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Profile of Learning Independence in Achieving Creative Thinking Ability of Vocational School Students

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Abstract: This research focuses on the profile of learning independence in achieving the mathematical creative thinking skills of vocational school students. This research was conducted in class X SMK with subjects consisting of 5 students. Data collection techniques using questionnaires, tests and interviews. Data analysis was carried out through data reduction, data presentation, data interpretation and conclusion drawing. In this study, data reduction was carried out by grouping students into high, medium and low levels of learning independence through a learning independence questionnaire. Furthermore, the data is presented with a description of the characteristics of the creativity level of students who have high learning independence in solving math problems. Then draw conclusions. Researchers used triangulation methods to compare data. The results of this study are that students have a high level of learning independence and students have difficulty working on tasks of mathematical creative thinking skills so that it takes a long time to do. Students are required to have activeness, own initiative, be resilient and persistence in learning. Students can involve various resources and activities such as reading alone, group study and question exercises in order to improve their mathematical creative thinking skills.

Keywords : independent learning; students' mathematical creative thinking skills

Introduction

Educational Benchmark for the progress of a nation. The role of education is very important for every citizen to increase human resources. Educated citizens can use their thinking to advance the good name of the nation and state. The aim of the 2013 Curriculum is to prepare Indonesian people to have the ability to live as individuals and citizens who are faithful, productive, creative, innovative and effective and able to contribute to the life of society, nation, country and world civilization (Pendidikan etal.,2013). In order to achieve this goal, teachers are required to teach students through the necessary knowledge, skills and strategies. Students must also have the knowledge and skills taught to help them to undertake skilled learning.

Learning to learn is defined as a closed ability to struggle and survive in adjusting the learning process of students to better and effectively manage time and information. This process

is related to the theory of independent learning introduced in the 1980s by Zimmerman. Independence learning is a learning process that occurs because of the influence and thinking, feelings, strategies and behavior of students who are results-oriented (Schunk, 1989)

Self-regulated learning processes require students to monitor their learning strategies independent of teachers and peers and adapt them if necessary. Monitoring activities include checking learning satisfaction, assessing learning difficulties, and predicting learning outcomes (Cheng,2011). A self-learning strategy is a set of plans that students can use to achieve goals.

The use of independent learning strategies for students, students are able to create better learning habits, improve learning techniques, monitor progress, evaluate performance, utilize strategies to increase the desired value and assess their academic progress and learning (Zumbrunn etal., 2011). Based on the description above, it can be concluded that independent learning works because of the influence of students' thinking and strategy in dealing with problems with results-oriented settlement strategies. Thought or how students think in dealing with questions and the preparation of settlement strategies is closely related to mathematical creative thinking abilities.

The importance of independence in learning mathematics because of the demands of the curriculum for students to face problems in the classroom and outside the classroom which are increasingly complex and reduce student dependence on other people in everyday life (Muhammad &Fauzi, 2011). Student learning activities carried out in the classroom and outside the classroom must be effective in making students active, critical, creative and want to be achieved.

This learning independence can affect students' mathematical creative thinking abilities. This is supported by the results of research conducted by (Mauludin &Nurjaman, 2018) which show that independent learning affects students' mathematical creative thinking abilities.

Factors that affect learning independence are environmental factors. The environment that individuals face greatly affects the development of a person's personality, both in negative and positive ways. A good family and community environment,and habits of life, independence (Syahputra, 2017)

Indicators that are a measure of student learning independence in this study are (KanaHidayati & EndangListya,2013.) 1) Independence from Other People; 2) Having a confident attitude; 3) Discipline behavior; 4) Having a sense of responsibility; 5) Behaving based on one's own initiative; 6) Self-control. Creativity is also the focus of the application of learning in all subjects, including mathematics (Fatah et al.,2016). Creative Thinking Means Finding new ways better to do anything (Sitorus&Doctoral, 2016).

Bergstom (Pehkonen, 1997) defines the ability to think creatively as "performance where the individualist produces something new and unpredictable". The student's ability to think creatively allows these students to obtain many ways or alternative solutions to a de Bono problem (Saputra,2009). The number of ways or alternative solutions to a problem will help students with the final result.

Sternberg defines creativity as actions that are made to produce original and valuable results (Sternberg,2009). Therefore creative thinking is very important for students to design, solve problems and get new ideas. Through creative thinking students are expected to be able to solve problems in everyday life creatively.

The ability to think creatively can be concluded, namely the ability of students to understand problems and find solutions with various strategies or methods. The components used as benchmarks in this study are as follows (Silver, 1997) (a)   fluency,   smoothness   The

ability to spark many ideas are created, ideas, answers, solving problems or questions, (b) flexibility, dexterity ability to generate ideas, answers, or questions varied, can see the problem from a different angle, looking for a lot of different alternatives and able to change the approach, (c) elaboration, the ability to develop an idea, add or specify the details of an object, idea or situation and (d) originality, the ability to express one's own opinion in response to a situation at hand.

Method

This research is a descriptive qualitative research. This study aims to describe in depth the profile of learning independence in the achievement of students' mathematical creative thinking skills in SMK. Students' creative thinking abilities are traced through a task-based interview. Data from creative thinking assignments and interviews are combined, then described qualitatively and the results are in the form of written, oral or descriptive words from the research subject and then analyzed. Therefore, this study uses an exploratory approach.

The technique of taking the subject of this study using purposive sampling technique where 5 students with high, medium and low learning independence abilities. The process of selecting research subjects is to choose 1 student who has high learning independence abilities, 1 student who has moderate learning independence abilities and 1 student who has low learning independence abilities based on the questionnaire sheet given to categorize the learning independence.

instruments in research There are two kinds of this, namely the main instrument and the instrument auxiliary. The main instrument is the researcher himself, while the assistive instrument consists of 3 kinds, namely: independent learning questionnaire, creative thinking ability task for Linear Program material, and interview guidelines. The learning independence questionnaire was adapted from the learning independence questionnaire developed by Sumarmo.

No	Pernyataan	Respon			
A	Indikator : Tidak tegantung terhadap orang lain	SS	TS	S	STS
1	Saya belajar materi konsep bangun ruang sisi datar dibawah kendali orang lain				
2	Saya meningkatkan prestasi belajar pada materi konsep bangun ruang sisi datar karena dorongan orang lain				
3	Saya memilih sendiri strategi belajar pada materi konsep bangun ruang sisi datar				
4	Saya menyelesaikan masalah kontekstual yang berkaitan dengan bangun ruang sisi datar sesuai dengan kemampuan saya sendiri				
5	Saya belajar matematika bergantung pada guru privat				

Figure 1. Examples of Students' Independent Learning Questionnaire

The task of creative thinking skills used in this study is an open problem that is structured by considering aspects of creative thinking (fluency, flexibility, elaboration and authenticity). The interview guide is used to explore in depth the profile of learning independence in the achievement of students' mathematical creative thinking skills in SMK.

The data collection technique in this research is to use triangulation method which means comparing the data from the task of creative thinking skills and the data from the interview results, in addition to the independent learning of students using

triangulation methods by comparing the data from the task of creative thinking skills and data from interviews, as well as the results of questionnaires. student learning independence and interviews of student learning independence.

The stages passed in data collection in this study were carried out through tests, questionnaires and interviews.

1. Giving tests, namely techniques for collecting data on students' creative thinking abilities in the material of the Opportunity Form of the Question Description.
2. Giving a questionnaire, namely a technique to collect data on student learning independence after categorizing the results of the questionnaire (high, medium, low)
3. The interview in this study was a semistructured interview where students expressed opinions related to the task of creative thinking skills. This interview was conducted to explore students 'independent learning in achieving students' creative thinking abilities. Therefore, the implementation is giving tests, questionnaires and interviews.

The data analysis technique in this study is based on the opinion of Miles and Huberman (Rijali, 2018) namely (1) data reduction; (2) data presentation; and (3) conclusion and verification. Data obtained from the results of assignments and interviews. After the data is obtained, data reduction is carried out. Data reduction is carried out by grouping students into high, medium and low levels of learning independence through a learning independence questionnaire. Furthermore, the researcher discussed with the mathematics subject teacher to select students who would be the research subjects.

Then the data obtained from the research results became the main focus of researchers for analysis. After the Data is Reduced, the next step is to present the data. In this study, data presentation in the form of descriptions of the characteristics of the creativity level of students who have high, medium and low learning independence in solving math problems. Furthermore, conclusions are drawn according to the data analysis that has been done.

Result and Discussion

Selection of research subjects was carried out using the results of the questionnaire on student learning independence. A student learning independence questionnaire was given to class X students of SMK Gama Tangerang which consisted of 5 students. The results of the analysis of the learning independence questionnaire instrument can be seen in Table 1

Table 1. The results of the Learning Independence Questionnaire

No	Self Regulated Learning	Number of Students
1	High	2
2	Medium	1
3	Low	2

From the results of the questionnaire, 1 subject with a high learning independence score was selected, namely students with the initials NH. The next day the students were given math test questions to measure the level of creative thinking of students in solving math problems on the Opportunity material in the form of story questions. The questions given are open questions, so that they can spur students to think about various answers and

ways of solving them. In this study the subject received 5 question numbers. In Problem No.3, NH can solve the problem correctly as shown in Figure 2.
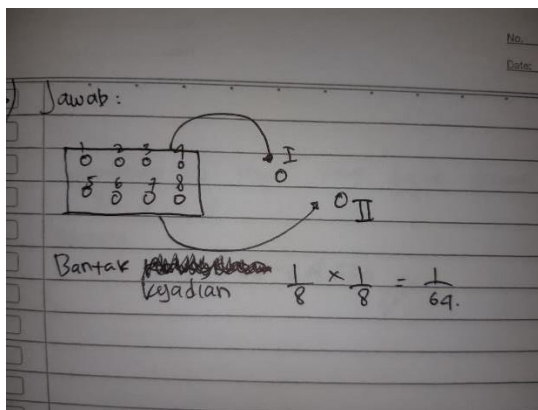

Figure 2. Results of NH Assignments for Question Number 3

Based on Figure 2, NH answered question number 3 in his own way and the answer was correct, but the information provided by NH was less clear. Unlike when answering question number 3.
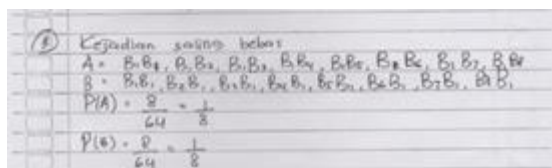

Figure 3. RA Task Results for Problem Number 3

Based on Figure 3, RA answered question number 3 in his own way and the answer was correct. This shows that at the originality stage each student has his own way of working on the questions. First, NH worked on the questions and the answers were correct, but the information conveyed in the answers was still unclear. Meanwhile, RA answered the questions correctly and also with clear information. NH and RA seem to have different creativity. So that it can be seen that NH and RA learning independence can transfer learning outcomes in the form of knowledge and skills in various situations. They tend to look for broad answers, besides that they also have passion in working on the questions given which tend to be difficult.

Based on the results of the assignments that have been given, an interview was conducted to NH, which results were as follows:

Q   : Why did you do it this way?

NH : Doing so can make it easier for me. Make a box that contains 8 balls, then I take 1 ball out of the 8 possibilities that occur in the first ball, then the results will be immediately obtained. And such answers are easier and faster.

Furthermore, an interview was conducted with RA, the results of which were as follows:

P   : Why do you do it in this way

RA   : You see, because there is a sentence 2 With a return, it means that the probability of occurrence A and B is the same.

Based on the interview excerpt and the written results above, it appears that NH and RA can face increasingly complex problems and reduce student dependence on other people in working on the questions given. This shows that danRA students who learn independently through open learning in the form of relative ideas different from what has been there before in trying to solve a problem.

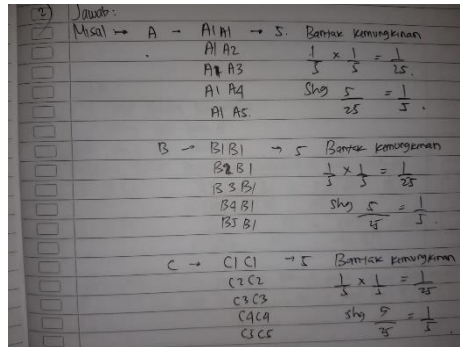Whereas in question number 2, NH solved the problem as Figure 4.

Figure 4. Results of NH Assignments for Problem Number 2

RA : You see, because there is a 2x retrieval sentence with a return meaning that the probability of the Asama B incident is the same.

Based on the interview excerpt and the written results above, it is seen that NH and RA can face increasingly complex problems and reduce students' dependence on other people in working on the questions given. This shows that NH and RA students who learn independently through open learning in the form of ideas which are relatively different from what has been there before in trying to solve a problem.

RA : You see, because there is a sentence of 2x taking with a return, meaning that the chances of A and B occurring are the same.

Based on the interview excerpt and the written results above, it is seen that NH and RA can face increasingly complex problems and reduce students' dependence on other people in working on the questions given. This shows that NH and RA students who learn independently through open learning in the form of ideas which is relatively different from what has been there before in trying to solve a problem.

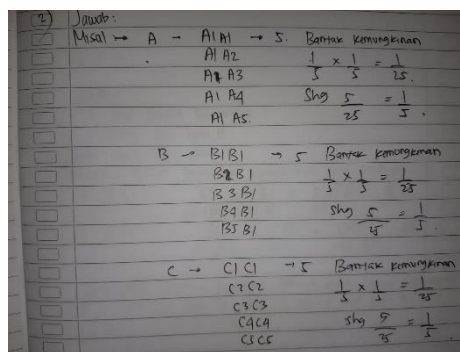Whereas in question number 2, NH solved the problem as Figure 5.

Figure 5. Results of NH Assignments for Problem Number 2

Based on Figure 5, NH answered question number 2 with the correct and detailed answer. Similar to RA's answer when answering question number 2. Figure 6. are the solutions.
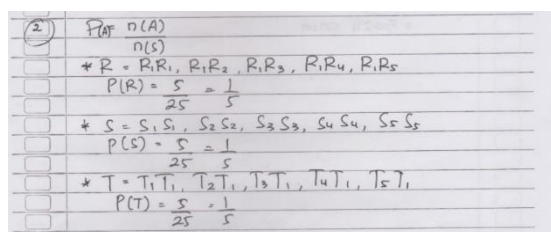

Figure 6. Results of RA Assignments for Problem Number 2

Based on Figure 6, RA answered question number 2 with correct and detailed answers. The answers in Figure 3 and Figure 4 are almost the same, the difference is only in Figure 4. Be more in-depth with the answer by doing detailed steps. Based on the written results, interviews were conducted with NH and RA with the results as follows:

P: Why do you do the questions in this way?
NH: because the head of the organization can be elected 2x for 2 terms. For 1 time the chance period is 1/5 so just multiply it. I took the letters to make it easier.

Then an interview was conducted with RA, the results of which were as follows:

P   : Why did you do the problems in this way?
RA   : Based on the Excerpt from the interview results and the written results above, NH and RA answered the questions with detailed steps to find the results. This shows that NH and RA have sufficient levels of formal education, have sufficient intelligence and have a sense of optimism and sure in himself.

In accordance with the objectives to be achieved, the ability to think creatively can present a profile of learning independence. When working on the given creative thinking skills task, students were found to be less enthusiastic because it used a long and gradual time.
Students who have a high category of learning independence, in doing the task, the ability to think creatively in mathematics uses a long time, but the results are accurate. Whereas for students who have low category learning independence, working on the questions uses time quickly and lacks accuracy, and works in a hurry.

Based on the results of the description above, it can be concluded that the independent learning questionnaire test carried out is something that attracts students' attention to determine their interest in mathematics. The task of mathematical creative thinking skills requires excellent

skills and skills to develop the ideas, ideas and concepts needed to find answers to the questions given to students and to see the student's learning independence while doing the task.

The results of the independent learning profile with mathematical creative thinking skills present students' creative activities in answering the questions given with independent learning, but the results are the students are less careful and less thorough. The process that occurs is students are active in providing ideas or ideas according to their knowledge. The profile described is the reaction of students in doing creative thinking processes with students who have high category learning independence.

Conclusion

Based on the results and discussion, it can be concluded that students have high learning independence and have difficulty working on the task of mathematical creative thinking skills so that it takes a long time to do. This shows that the students required to have activeness, self-initiative, tenacity and persistence in learning. Students can involve various resources and activities such as reading by themselves, group study and problem exercises in order to improve mathematical creative thinking skills.

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