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Integration of Discovery Learning and Active Learning Methods in Shaping Students' Critical, Creative and Innovative Culture

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Abstract

This study seeks to examine and find the integration between discovery learning and active learning methods in forming a critical, creative, and innovative culture for students. Given, both methods are methods that seek to maximize the active role of students in the learning process. The research method used is the library method based on the constructivist and positivistic paradigms by collecting various documents, journals, and books related to the themes studied. The discovery learning method focuses on the process of finding solutions; answers to problems given by the teacher to students. The identification process of finding answers will educate students to think critically and lead them to be creative and innovative in creating their findings. Meanwhile, the active learning method focuses on the active process of students by being fully involved in the learning process, this full involvement will require students to always think critically, creatively, and innovatively so that the learning atmosphere can be more effective, efficient, and colorful. Then, the integration between the discovery learning method and active learning in forming a critical, creative, and innovative culture is by focusing learning centered on students, by giving them investigation tasks which will then be discussed, verified, and then presented with correct and interesting presentations.

Keywords: *Discovery learning, active learning, critical, creative, innovative*

Introduction

During the last few decades, many learning strategies have been developed to be applied in teaching and learning activities in the classroom. One of the concerns of today's learning strategies is to keep students active and have critical thinking skills so that they can find answers independently (Haris et al., 2015; Amal et al., 2022). Of the many methods developed, the method that emphasizes the importance of critical thinking is discovery learning (Sumianingrum et al., 2017; Sutiah et al., 2021). Based on Balim (2009), discovery learning is a learning method based on a constructivist approach which means that students must build knowledge based on the understanding construction process carried out by the students themselves. In other words, this discovery learning method focuses on the involvement of students in seeking and finding an understanding logically and systematically (Atika et al., 2018).

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Meanwhile, active learning allows students to engage in instructional activities and do something and think about what they are doing (Bonwell & Eison, 1991; Ampera et al., 2020; PS et al., 2022). Furthermore, the active learning approach emphasizes developing students' skills than transmitting information to them. Hence, this approach also tends to provide space for students to explore their attitudes and values. Active learning also involves students in the learning process through various activities, such as reading, writing, and demonstrating (Freeman et al., 2014). Besides, students are free to make presentations in class, so that this activity makes them more active. Active learning is a broad concept; most often referring to student-centered and activating learning methods and instructor-led activities (Felder & Brent, 2009; Mitchell et al., 2017; Prince, 2004). Therefore, it is generally not a learning concept but an instruction concept. As a result, active and interactive student participation in the teaching and learning process will enable students to ask questions, communicate, and interact with others while giving and sharing opinions and ideas (Carr et al., 2015). In the end, the concept of active learning has received increasing interest.

The dimensions or indicators used in this discovery learning method are indicators of critical, creative, and innovative thinking. According to Santrock (2007), thinking is an activity that involves manipulation and transformation in memory intending to form concepts, reasons, critical thinking, and problem-solving. Thinking according to Ruggiero (2009), is "Thinking is any mental activity that helps formulate or solve a problem, make a decision, or fulfill a desire to understand. It is a searching for answers, a reaching for meaning". Thinking is a mental activity that helps solve problems, make decisions, or reach understanding. Thinking is looking for answers or looking for meaning. Thinking can be related to human mental activity in fulfilling their curiosity to find answers to a problem or thing. This activity certainly involves certain processes in the brain so that it finds something that is appropriate and suitable to be used to find solutions to the problems it faces so that creativity emerges through creative thinking.

Creative thinking (creative thinking) is an individual's skill in using his thinking process to generate new, constructive ideas based on rational and perceptual concepts and principles, and individual intuition (Ahmadi et al., 2011). Innovative thinking according to Sutirna (2018) states that innovation is an idea, practical things, methods, methods, man-made goods, which are observed or felt as new for a person or group of people (society). Meanwhile, according to Hutagalung & Hermawan (2018) innovation is a discovery that is different from the previous one in the form of thoughts and ideas that can be developed and implemented so that the benefits are felt.

The study on the application of the discovery learning method in improving the critical thinking framework is explained in the research of Utaminingsih (2021) that the discovery learning method can improve the critical thinking process by doing a lot of experiments. Because by doing a lot

of experiments, students will be able to solve the problems presented (Chusni et al., 2020; Suryaningtyas et al., 2020; Purba et al., 2019). In addition to forming critical thinking, the discovery learning method is also able to form a creative and innovative culture (Edmonson, 2018; Martins & Terblanche, 2003; Nazirun & Candra, 2021). Then, a study on the application of active learning methods in shaping students' critical thinking framework as studied by Sgambi et al. (2019) that students or students are invited to active learning they can find many creative, innovative ideas, and many experiences that they can take so that a critical spirit grows within them (Oros, 2007; Park & Choi, 2014). The active learning method seeks to direct students to find various solutions to the findings and problems they find in learning so that they can solve problems and can find innovations in providing solutions to these problems (Danko et al., 2018; Dudley et al., 2013; Purba et al., 2020).

Based on the study and analysis above, a new and in-depth study is needed that is integrated to create a critical, creative, and innovative culture through a combination of discovery learning and active learning methods. It aims to find similarities and differences in the emphasis of the two methods in the process of forming a critical, creative, and innovative culture. Thus, it is hoped that there will be a new approach in the learning process from the results of the integration of the two methods.

RESEARCH METHODS

The method used in this research is library research which is part of the type of qualitative research (Given, 2008). The library method is a method whose primary sources are books, journals, documentation, electronics, and other written sources related to the theme under study (Fleming-May, 2014). The literature method emphasizes the power of analysis (Fallin, 2016). Literature research provides the basis for a valid and comprehensive information search process so that the objectives of the research can be achieved optimally (Connaway & Powell, 2010; George, 2008). The data analysis used in this literature research is induction, data reduction, interpretation, and comparison (Arikunto, 2013; Handini, 2012).

RESULTS AND DISCUSSION

Discovery learning is a method to shape critical, creative, and innovative thinking

The Discovery learning model is a method of learning which focuses on problem-solving skills, problem-solving skills, and exploring ideas to create innovation and solve the problems which the teacher provides in the learning process (Balim, 2009). Discovery learning is used to develop students' critical thinking in learning so that the quality of learning can be improved (Putri et al., 2020; Ingtyas et al., 2021). Thinking critically is often developed through problems which demand students to seek information and systematically analyze the situation (Batubara, 2019; Yaiche, 2021). Consequently, this teaching strategy guides the students to do systematic and measurable

research (Abrahamson & Kapur, 2018). Thus, this makes discovery learning a teaching strategy that scaffolds systemic analysis learning method (Druckman & Ebner, 2018; Ingtias et al., 2022).

Critical thinking is a process of seeking an answer to a problem that guides students to shape students' creative and innovative thinking skills (Subagis, 2021; Surahmat et al., 2020). Students' creativity and innovation can be measured through ideas and solutions that the students find (Setyaningrum et al., 2020). This means that the process of solving a problem does not only demand critical thinking skills, but students also need to develop innovative and creative thinking skills to create relevant, updated, contributed, and new solutions. The learning stages of discovery learning consist of simulation, problem statement, data collection, verification, and generalization (Prasetya & Harjanto, 2020). Based on previous research, the strategies offered by discovery learning often help students to develop critical and innovative thinking. For example, in research conducted by Sucipta et al. (2018), discovery learning significantly helps students to think critically compared to the conventional teaching method. Similar to this finding Kholifah et al. (2015) and Lieung (2019) found that the discovery learning method helps students to sharpen their understanding of knowledge and their critical thinking.

Moreover, if the discovery learning is accompanied by other strategies, such as the concept mapping strategy, the students will learn a difficult concept of knowledge faster (Kholifah et al., 2015). Nevertheless, Farib et al.'s (2019) research add a different perspective about discovery learning. Discovery learning can be ineffective for students who have low learning capability. This is because the students are not ready to conduct intensive discussions and to face difficult problems which demand high-order thinking (Farib et al., 2019). In other words, the teachers should consider the students' learning capability before implementing discovery learning in a classroom. Besides guiding the students to think critically, discovery learning also helps students to think creatively and innovatively. Based on some research, such as research from Rudyanto (2014), discovery learning significantly aids the students to think creatively. Adding this finding, Indiastuti (2016) found that creative thinking which occurs in the implementation of discovery learning is also triggered by students' strong curiosity.

Additionally, creative and innovative thinking can be shaped in learning which focuses on thematic learning. According to Cintia et al. (2018), the implementation of discovery learning for thematic learning in an elementary school caters to the process of creative and innovative learning. Based on the data gathered for this research, about 81 percent of students can think creatively after the teachers implement discovery learning in the classrooms (Cintia et al., 2018). This shows that discovery learning significantly guides students to become more creative and innovative.

Active learning method as a method to shape critical, creative, and innovative thinking

The active learning method is a method that educates the students to fully getting involved in a lesson (Akınoğlu & Tandoğan, 2007; Liang et al., 2018). Thus, the learning focuses on students' creative and active learning to do a systematic and creative investigation to solve a problem (Y. Chen et al., 2015; Chiu & Cheng, 2017). Active learning is an indicator of high-level learning (Hartikainen et al., 2019) which guides students to actively engage the materials in the lesson (Lumpkin et al., 2015). This atmosphere will make the students think critically, creatively, and innovatively (Lopez et al., 2012). Active learning shapes students to think critically in a discussion (Kusumoto, 2018; Styers et al., 2018), to conduct an investigation (Walterz et al., 2017), and to think creatively and innovatively in designing a topic for a discussion (Kim et al., 2013). Thus, a more interesting classroom atmosphere can be achieved (Rahardjanto, 2019; Sharoff, 2019).

The implementation of active learning is not a new thing in learning theory. This is because it is impossible to declare that the learning is happening in a classroom without direct collaboration and activities from the students. The core of active learning is on the students' activeness in a classroom. In real teaching and learning practice, the students do not have the same activeness rate. Active learning method demands high activeness rate to get maximum learning process. Studied from the process of teaching and learning and an active learning strategy can be understood as a learning strategy that demands students' activeness and participation so that students can effectively change their behavior (Muhaimin, 2005).

The implementation of the active learning method should occur in two aspects. It appears in curriculum documents, such as syllabus and lesson plan, and the practice of teaching and learning. Both aspects are inseparable because the strategies of teaching should be accommodated by a comprehensive and systematic learning plan (Muhaimin, 2005). Further, to support the process of active learning, teachers or educators should have realia, media, and complete references (Mukhtar, 2009). This aims to create active, efficient, and communicative learning.

Active learning methods are used to facilitate learning to encourage students to actively test, identify, discuss, apply new knowledge, and strengthen teamwork in completing learning tasks (Altintas & Yenigül, 2020; Maudsley & Strivens, 2000). Explicitly the culture can form a critical, creative, and innovative frame of mind of students so that students will show a variety of skills and competencies to the maximum (Scheel, 2002).

Students are taught how to analyze information, solve problems, initiate creative ideas, and conduct innovative trials (Armbruster et al., 2009; Pellicer et al., 2016). This is certainly under the guidance and direction of teachers as mentors and teachers and controllers so that learning remains directed and following previously formulated goals (Reimers & Chung, 2021). To that end, the use of active learning methods is very helpful for students in practicing critical thinking, acting or doing creatively, and bringing up ideas innovatively (Millard & Hargreaves, 2015; Odum et al., 2021).

Integration of discovery learning method and active learning method to shape critical, creative, and innovative thinking

Discovery learning is one of the active learning models. A learning process will run well and creatively if it applies student-oriented learning methods. In that way, students will get a precious opportunity to find a concept, theory, rule, or understanding through examples encountered in life. Supriyadi (2011) also supports this definition by stating that the teaching-learning process with the discovery instructional system requires the teacher to present learning materials, not in a final form (intact from beginning to end). In other words, the teachers only provide part of it, and the students do the rest. These activities will encourage students to apply and find something useful for themselves. Those learnings can provide positive benefits in shaping students to think critically, creatively, and innovatively. Ennis (1990) stated that there are five groups to indicate critical thinking skills: elementary clarification (by giving a simple explanation), fundamental support (by building basic skills), inferring (by making an inference), advanced clarification (by making further explanation), and strategies and tactics (by managing approaches and techniques). The five indicators have different descriptions. The goal is to form students to think critically, creatively, and innovatively. For example, in the first indicator, elementary clarification, students can analyze statements and clarify questions/answers.

The integration of discovery learning and active learning methods in the learning process provides opportunities for students to be more creative as possible in filling their learning in the classroom, more active (Bean, 2011), and independent in completing tasks given by teachers and more innovating in finding answers or ideas so that the learning atmosphere is more colorful and dynamic. The synergy of both methods in addition to educating students to learn independently to find various answers; ideas that match the problem faced or to something new that is in accordance with the learning material also civilize them to play an active role by doing a lot of discussions, asking various questions, finding new sources of information, creating as beautifully as possible and exploring it in real life (X. Chen et al., 2019).

This is in accordance with the results of Huang (2008) research that in involving students actively in learning activities, it is necessary to approach problem-based, inquiry, experience, discovery, and investigation which all lead to student learning independence. With learning methods whose point of emphasis on the discovery and liveliness of students will facilitate communication, socialization, and strong cooperation, so that the role of teachers is needed in providing directed guidance to them in the process of researching, discovering, reflecting, authenticating, presenting, and exploring. Rosario et al. (2020) and Rowles (2013) asserts that there is a relationship of discovery-based learning with active learning, this is to make students more competitive and also independent who are finally accustomed to critical thinking, acting creatively and innovatively (Laverie et al., 2008; Rowles, 2013; Sochacka et al., 2016). Thus, it can be illustrated through the

concept map below that the integration between discovery learning methods and active learning can form a culture of critical, creative, and innovative thinking for students with the support of teacher-directed guidance and effective communication so that the learning process based on discovery and investigation can run well, efficiently and maximally (Ferrari et al., 2009; Mulyani et al., 2021; Sgambi et al., 2019).

CONCLUSION

From this research it can be concluded that the discovery learning method focuses on the process of finding solutions; Answer to the problem that the teacher gives to the student. The identification process to find answers will educate students to think critically, and also lead them to be creative and innovative in creating their findings. Meanwhile, the active learning method focuses on the active process of students by being fully involved in the learning process, this full involvement will require students to always think critically, creatively, and innovatively so that the learning atmosphere can be more effective, efficient, and colorful. Then, the integration between discovery learning and active learning methods in shaping critical, creative, and innovative culture is to focus focused learning centered on students, by giving them research tasks that are then discussed, divaricated, and then presented with a correct and interesting presentation.

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