The Effect of Using E-Learning and Divergent Thinking Patterns on Economic Learning Achievement

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Abstract

The purpose of this study was to look into the impact of e-learning and divergent thinking patterns on students' economic achievement at SMA Negeri 2 Tumijajar. The quantitative approach method is used in this study. This study's instrument was a closed questionnaire with a likert scale. The IBM SPSS Version 26 application was used to analyse the data. The findings revealed that using e-learning had a positive and significant effect on students' economics learning achievement, with a t-count > t-table value of $3.084 > 1.656$ and a probability value (sig) of $0.002 < 0.05$. Divergent thinking patterns influence students' economics learning achievement in a positive and significant on students' economic learning achievement. The probability value (sig) is $0.003 < 0.05$ and the value of t-count > t-table is $3.080 > 1.656$. The F test results showed that the use of e-learning and divergent thinking patterns had a simultaneous effect on students' economic achievement, with an F-count > F-table of $8.427 > 3.06$ and a significance value of $0.00 < 0.05$.

Keywords: *E-learning; Divergent Thinking Patterns; Learning Achievement*

Introduction

The world has now entered the fourth industrial revolution 4.0, which is characterised by increased connectivity, interaction, the development of digital system, artificial intelligence and virtual (Lase, 2019). The advancement of information and communication technology has influenced a new way of thinking in society. These changes have an impact on Indonesia's education system, which is required to deal with changes in innovation in the industrial revolution 4.0 era so that there is no gap between the development of science and the development of information and communication technology. According to Rafiola et al., (2020), the success rate of education determines a nation's progress, and learning activities that are in line with developments and changes in the educational paradigm are learning activities that can synergize the cognitive, affective, and psychomotor domains at the same time.

The effective use of technology in education will help advance education in the 4.0 revolution era and can assist students in the learning process (Budiharto et al., 2019). In the revolutionary era, educators play an important role in using innovative digital technology to support learning activities, and teachers can try to focus on student-centered learning so that students can be more active and develop their

mindset (Rafiola et al., 2020). The digital technology and online media that are used function to find teaching materials that can aid in understanding learning material (Yuniani et al., 2019).

E-learning in the form of websites or other applications is one of the information technologies that can be used in the learning process. The use of e-learning will result in changes to the education system, the content to be delivered, the method of instruction, and the challenges faced by students and teachers. Furthermore, e-learning is expected to affect students' cognitive abilities, making it easier to achieve learning outcomes (Saputra & Hidayani, 2021). According to Bonk & Graha (2009), combining internet technology and face-to-face interactions can improve pedagogy and facilitate information access.

According to Yuniani et al., (2019), learning strategies in the twenty-first century have shifted from traditional to digital systems that are more advanced to meet the demands of revolution 4.0, so that students are expected to be information and communication literate in order to realise relevant and conducive learning. According to Cunska & Savicka, (2012), educational success is determined by how quickly and easily students can obtain various amounts of information. In addition to the use of media, learning in the fourth industrial revolution era has goals with the characteristics of thinking skills. Divergent thinking skills are one of the thinking skills that high school students can learn. Divergent thinking can be cultivated to enhance student creativity(Kurnia, 2018).

A preliminary study conducted at SMA Negeri 2 Tumijajar discovered several issues, including students who were not optimal in their use of e-learning and the ability to think divergently at the school level, which had not been properly addressed. Students in economics learning are not accustomed to seeing problems from various angles or are not given the opportunity to provide various answers to a problem, and most students only imitate friends' answers rather than attempting to work on their own with these students' abilities and thoughts. This issue has an impact on student test scores, which are still falling short of the minimum completeness criteria (KKM).

According to Salsabila & Puspitasari (2020), there are two types of factors that can affect learning achievement: internal and external factors. Students' ability to think is one of the internal factors that influence learning achievement. External factors include the physical environment of the school, which can help students achieve their goals. This also agrees with Ambarita (2020) that factors influencing learning achievement include the use of learning media and students' thinking abilities.

Use of E-Learning

E-learning is an internet application that connects students and teachers in online learning forums to overcome time, space, conditions, and circumstances limitations (Popovici & Mironov, 2015). E-learning is typically defined as the application of knowledge, information, and technology to connect individuals or materials for educational purposes (formal, informal and non-formal) (Ehlers & Hilera, 2012). The use of e-learning can have an impact on the process of transforming traditional education into digital form by utilising ICT facilities, which can be viewed positively as a medium that provides and facilitates interaction between teachers and students in order to make learning more effective (Kosassy et al., 2018). According to Septiani (2018), using e-learning has several benefits in learning such as increasing absorption of the material being taught, increasing active participation, increasing students' independent learning abilities, and improving the quality of learning material, which is expected to stimulate the growth of innovation. new students as needed According to Hakim et al (2019), using e-learning as a learning medium can assist teachers and students in achieving effective and efficient learning outcomes.

The use of e-learning has a significant relationship with student achievement in the learning process (Hoerunnisa et al., 2019). According to Ibrahim & Suardiman (2014), because e-learning is new to students, they become curious and want to learn more about the lessons presented, which increases student motivation and achievement. Other research indicates that students who use e-learning have a

positive and significant influence on their learning achievement (Arryadna & Pratiwi, 2022; Prasistayanti et al., 2019). According to (Saputra & Hidayani (2021), e-learning influences the learning achievement of high school students. In line with the previous opinion, Pratama & Arief (2019) stated that e-learning is a factor in the learning approach that can affect student learning achievement. Aji & Napitupulu (2018)'s research, on the other hand, found that e-learning had no effect on student achievement.

Divergent Thinking Patterns

Divergent thinking is a way of thinking that trains one's mind to think more critically, looking for a solution with multiple alternative answers to develop creativity (Abdilllah, 2016). According to Khatri & Dutta (2018), divergent thinking skills help students think of something different in order to generate creative ideas in finding solutions and improve students' problem solving abilities. According to Jauk et al (2014), divergent thinking is an important component of the creative thinking process. Divergent ability is the foundation of creativity, which must be developed by increasing students' enjoyment of being creatively busy, and students are expected to increase their knowledge of science so that students can effectively solve their learning tasks (Marissa, 2018). Divergent thinking can thus be defined as a type of creative thinking that provides multiple possible answers based on the information provided, with an emphasis on the quantity, diversity and originality of the answers.

According to Murniati & HM (2015) research, the ability to think divergently has a positive effect on learning achievement, which means that the greater the ability to think divergently, the greater the learning achievement of students. Furthermore, (Rauf et al (2020)'s research shows that divergent thinking has a positive and significant effect on student achievement.

Learning Achievement

Sholeh & Sa'diah (2018) explained that learning achievement is the result achieved by students as a form of mastery of the material that has been taught which is expressed in the form of grades or report cards for each field of study after experiencing the teaching and learning process. Learning achievement is a change in behavior that is obtained by students after carrying out the learning process by looking at the results achieved by the students concerned (Syafari & Montessori, 2021). According to Salsabila & Puspitasari (2020) also explains that learning achievement is a real skill that can be measured by knowledge, attitudes, and skills as an active interaction between learning subjects and learning objects during the teaching and learning process.

The outcomes obtained by students after completing the learning process are indicators of achievement of learning objectives (Syafari & Montessori, 2021). The value of Daily Deuteronomy, Mid-Semester Assessment or Final Semester Assessment can be used to demonstrate learning achievement. Learning achievement is the outcome of students' participation in learning activities both inside and outside of the classroom (Kambuaya, 2015).

The objectives of this study are as follows: 1) to investigate the impact of using e-learning on economic achievement. 2) to investigate the impact of divergent thinking patterns on economic achievement. 3) to investigate the impact of using e-learning and divergent thinking patterns on economic learning achievement.

Hypothesis

H1: The use of e-learning has a positive and significant effect on learning achievement.

H2: Divergent thinking patterns have a positive and significant impact on learning achievement.

H3: The use of e-learning and divergent thinking patterns at the same time has a positive and significant effect on economic learning achievement.

Based on theoretical explanations, research findings, and hypothesis development regarding the effect of e-learning and divergent thinking patterns on learning achievement. The framework research on (figure 1) is as follows:
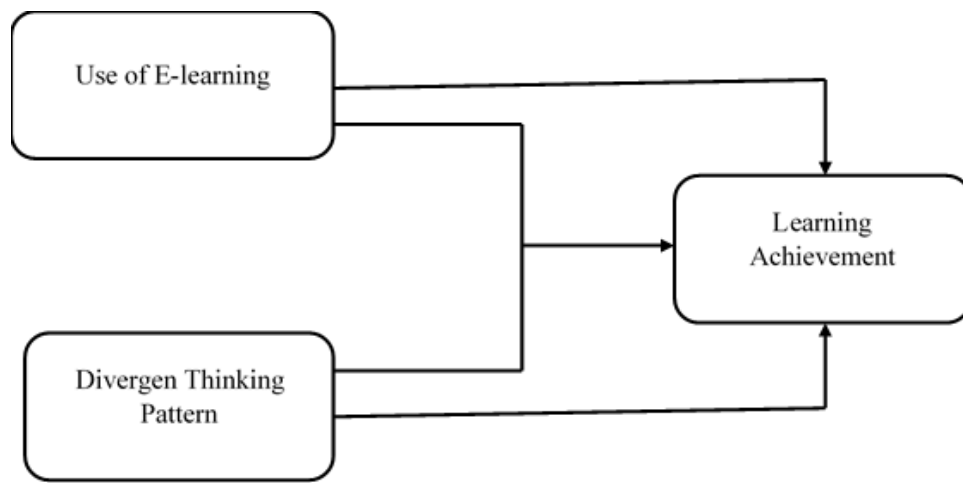

Figure 1: Thinking Framework

Research Method

This study employs a quantitative approach with the assistance of the IBM SPSS application version 26. A questionnaire is used to collect data. The instrument measurements employed a Likert scale with four response options: (1) STS (Strongly Disagree), (2) TS (Disagree), (3) S (Agree), and (4) SS (Strongly Agree). The descriptive statistical analysis and inferential statistical analysis techniques used are the normality test, linearity test, multicollinearity test, heteroscedasticity test, and hypothesis testing (t test and F test). Quantitative research methods are designed to put hypotheses to the test. Quantitative research is used to compare the variables x and y using numbers.

The variable indicators in this study are explained in table 1.

Table 1. Variable Indicators

Variable	Indicators
Use of E-learning (Hanson, 2003)	Utilization of E-learning, Implementing e-learning and the role of e-learning
Divergent Thinking Patterns (Ilhamsyah, 2022)	Fluency, Flexibility, Originality and Elaboration
Learning achievement	Cognitive domain, affective domain, psychomotor domain

This study was carried out at SMA Negeri 2 Tumijajar in Tulang Bawang, Barat. In this study, the population consisted of 137 students from class XI IPS. The sample technique used is a saturated sample, with the entire population, 137 students, serving as the sample. In this study, questionnaires and documentation were used to collect data.

This study employs primary data derived from the results of a questionnaire distributed to respondents, which included a questionnaire on e-learning use and divergent thinking patterns. The author obtained secondary data from the odd semester Mid Semester Deuteronomy (UTS) scores.

Result and Discussion

Based on a series of validity and reliability tests on the questionnaires used in this study with the SPSS application program, it is known that the e-learning and divergent use questionnaires total 39 statement items, 36 items were declared valid because they had a significance level above 0.361 and 3 items were declared invalid because it has a significance level below 0.361. In this study, if an invalid statement item was found, the steps taken by the item were discarded and not used in the study so that a total of 36 questionnaire statement items were used. The reliability test was carried out using Cronbach Alpha. The results of the estimation of instrument reliability for each variable are 0.849 (X_1) and 0.853 (X_2). That way, the entire questionnaire instrument in this study is reliable.

The results of the data normality test using the one-sample Kolmogorov-Smirnov Test obtained the Asymp value. Sig. (2-tailed) of $0.064 > 0.05$ shows if the data on e-learning use, divergence and learning achievement are normally distributed. For the results of the linearity test of Deviation from Linearity X_1 value was 0.290 and the Deviation from Linearity X_2 value was 0.997. Both of these values are greater than 0.05 so it is decided that the regression model passes the linearity test.

The multicollinearity test results revealed that the tolerance values X_1 and X_2 were 0.984, while the VIF X_1 and VIF X_2 were 1.016. Based on these findings, it is determined that the acquisition of tolerance values X_1 and $X2$ is greater than 0.10 and that the acquisition of VIF values X_1 and X_2 is less than 10, implying that the regression model is free of multicollinearity. The acquisition of significance X_1 for the heteroscedasticity test is 0.720, and the acquisition of significance X_2 is 0.456. Because the two acquisition probability of significance were greater than 0.05, it was determined that the regression model lacked heteroscedasticity. The calculated value of D (Durbin-Watson) for the autocorrelation test is 1.594, which is between 2 and close to 2 that indicating there is no autocorrelation.

Table 2. T-test (Partial)

Coefficients [a]

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1 (Constant)	73.065	3,649		20.023	.000
Use of E-learning	.196	.063	.253	3.084	.002
Divergent	.264	.086	.253	3.080	.003

(Source: Primary data processed, 2022)

The Effect of Using E-learning Economic Learning Achievement

According to table 1, the significance value of using E-learning (X_1) on the learning achievement variable (Y) is $0,002 < 0.05$. Statistical t test results for the use of E-learning obtained values from t-count > t-table of $3.084 > 1.656$. It is possible to conclude that e-learning has a significant positive effect on economic learning achievement or that e-learning has a partial effect on learning achievement.

The findings of this study are consistent with the findings of Sya'adah et al (2021), who discovered that the use of e-learning has a positive and significant effect on student achievement. According to the study's findings, the more students who use e-learning, the better their learning

outcomes; conversely, the less students who use e-learning, the worse their learning outcomes. Similarly, the study conducted by Arryadna & Pratiwi (2022) discovered that the use of e-learning had a positive and significant effect on student achievement.

The findings of this study are also consistent with Wang's theory of e-learning sanctions (ELS) developed in (Tarigan, 2011). This theory includes four qualities in the use of e-learning, namely the quality of face-to-face learning, the quality of learning in the community, the quality of learning materials, and the quality of individuals. According to Clark (Lin et al., 2014), e-learning is not media or technology, but rather a design strategy or method used in media technology. Where the teacher must decide on learning objectives, analyse students' abilities and learning content, and accept the effectiveness of learning. According to Muhson (2010) research, the use of Information Technology (IT) in the form of the internet (e-learning, distance learning, web-based learning, and other IT-based educational terms) as an economical learning medium that can expedite the learning process and optimise results. study.

Some research findings indicate a positive relationship between e-learning use and academic achievement, while others show a negative relationship between e-learning use and student achievement.

The Effect of Divergent Thinking Patterns on Economic Learning Achievement

According to table 1, the significance value of the X_2 (divergent) is 0.003 < 0.05. According to the results of the divergent statistical t test, the value of t-count > t-table is 3.080 > 1.656. The analysis results show that divergent thinking patterns have a significant positive effect on economic learning achievement.

The findings of this study are consistent with the findings of Nurdiansyah, (2016), who investigated the effect of divergent thinking on mathematics learning outcomes. The study included 117 students from three schools in the Bontotiro sub-district of Bulukumba district. According to the findings of Murniati & HM (2015), divergent thinking has a significant effect on student achievement, so students who have the ability to think divergently will have higher learning achievement than students who do not have that ability to think.

According to Nirwana et al (2018), students with high divergent thinking skills become accustomed to solving non-routine problems and can apply them to solve problems in everyday life. According to Upu et al (2020), when solving a problem, students must look for multiple solutions rather than relying on just one. Divergent thinking skills are demonstrated by students' ability to look at problems from multiple perspectives and solve problems using multiple techniques in order to develop alternative approaches.

Table 3. F test (Simultaneous)

ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	326,056	2	163.028	8,427	.000 [b]
	Residual	2592,309	134	19,346		
	Total	2918.365	136			

(Source: Primary data processed, 2022)

The Effect of Using E-learning and Divergent Thinking Patterns on Economic Learning Achievement

From the F-statistic test conducted by the researcher, it was obtained that the F-count > F-table was 8.427 > 3.06 and had a significance percentage value of 0.00 < 0.05, thus stated the use of e-learning and divergent influences simultaneously and significantly on the learning achievement variables of

students. From the results of the two previous studies that have been partially discussed, together with the variables using e-learning and divergence have a significant effect on the economic achievement of students.

The following attitudes were observed in this study: students' use of e-learning and divergent thinking patterns. The use of e-learning as a process of using learning media that utilizes internet technology support, by utilizing e-learning learning in the learning process, students who usually only listen will become more active in accessing subject matter anytime and anywhere without being limited to just listening to teacher lectures in class, so that it can improve student learning outcomes (Weni & Isnani, 2016). Girsang et al (2021) explain that e-learning learning is built on several principles that all contribute to the learning process's success. In line with Maghfiroh et al (2020)that the use of e-learning is a learning method that has a significant contribution to improving the quality of the teaching and learning process.

E-learning can increase student enthusiasm for learning, courage to express opinions in forums, confidence in asking questions, time discipline, and a sense of responsibility (Maghfiroh et al., 2020). According to Warokka et al (2022), through e-Learning, students can actively observe, perform, and demonstrate virtual teaching materials in various formats, making students more interesting and dynamic in order to motivate students to progress further in the learning process.

Kurnia (2018) discovered that one of the thinking skills that can be developed in students in public high schools is the ability to think divergently. Divergent thinking, according to Kurnia, can be developed to improve students' creativity. Divergent thinking is also a method of developing several distinct solutions to a problem (Umar & Alhassan, 2018). Ilhamsyah (2022) revealed that when students have high divergent thinking skills, the learning process becomes easier, and they can achieve very good and satisfying learning outcomes.

Table 4. Model Summary Statistics

Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.334 [a]	.112	.098	4.398

(Source: Primary data processed, 2022)

A coefficient of determination test was performed based on the table above to determine the contribution of the independent variables of e-learning and divergence in explaining the dependent variable of learning achievement. According to Table 4, the value of R Square 0.112 indicates that the use of e-learning and divergent variables contributes to learning achievement by 11,2%. The remaining 88,8% is influenced by other variables not discussed in the study. Based on the data analysis, students who are able to use e-learning in their learning and have the ability to think divergently will achieve high learning outcomes. Students who do not use e-learning and have low divergent thinking in learning will achieve lower academic results. Divergent thinking is required in the learning process because without it, students do not see problems from multiple perspectives and are less able to provide multiple solutions to a problem. When students are frequently given lessons in the form of lectures and questions and answers, the opportunity for students' thinking skills to develop is limited. As a result, students are less tolerant and less open to opinions that differ or deviate from the norm.

According to the research findings, the factors of e-learning use and student divergence during learning had a simultaneous effect on the economic learning achievements of students at SMA Negeri 2 Tumijajar. It is hoped that this research will contribute to expanding the scientific repertoire of relevant research.

The limitation of this study is that the variables examined only examine two factors affecting

Learning achievement, namely the use of e-learning and divergence. In this study, the learning achievement of students in class XI Social Sciences Department of SMA Negeri 2 Tumijajar odd semester 2022/2023 Academic Year was devoted to economics subjects.

Conclusion

Based on the findings of the previous research, it is possible to conclude that: (1) there is a partially positive and significant relationship between the use of e-learning and students' economic learning achievement. (2) Divergent thinking patterns have a moderately positive and significant influence on students' economic learning achievement. (3) There is a significant influence on students' economic achievement when using e-learning and divergent thinking patterns at the same time. Based on the findings of the study, teachers should be able to improve their skills in using e-learning in general, not just on specific materials. E-learning media for use in schools must be created in order to encourage students to participate in e-learning activities. Teachers can also encourage students to improve their divergent thinking skills so that they achieve even better learning outcomes.

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