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The Effectiveness of the Self-Directed Learning and Discovery Learning Model to Improve Student Independence Learning

Nurul Umamah[1], Winda Ramadhani S[2], Sumardi[3], Marjono[4]

[1,2,3,4] Department of History Education, Faculty of Teacher Training and Education, University of Jember, Indonesia

[1]ORCID ID 0000-0002-3589-5014

ABSTRACT: This study aims to determine the effectiveness of the Self-Directed Learning model and Discovery Learning model in increasing the learning independence of students in historical subjects. The research design used a quasi-experimental with a pretest-posttest control group with data analysis techniques using a paired sample T-test. The sample in this study was class X students at SMAN Kalisat Jember. The research instrument uses a measuring tool for student independence, namely in the form of a questionnaire with a rating scale model. The results of the t-test analysis show the average value of students' independent learning with the Self-Directed Learning of 61.36. Meanwhile, the average value of independent learning of students with the Discovery Learning model is 56.03, it shows that the Self-Directed Learning model is more effective in improving students' independent learning with a high effectiveness of 0.88.

KEYWORDS: Self-Directed Learning, Discovery Learning, Learning Independence

INTRODUCTION

Advances in information and communication technology make changes fast and difficult to predict in all aspects of life. Technology integration makes learning more interesting, active, creative, systematic, and effective (Ghavifekr & Rosdy, 2015). Industrial Revolution 4.0 education provides learning innovative ideas (Gulicheva, Lisin, Osipova, & Khabdullin, 2017). Learning technology integration as a form of educational innovation (Shahroom & Hussin, 2018). This era demands connectivity in all things (Internet of Things) and is believed to bring changes to students' learning process to become very complex.Such a technology-supported teaching and learning process is a core concept of Education from the Industrial Revolution 4.0. Students from generation Z are independent thinkers by utilizing access to information through technological assistance (Boholano, 2017:23; Anagun, 2018:825). The use of technology has become one the important things and cannot be separated from the learning environment so that it can meet the learning preferences of Gen Z students (Anaelka, 2018; Al Kandari & Al Qattan, 2020). Generation Z was born in an era of progress and easy access to technology in everyday life.

The problem of learning history is due to the lack of interest of generation Z students who have a unique thinking tendency and a generation that is technologically literate, moves quickly from one task to another, and always thinks practically (Safitri, Umamah & Sumardi., 2019). Learning history has a very important role in forming a national identity (Amri, 2015; Abrar, 2015; Umamah, 2017). The history education curriculum's purpose is to function as a social reconstruction; by reconstructing past events, students will learn how to solve problems in the present and plan effectively (Umamah, 2017). By analyzing the present situation, we can make projections for the future. Of course, this analysis is based on historical facts. History Learning not only helps make a diagnosis of the present but also the prognosis, this means projecting the future. The characteristics of learning history are by studying the development of society from various aspects of life such as politics, economics, society, culture, and religion so that students must be able to develop their knowledge in searching, processing, and finding the information they need themselves.

The independent curriculum emphasizes learner-centered learning and applies 21st-century competencies. Learning in the 21st century is oriented towards 4C skills. These skills help students develop the quality of their learning to reach a higher level of education (Kivunja, 2015: 225). Teachers' innovative abilities are expected to result in more meaningful learning for students (Umamah *et al*, 2020). These skills have begun to be implemented in Indonesia in a competency-based independent curriculum and character education.The Indonesian national education system aims to develop the character of students with the main character values that must be prioritized, namely: Faith, Fear of God Almighty, and Noble Morals; (2) Global Diversity; (3) Mutual Cooperation; (4) Independent; (5) Critical Reasoning, (6) Creative (Ministry of Education and Culture, 2021). Independence requires self-awareness, habit and gradual practice of discipline.

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Character education will be easily achieved if educators have the flexibility of mindset, innovation, and ingenuity to combine lesson content, educational goals, and character values (Umamah, 2015: 234). Independent character is one of the main values in character education for the Indonesian nation, following the objectives of the Merdeka Curriculum to produce students as independent human beings who never stop learning. Independence can be increased through activities that involve students thinking creatively, being able to analyze and present hypotheses, and being able to solve problems independently with critical thinking skills (Halpern, 2000:43; Dewey, 1997:25). Independence is when a person has to learn how to set their own goals and achieve them (Gibbons, 2003). Aspects of independence in adolescents involves three aspects, namely emotional autonomy, behavioral autonomy, and value autonomy. (Steinberg, 2002). The implementation of a learning environment and learning strategy that encourages student participation in the learning process can promote students' independence.

Applying a learning environment and learning approach that supports students to play an active role in the learning process can increase students. Previous research conducted by Meindrawati, Umamah & Sumarno (2017) showed the results of research related to the independence of students in learning history class XII IPS 1 through observations made, the average percentage of classical independence data was 47.70%. These results explain that the criteria for independence XII IPS 1 are still in the fewer criteria. Based on previous research studies conducted by Priyanti, Umamah & Sumardi (2019) shows based on the results of pre-cycle research the conditions in class XI IPS 2 MAN 1 Jember are as follows: (1) 50% confidence; (2) responsibility 47.36%; (3) initiative 50%; (4) discipline 46.71%; and (5) completeness of student learning outcomes on daily tests = 26.31%. The conditions in the class have problems related to independence and learning outcomes. Another observational study conducted by Rufaidah, Umamah & Sumardi (2019) found that the percentage of student independence was 55.32% which was stated to be low in student learning independence.

The learning model that can increase independence is the Self-Directed Learning model. The Self-Directed Learning model encourages students to be responsible independently in solving problems and becoming agents of change in their learning process. The application of the Self Directed Learning learning model as per the demands of learning history per the independent learning curriculum, where students are expected to be able to develop their learning motivation independently and actively participate in history learning so that the objectives of learning history can be achieved optimally.The concept of the learning model Self-Directed Learning or independent learning is a learning process carried out on its initiative (Plews, 2017). These skills will enhance individual knowledge, expertise, and achievement.

Self-directed learning (SDL) means learning that is free to determine the direction of plans, resources, and decisions to achieve academic goals. The Self-Directed Learning learning model awakens and empowers students that learning is an individual responsibility, and the learning process that is carried out is centered on students (Song & Hill, 2007: 30).The results of previous research which are in line with this research are Priyanti, Umamah & Sumardi (2019) based on research results showing that the application of the Self Directed Learning learning model can increase student independence and outcomes. Another study by Rufaidah, Umamah & Sumardi (2020) showed the results that the independence and learning outcomes of students who were taught using the information technology-based Self-Directed Learning model were better than students who were taught using other models.

Another learning model that emphasizes independence is the Discovery Learning model. Discovery Learning is cooperative learning, where students work in structured learning on activities designed to increase students understanding of the material (Ott, Hamilton, & LaCourse, 2018). Research from (Meindrawati, Umamah & Sumarno, 2018; Priyanti, Na'im & Soepeno, 2015) states that Discovery Learning can increase independence and learning outcomes. Other research from (Safitri, Umamah & Sumardi, 2018) stated that Discovery Learning can foster students' abilities in discovery, exploration, problem-solving, and independent (independent) thinking. The Discovery Learning learning model encourages students to be actively involved, independent, and able to create knowledge concepts in the learning process (Priyanti, 2015; Meindrawati, 2018; Suartama, 2020; Chusni et al., 2020).

Based on the problems in the background that have been described, the researcher wants to conduct experimental research related to the effectiveness of the Self-Directed Learning model and Discovery Learning Model for student independence in historical subjects. This research will verify which learning model is more effective for students' independence learning in history subject.

METHOD

This research is a quasi-experimental design with a quantitative approach. The selected group is a pre-existing group. The research sample used was 72 students of class X-3 and class X-5 at SMAN Kalisat Jember academic year 2022/2023, selected through a homogeneity test. In this study, researchers treated the Self-Directed Learning and Discovery Learning models and observed their effects on students' independence learning. Research variables consist of independent variables and dependent variables. The independent variables in this study are the Self-Directed Learning model (X1) and Discovery Learning (X2). The dependent is the variable that is affected. The dependent variable in this study is independence learning (Y). This study uses indicator of independent learning, including (1) *emotional autonomy*; (2) *behavioural autonomy*; (3) *value autonomy*. The data collection

method consists of documentation and questionnaire to acquire data on the number of students in grade X and the value of the research population and the value of the research sample. Test to obtain information about students' independence learning. The research instrument used was a performance questionnaire in the form.

Table 1. Table of Skala Likert Instrument Independence Learning

Statement	Description	Value
STS	Totally Disagree	1
TS	Don't Agree	2
S	Agree	3
SS	Strongly Agree	4

Source: Rufaidah (2020)

The data analysis technique used the t-test (Paired Sample t-Test) assisted by SPSS for Windows version 24. The t-test (Paired Sample t-Test) aims to determine the difference in independence learning of experimental class 1 students treated with the Self-Directed Learning model and experimental class 2 treated with the Discovery Learning model. The t-test conducted the data prerequisites are normal distribution and homogeneous. The normality test uses Kolmogorov-Smirnov, then the homogeneity test uses Homogeneity of Variance. Decision-making criteria in this study use a significance level of 5%. The effectiveness test used to measure the effectiveness of independence learning is the Eta Squared effectiveness formula with the effectiveness test interpretation criteria below.

Table 2. Criteria for effectiveness test

Score	Interpretation
0,01	Small Effect
0,06	Moderate Effect
0,014	Large Effect

Source: Cohen, Manion, & Morrison (2018)

RESULT

Before the data is analysed using the Paired Sample t-Test, the data is first tested for normality using the Kolmogorov-Smirnov formula assisted by SPPS for Windows version 24. The normality test was measured on the test results of both samples, X-3 as the experimental class 1 which was treated with the Self-Directed Learning model and X-5 as the experimental class 2 which was treated with Discovery Learning model. The decision-making criteria in this study used a significance level of 5%. The results of the normality test are presented in the table below.

Table 3. Normality test results

Sample	Data	N	Sig.	Notes
Experiment 1	**Pre-Questionnaire**	**36**	0,200	Normal distribution
	Post-Questionnaire	**36**	0,91	Normal distribution
Experiment 2	**Pre-Questionnaire**	**36**	0,200	Normal distribution
	Post-Questionnaire	**36**	0,71	Normal distribution

Source: Primary data processed

Based on the results of the normality test in the experimental class above, the acquisition of pre-independence questionnaire data is normally distributed with a sig value of 0.200 > 0.05, and the post-independence questionnaire data is normally distributed with a sig value of 0.91 > 0.05, so from these two data H0 accepted. Based on the results of the normality test in the experiment class 2 above, the independence pre-test data obtained were normally distributed with a sig value of 0.200 > 0.05, and the independence post-test data were normally distributed with a sig value of 0.71 > 0.05, so from these two data H0 was accepted. Shows a number greater than 0.05 so that the pre-questionnaire and post-questionnaire in experimental class 1 and experiment class 2 were declared normally distributed. Furthermore, the results of the homogeneity test are presented in the table below.

Table 4. Homogeneity test results

Data	Levene Statistic	df1	df2	Sig.	Keterangan
Pre-Questionnaire	0,819	1	69	0,369	Homogen

Source: Primary data processed

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Based on the results of the calculation of the homogeneity test for independence of pre-question data independence of students in the experimental class 1 and experiment class 2, it can be seen in table 4, the pre-question data independence is at 0.819 with a Sig value. (0.369) which is greater than 0.05 then H0 is accepted. Thus, it shows that the pre-question data for the independence of students in the experimental class and the control class are declared homogeneous.

After the prerequisite test for data analysis is met, a t-test is conducted to then see the effectiveness of the Self-Directed Learning model on independence learning. Paired Sample t-Test is used to see the difference in the average value of students' independence learning and the t-value that will be used in the effectiveness test formula. The results of the t-test on the independence learning test for experimental class 1 and experiment class 2 are presented in the table below.

Table 5. Results of the t-test of experiment 1 and experiment class 2

Class		N	Mean	Std. Deviation	Std. Error Mean
Experiment 1	**Pre-Questionnaire**	36	51,89	4.509	.751
	Post-Questionnaire	36	61,36	4.716	. 786
Experiment 2	**Pre-Questionnaire**	36	51,47	3.858	.643
	Post-Questionnaire	36	56,03	3.282	.547

Source: Primary data processed

The average value of the pre-questionnaire in experimental class 1 which was taught by the Self-Directed Learning model is 51,89 and the average value of the post-questionnaire is 61,36. The average value of the pre-questionnaire in experiment class 2 which was taught by the Discovery Learning model is 51,47 and the average value of the post-questionnaire is 56,03. Based on the difference in the average value of the pre-questionnaire and post-angket in experimental class 1 and experiment class 2, it can be concluded that the independence learning of students taught using the Self-Directed Learning model are better than students taught using the Discovery Learning model.

The decision-making criteria were based on a significance level of 5% with the following hypothesis: (a) If Sig value (2-tailed) > 0.05, then there is no significant difference; (b) If Sig value (2-tailed) < 0.05, then there is a significant difference. The following are the results of the t-test on the pre-questionnaire and post-questionnaire to measure independence learning before and after treatment in experimental class 1 and experimental class 2 are stated in the table below.

Table 6. Results of paired sample t-test for experimental class 1

		Mean	Std.Deviation	Std.Eror Mean	Lower	Upper	T	Df	Sig.(2-Tailed)
Pair 1	PRE_POST	-9.472	3.493	.582	-10.654	-8.290	-16.272	35	.000

Source: Primary data processed

The data presented in table 6 shows that the Sig. (2-tailed) pre-questionnaire and post-questionnaire data is 0.000 < 005. Based on the decision-making criteria, it can be concluded that there is a significant difference in the level of Independence learning between students who are taught before using the Self-Directed Learning model and after using the Self-Directed Learning model. Next is the effectiveness test stage with the relative effectiveness formula. The results of the effectiveness test of Self-Directed Learning model are as follows:

$$\text{Eta Squared} = \frac{t^2}{t^2+(N-1)}$$

$$= \frac{(-16.272)^2}{(-16.272)^2+(36-1)}$$

$$= \frac{264.777}{299.777}$$

$$= 0{,}883$$

The result of the effectiveness test of the Self-Directed Learning model is 0.88, shows the large effect criteria. This means that the Self-Directed Learning model is effective for improving students' independence learning with a high level of effectiveness.

Table 7. Results of paired sample t-test for experimental class 2

		Mean	Std. Deviation	Std.Eror Mean	Lower	Upper	T	Df	Sig. (2-Tailed)
Pair 1	PRE_POST	-4.556	4.191	.699	-5.974	-3.137	-6.521	35	.000

Source: Primary data processed

The data presented in table 7 above shows that the Sig. (2-tailed) pre-questionnaire and post-questionnaire data is 0.000 < 005. Based on the decision-making criteria, it can be concluded that there is a significant difference in the level of Independence learning between students who are taught before using the Discovery Learning model and after using the Discovery Learning model. Next is the effectiveness test stage with the relative effectiveness formula. The results of the effectiveness test of Discovery Learning model are as follows:

$$\text{Eta Squared} = \frac{t^2}{t^2+(N-1)}$$

$$= \frac{(-6.521)^2}{(-6.521)^2+(36-1)}$$

$$= \frac{42.523}{77.523}$$

$$= 0{,}548$$

The result of the effectiveness test of the Discovery Learning model is 0.54, shows the large effect criteria. This means that the Discovery Learning model is effective for improving students' independence learning with a high level of effectiveness.

DISCUSSION

This study examines the effectiveness of critical thinking skills of students who are taught using the Self-Directed Learning model and the Discovery model. The results of the t-test analysis obtained the average value of the post-questionnaire independence learning of the experiment class treated with the Self-Directed Learning model is 61.36. While the average value of post-questionnaire independence learning treated with the Discovery Learning model is 56.03, which shows that the Self-Directed Learning model is better at improving students' independence learning. Based on the effectiveness test results, both models show high effectiveness, with the Self-Directed Learning model having a higher effectiveness level is 0.88. While the effectiveness level of the Discovery Learning model is 0.54. So, it can be concluded that the Self-Directed Learning model is more effective in improving students' independence learning with a higher level of effectiveness.

Independence learning refers to the autonomous ability of learners to manage their own learning process, by viewing themselves as the source of their own actions and decisions as the responsibility for one's lifelong learning (Foo & Hussain, 2010). The adult learning theories that emphasize adults' feelings of personal autonomy in their learning are the source of the research tradition on self-directed learning. This implies that students accept responsibility for setting their learning objectives and taking ownership of their progress (Garrison, 1997; Knowles, Holton, & Swanson, 2015; Merriam, Caffarella, & Baumgartner, 2007). It also means that adults want to be perceived and treated as capable of making their own decisions by others (Knowles et al., 2015, p. 44). We believe that instructors are more likely to be actively engaged in learning if they are considered responsible adults in charge of their education (Ellinger, 2004; Deci & Ryan, 2000). The efforts of educators in the classroom to increase learning independence students is very important to do so that problems that arise regarding student learning independence can be minimized.

Learning activities should be able to provide students with a sense of comfort and calm because learning is fun and providing students with a sense of comfort will provide a lasting memory in students' memories. (Schweder & Raufelder, 2019). Learning with the student-centered learning model is believed to be a process in which students take initiative in the learning process (Knowles et al., 2015). There are different phases in self-directed learning processes (Knowles et al., 2015; Tough, 1979). These stages typically include a needs assessment, planning, learning, and evaluation. A learning need is defined as a mismatch or gap between the desired competencies and the learners' current level of ability (Knowles et al., 2015). The following are some results from previous research which are in line with this research belonging to Priyanti, Umamah & Sumardi (2019) which shows that the application of the Self-Directed Learning learning model can increase student independence and outcomes. Another study by Rufaidah, Umamah & Sumardi (2020) showed the results that the independence and learning outcomes of students who were taught using the information technology-based Self-Directed Learning model were better than students who were taught using other models.

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Discovery Learning as cooperative learning, where students work in structured learning on activities designed to increase students' understanding of the material (Ott, Hamilton, & LaCourse, 2018). Discovery learning model syntax is: stimulus; problem identification; data collection; data processing; proof; generalization. This model organizes teaching in such a way that students acquire knowledge that has never been known before and does not start notifications, but discovers for themselves (Alfieri, Brooks, Aldrich & Tenembaum, 2011). Discovery Learning is a learning strategy that motivates and is implemented based on the activities and observations of students (Bruner, 1961 in Ilhan, A., & Gülersoy, 2019).

One model that can be used to increase independence and history learning outcomes is the application of self-directed learning (SDL) models. The Self-Directed Learning model is a learning model that emphasizes independent learning. The stages of integrative Self-Directed Learning include: 1) planning; 2) monitoring; and 3) Evaluating. The stages of the Self-Directed Learning model indirectly show the superiority of this learning model. The Self-Directed Learning model is flexible but still oriented towards planning, monitoring and evaluation and depends on the skills of students in managing learning independently. Several stages of the Self-Directed Learning model involve almost all indicators of learning independence, including: 1) emotional autonomy; 2) emotional autonomy; and 3) value autonomy. Therefore, the Self-Directed Learning model applied in learning is superior in increasing student learning independence. The Self-Directed Learning model emphasizes students being actively involved in classroom learning.

The Self-Directed Learning Model and the Discovery Learning Model both have an influence, but the Self-Directed Learning model is superior in influencing student learning independence. The Self-Directed Learning model awakens and empowers students that learning is an individual responsibility, and the learning process is focus on students (Song & Hill, 2007). So, it can be concluded that the Self-Directed Learning model is very effective for student independence.

CONCLUSION

Based on the results of research on the effectiveness of the Self-Directed Learning model and Discovery Learning model on students' independence in learning history, it can be concluded that the Self-Directed Learning model is more effective in improving students' independence learning in historical subjects. The results of the t-test analysis show the average value of students' independence learning with the Self-Directed Learning of 61.36. Meanwhile, the average value of independence learning of students with the Discovery Learning model is 56.03, it shows that the Self-Directed Learning model is more effective in improving students' independence learning with a high effectiveness of 0.88.

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