Banda Aceh City, which can be explained in Table 12.

Table 12. Data Distribution of Technology Integration Trends

No.	Score	Frequency	Percentage (%)	Category
1	1.00 – 1.80	0	0 %	Very not Good/Very Low
2	1.81 – 2.60	0	0 %	Not good/Low
3	2.61 – 3.40	8	12.1 %	Fair/Moderate
4	3.41 – 4.20	35	53 %	Good/High
5	4.21 – 5.00	21	31.8 %	Very Good/Very Good
Total		66	100.0 %	

The table shows that 53% of teachers are in the Good category, 31.8% are in the Very Good category, 12.1% are in the Fair/Moderate category, and there are no Very not Good and Not Good/Low categories. Thus, the tendency of technology integration for PPKn teachers is mainly in the Good/High category.

Variable data normality test using the SPSS for Windows version 22 application using the Kolmogrov-Smirnov formula and test criteria: if the significance value is more than 0.05, the data is normally distributed; otherwise, the data is not normally distributed. The following are the SPSS test results for the normalcy test:

Table 13. Variable Data Normality Test

		Self Efficacy	Integration Technology
N		66	66
Normal Parameters [a,b]	Means	3.7129	4.0103
	std. Deviation	,31352	,46072
Most Extreme Differences	absolute	.096	.072
	Positive	.096	,069
	Negative	-.082	-.072
Test Statistics		.096	.072
asymp. Sig. (2-tailed)		,200c [,d]	,200c [,d]

The output showed a significant self-efficacy value of 0.200 > 0.05, it can be concluded the data were distributed normally. The significance value of technology integration was equal to 0.200 > 0.05; the data from the technology integration is also normally distributed.

The linearity test was conducted using SPSS for Windows. The significance value must be larger than 0.05 to indicate that the two variables have a linear connection. If the significance level is less than 0.05, the two variables are not linear. (Sugiyono, 2012: 274). The following is a table of linearity test results.

Table 14. Variable Data Linearity Test
ANOVA Table

			sum of Squares	df	Means Square	F	Sig.
Technology Integration * Self Efficacy	Between Groups	(Combined)	9,796	21	,466	7,292	,000
		Linearity	8,509	1	8,509	133,017	,000
		Deviation from Linearity	1,287	20	,064	1.006	,479
	Within Groups		2,303	36	,064		
	Total		12,099	57			

According to the linearity test results, the significant value for the self-efficacy variable with technology integration is 0.479. Based on the findings of this study, it can be observed that the significant value is more than 0.05, implying that there is a linear relationship between variable X (Self-Efficacy) and variable Y (Technological Integration). Based on the results of the linearity test, it can be determined that the linearity in this study is met, allowing the analysis of hypothesis testing and regression testing to proceed.

The hypothesis that has been tested in the research was the relationship between teacher self-efficacy and technology integration in Civic Education learning in Banda Aceh. In this study, the authors formulated one kind of hypothesis, namely (Ha): There is a positive and had significant relationship between technology and teacher self-efficacy in Civics learning in Banda Aceh.

According to a descriptive study, the category of teachers in integrating technology in the learning process remains slightly good. Based on existing data, it appears that civics teachers are still limited in their use of technology due to the age issue; older teachers often lack technological skills, whereas younger teachers may have these skills but do not employ them in ways that improve the quality of their teaching. Some research on why teachers do not fully integrate technology into classroom teaching (Backfisch et al., 2021; Beglau, 2011; Bingimias, 2009; Coman et al., 2020; Santos & Castro, 2021; Scheffler & Logan, 1999; Taghizadeh & Hasani, 2020) focuses on the assumption, or even the fact, that technology integration still lags behind primarily due to teachers' lack of adequate preparation to use these fast-moving media as learning aids.

Based on the above analysis, there was a high level of trust in integrating ICT into the learning practices, especially by pre-service teachers (young teachers). These findings show the advantages of Saudi Arabia's technological transition and its high use of ICT resources in comparison to other Gulf region countries (Hartley & Al-Muhaideb, 2007; Onsman, 2011). The results are in line with several previous studies. For example, Liang and Tsai (2008) and discovered that pre-service teachers have higher ability and self-efficacy to utilise ICT in learning practices (Caner, & Aydin, 2021; Fajri, Budimansyah, & Komalasari, 2022; Fajri, Suryadi, & Anggraeni, 2021; Jenßen, Gierlinger, & Eilerts, 2021; Sam et al., 2005).

4. CONCLUSION

Based on the findings of the preceding chapter's study and discussion, it is possible to conclude that there is a positive relationship between teacher self-efficacy and the ability to integrate technology into civics instruction in Banda Aceh City. A correlation coefficient value of 0.839 > 0.254 with a Sig. (2-tailed) of 0.000 0.05 indicates a positive association, indicating that teacher self-efficacy influences the ability to integrate technology in Civics instruction. Educators should consider incorporating technology into the learning process to enable pupils to obtain the necessary skills to utilise technology in accordance with contemporary advancements effectively. In addition, instructors or educators must engage in ongoing learning and training initiatives to enhance technology integration in the educational

setting. It is advisable for students to familiarise themselves with and effectively exploit the available technologies in the educational context. In order to provide studentss with the necessary skills for the future, it is imperative to ensure that appropriate measures are taken. In order to provide valuable insights for future researchers, it is advisable to offer comprehensive recommendations about additional factors that influence a teacher's capacity to enhance technology literacy and effectively integrate it into the educational process, hence fostering meaningful learning experiences for students.

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