



Review Article

Think Talk Write (TTW) learning strategy and effects on creative problem-solving skills and creativity

Syamsul Huda*¹, Munifah², Rofiqul Umam³

Institut Agama Islam Negeri Kediri, Indonesia

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Abstract

Creative problem-solving skill is now one of the skills that each individual needs to specialize. The development of human-produced technology such as artificial intelligence and deep learning was made possible by understanding important features such as creativity in human cognitive structure. These advances in technology should be used effectively in curricula in education systems. However, difficulties in creative thinking make it difficult to achieve the objectives of curriculum. One of the learning strategies that might be implemented based on the above problems, namely the Think Talk Write (TTW). In this study, the TTW strategy will be examined in terms of creative problem solving, developing thinking skills and supporting creativity in classroom applications. In differentiated instruction, the development of thinking skills is emphasized in differentiating process dimensions. Is thinking skills or taking a strategy into the mainstream of teaching a problematic approach? Do a lot of research knowingly prefer a wrong way? How should the curriculum adaptation for individual differences, the nature of differentiation, be done in terms of TTW? questions are discussed in this article.

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Introduction

New education paradigms and globalization have been running and can not be avoided by anyone in the world. Even developed countries such as America, Japan, Britain, and several countries in Europe were affected by this global impact. Because the population is growing and has now reached a number that far exceeds the highest limit of the world's inhabitants. Therefore, it is very common in the 21st century, that a country needs another country to meet the basic needs of its citizens, while that country, at the same time, is over-product for other aspects (Novoa, Johann, Morillo, & Inciarte, 2019). Dependence of one country on another, not stopping with buying and selling, but will also develop into the investment area to develop an industry. And when entering investment, there are two factors that they will bring, namely financial capital and capital of technological tools. For these two factors, we need reliable human resources to be able to operate the technology and to manage money well. It is not possible that all human resources will be brought from the investor's country, and they will use the human resources in the investment destination country. For this purpose, Indonesian human resources must be prepared, so that they are compatible with the strengths of other countries' human resources, especially investor countries that bring money and technology capital (Balsa, 2019).

To be able to produce intelligent human resources that are competitive and able to adapt to various advances in the 21st century, education must make various improvements in various aspects. There are at least two aspects that can be seen to formulate a learning model in the 21st century, namely from the aspect of work that will be hunted by

1 Assoc. Prof., Institut Agama Islam Negeri Kediri, Indonesia. E-mail: syamsulhudaiainkediri@gmail.com

2 Assoc. Prof., Institut Agama Islam Negeri Kediri, Indonesia. E-mail: munifahkediri@gmail.com

3 School of Science and Technology, Kwansai Gakuin University, Japan. E-mail: egk71822@kwansai.ac.jp

alumni, and also aspects of students themselves who have experienced many psychological and sociocultural changes due to technological advancements. In the aspect of the labor market, there are at least three arguments why education and learning policies must now be evaluated and then changed (Jaimes, 2019).

In the context of the curriculum, schools must facilitate their students to study science, economics, social, history and citizenship, in addition to international languages. Then schools must also make changes to the curriculum design to foster their students to have global awareness, know and be aware of the importance of financial management, procedures for doing business and also must be a social group that is not blind to entrepreneurship, awareness of the need for healthy living (Look, Participation, & Happiness, 2019), and also awareness of the need for protecting and preserving the environment, protecting and conserving forests as a source of water, producing oxygen, preserving and maintaining clean air from pollution, all of which will inevitably be an additional new subject matter, but can be inserted in extra-curricular activities, or become a subject in relevant subjects, or illustrations in the learning process of science, mathematics and social subjects. Awareness of globalism is an important part in curriculum and learning redesign that must be developed for this 3rd millennium generation, due to the increasing world population, increasingly limited natural resources to meet the livelihoods of humanity, increasingly dynamic world population mobility, and competition which is getting tighter (Networks, Channels, Participation, Moreno & Trejo, 2019). The importance given by developed countries to education is the most important factor in reaching this level of development. They dynamically make the necessary arrangements to train the necessary human resources for their future. One country that views "education is the main factor" is Japan. Japanese Emperor Hirohito when he lost in the second world war in 1945 asked his ministers the first time was "How many teachers are still alive?". After that Japan shot so fast in the economic field, even more advanced before they lost. This is caused because they have an awareness of education and consistently build it with a clear educational vision (America, Role, Chac, Giancarlo, & Orozco, 2019).

From the above story, we can learn that education is the basic foundation for development in all fields of life. Teachers are the spearhead of education itself; the quality of teachers will determine the direction of education. In carrying out the vision and mission of education, the teacher is demanded to be able to be a creative human being in teaching students. Implement a varied learning model, so students will be happy in following the educational process. The teacher is also expected to always "listen closely" what the child wants, so the teacher will be able to dive into what the child desires in learning (Umam & Sommanawat, 2019).

The redesign of the education program was developed in order to produce alumni who have the main criteria to be successful in their careers and professions. Education must be able to produce alumni who master the core subjects of science, mathematics, social, history, and citizenship, as well as various skills, patterns of thinking, perspectives and attitudes that are in line with 21st century development. Then they must also have the competence to be able to access information, and the media, the skills they can use to enter the job market, and have the awareness to be lifelong learners, and to be creative and innovative people in whatever field they work. These are the main competencies that must be possessed by every student who will enter the labor market in the era of the third millennium, the era of globalism and international collaboration, and in the digital era and the use of technology far greater than the era of the second millennium era ago (Rahim et al. 2018).

However, not all competencies are part of the learning program as the core subject in the school curriculum, because in addition to being slim, the curriculum also always uses a scientific branch approach (Holidun, Masykur, Suherman & Putra, 2018), because education is changing the way of thinking, acting, acting and developing skills that all can only be done with a science and technology approach (Rahim et al. 2018). Therefore, many competencies are mandated in the learning process, namely the learning process, illustrations of scientific concept explanations, as well as the process of understanding science, technology mastery training, even textbooks that require illustrative explanations, not something that is free of value, all of which must be part of the process changing student behavior, which must be controlled by the teacher, as well as the school environment and culture, must be based on the need to achieve educational goals (Akbar & Komarudin, 2018). Thus, the learning process has two sides of a blade, namely increasing competence based on science and technology, and increasing competency based on learning activities (Rahmawati, Lestari & Umam, 2019). When the teacher instructs students to peer review with classmates, he is essentially encouraging his students to deeply understand the teaching material they are learning (Suriati, 2019), accept it as new truths and familiarize it in their professional and social lives, and at the same time, he also practice their interpersonal skills, train their communication, practice openness and even be trained to be able to accept others (Maulidi, Apriliani & Syazali, 2019).

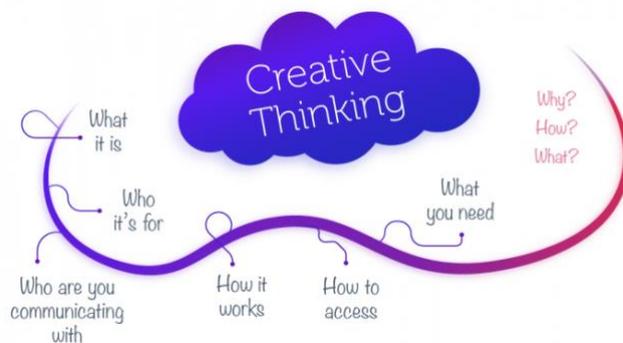


Figure 1.
Creative Thinking Process in Learning

Critical thinking in the world is often paired with critical thinking. However, pragmatically critical thinking is often also understood differently by the wearer. There is a very easy way to define critical thinking is to always think differently from the policies of public officials. If someone is able to think differently from the policy decisions of public officials, it is often said that he is critical. Even though this policy does not necessarily deviate from the vision and mission of the institution, so that the criticism does not get a public response. Critical thinking style like this, can not be used as a reference for students, because it is not productive (Utami, Jatmiko, & Suherman, 2018). Then, there are also those who are able to choose from a variety of policies, circumstances, or developments that appear out of regulation, policy, or the direction of institutional development, so it is assumed to be a disaster or a big or small disaster. However, he only tends to question which results in blaming policy makers or decisions, so that it ends in chaos for being able to influence other groups to strike. This style is also less productive because it does not provide a way to make improvements in the future for the progress of the institution (Wibowo & Pratiwi, 2018).

Defining of TTW Strategy

The Think Talk Write (TTW) cooperative learning model was developed by Huinker & Laughlin. Basically this learning is structured through the process of thinking, speaking and writing (Pratiwi & Muiz, 2016). Learning strategies Think Talk Write (TTW) can grow and develop creative problem-solving skills. The flow of TTW learning progress trigger with the engagement of students in thinking or dialoguing with peers after the meaningful reading, then conversation, discussion and talking about topic, and then explaining and sharing ideas with peers, the last stage is the writing.

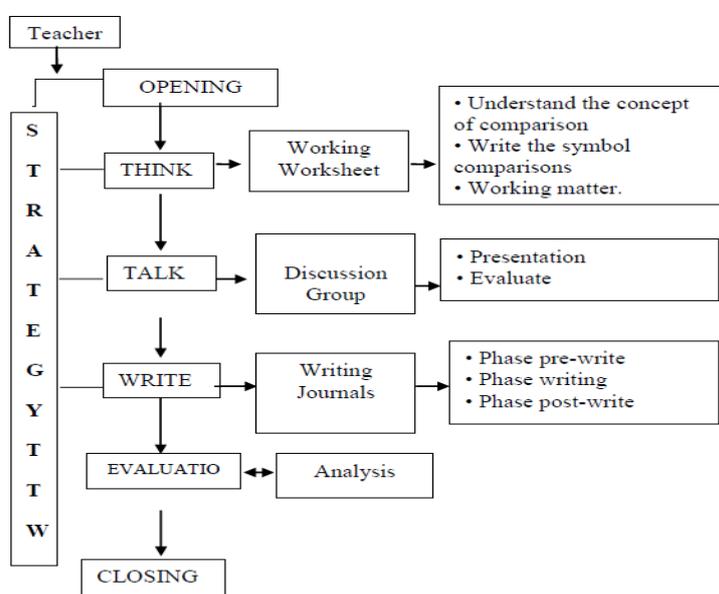


Figure 2.
Schematic Design Didactic of Think Talk Write's Strategy (Pratiwi & Muiz, 2016)

As with all other creativity techniques, atmosphere and climate are very important in the use of the TTW strategy. It would be good to have the ideal number of groups, that is, 3-5 people. Of course, this number can be increased

with a good moderator. Especially for efficient use of the strategy, all its features such as taking notes, giving opinions, discussing, sharing should be used well (Prastowo et al., 2019). These thinking, speaking and writing activities are a form of teaching and learning activities that provide opportunities for students (Ikashaum, Yunarti & Sutiarto, 2014) to actively participate (Habibi et al. 2019). The stages carried out in learning to use this type are thinking (Think), talking (Talk), and writing (Write).

In a research, the teacher stated that students can find out the problem by observing and reading carefully the questions given by the teacher, the strategy taken to solve the problem is by reading the examples of the problems given by the teacher beforehand, and retraining by doing the exercises when the time is working still possible. According to the teacher, in terms of how to solve problems during the learning process, there are some students who can work on problems easily and some others are still experiencing difficulties (Diani, Irwandani, et al. 2019). Teachers say that some students have not been able to understand the problems that occur in the problems, so students are not able looking for a solution to the problem. Students are also still wrong in understanding the concept, the operation of simple calculations, which is due to an imbalance (disequilibrium) on the knowledge of previous students (Diani, Herliantari, Irwandani, Saregar & Umam, 2019).



Figure 3.

Problem Solving Skills Process using Thinking Skills (www.strengthstheatre.com)

Giving problems at the beginning of learning will trigger mental activity in students. Involving students working in small groups can create communication between people in determining solutions to problems (Sagala, Saregar, Thahir, Umam & Wardani, 2019). Instruction should be designed by taking problems to the focus of learning. Having group interaction and teamwork in creative problem solving can provide some advantages. In the problem solving process, students use many skills such as making hypothesis, scientific prediction, inference, designing research experiment, argumentation, data collection, analysis and interpretation (Diani, Herliantari, et al. 2019). If the student can follow up with critical thinking in this process, the goals expected from teaching can be realized. Feedback obtained from yourself, from peers, and from teachers, improves the quality of the learning process (Diani, Irwandani, et al. 2019).

The working in a group consisting of three or more members can essentially provide their own power and benefits. One of the assumptions underlying the development of cooperative learning (cooperative learning) is that the synergy arising through cooperation will increase motivation that is far greater than through an individual competitive environment. Huda also stated that interaction with others can help individuals undergo a learning process that is better than just doing it themselves, so thoughts, ideas, and understanding will always develop in individuals. In a sense, through interaction an individual can develop his knowledge more broadly (Kasayanond, Umam, & Jermsttiparsert, 2019). This learning strategy can help students in constructing the knowledge gained from the results of the discussion. Students can also communicate or discuss their thoughts with peers, thus helping students better understand the material being taught (Lestari et al. 2019).

Implementation of TTW Strategy

According to (Huda, Tsani, Syazali, Umam & Jermsttiparsert, 2020), the teacher's role to make effective use of the TTW learning model is to propose and provide assignments that enable students to think topic actively and voluntarily, encouraging and listening to the ideas expressed, considering and providing information on what students are

exploring in discussions, and monitoring the activities of students. The stages of TTW learning model that starts from the process of thinking, talking and writing are expected to have an influence on students' mathematical problem solving abilities based on the steps of problem solving according to Polya, with indicators: (1) showing understanding problems, (2) organizing data and writing relevant information in solving problems, and (3) presenting mathematical problems in various forms.

Research related to TTW was conducted by (Hernita, Kurniasih & Khusna, 2018), stating that the TTW learning model influences students' mathematical communication skills. The increase in mathematical communication skills of students who follow the TTW learning model is higher than the increase in mathematical communication skills of students who follow conventional learning (Astin, Coesamin & Djalil, 2015), discusses the influence of TTW learning models on the critical thinking skills of grade VII students on fraction numbers, concludes that there is a significant effect between classes using TTW learning models with an average of 78.23 and classes that do not use learning models TTW with an average of 71.18 difference of 7.05. (Simanjuntak, 2015) states that the TTW type of cooperative learning model is more effective than conventional learning models of students' mathematics learning achievement. Susanto and Bharata (2018) stated that the application of the TTW strategy in mathematics learning increases the problem-solving ability and mathematical disposition of students in class VIII on the material to build cubes and blocks.

In the discussion about optimizing the pedagogical process with multiliteracy pedagogy, by trying to insert four (4) aspects in the process of learning science, social, and language, namely taxonomy of thinking, Taxonomy Bloom, Multiple Intelligence and habit of mind. Even though it may still overlap with one another, because it was developed partially, at least education continues to respond to the progress of world civilization, and not only fixated with a Taxonomy Bloom, which focuses on behavioral change through science, social, technology and also the language learned (Munifah et al. 2019). student at school. Multiliteracy pedagogy tries to offer competencies that are needed for professional development in the millennia, which is more flexible (Huda et al. 2019), responsive and also suitable for the needs of working in a cross-cultural and linguistic world.

Various challenges in the world of work that no longer require workers to complete administrative routine work, but instead professional workers are required to innovate and be more creative in business development, communicating with various business partners across countries, nations, cultures, religions and language. Therefore, students must be prepared with four competencies, namely critical thinking, communication, collaboration, creativity and innovation (Ramadhani, Huda & Umam, 2019). Without ignoring various other competencies, these four competencies become a much stronger focus for teacher assignments in the 21st century.

Differentiated Instruction and TTW Strategy Using

Differentiated instruction is applied in four dimensions in order to adapt students according to their individual differences in order to achieve effective learning outcomes. These dimensions are in the form of content, process, learning environment and product (Maker, 1982; Akkaş & Tortop, 2015). Many studies examine the effectiveness of any instructional strategy or method. This is actually a differentiation in the process dimension. However, it would be wrong to think that this differentiation will be sufficient to meet all of the educational outcomes. Because, what kind of differentiation is made for the other three dimensions in instructional differentiation is uncertain. In this respect, the researches and applications that use the strategy that is desired to increase the instructional effectiveness alone are theoretically incorrect (Tortop, 2018).

There is also a differentiation in the use of strategy according to the individual differences of the students. For example, the simplest content to be learned in students with intellectual disability is emphasized. So the content dimension is important. However, in gifted children, the process dimension is important for the development of more thinking skills, as the student will learn the content quickly. In this respect, when an idea about applying a strategy to a normal class is taken, it should not be wrong to act according to the logic of differentiation (Tortop, 2018). Therefore, it may be wrong to act with the idea that "the strategy is suitable for all groups" without describing individual differences in the classroom. It is recommended that practitioners and researchers pay attention to these issues.

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Biodata of the Authors

Assoc. Prof. Dr. H. Syamsul Huda, M.Ag. He was born at Jombang City. He is a Assoc. Prof. and senior lecture at Institut Agama Islam Negeri Kediri, Indonesia. His research is focused on Education especially in Religion education.

Affiliation: Institut Agama Islam Negeri Kediri, Indonesia.

Email: syamsul_huda63@yahoo.co.id **Phone:** (+62)818515539

Orcid Number: 0000-0002-6830-9720

SCOPUS ID: 57211227175



Assoc. Prof. Dr. Munifah, M.Pd. Her research focuses on teacher behavior and correlation between management education and religion education especially in Islamic school. **Affiliation:** Institut Agama Islam Negeri Kediri, Indonesia.

E-mail: munifahkediri@gmail.com

Phone: (+62)81335717235

Orcid Number: -

SCOPUS ID: 57211227175



Lec. Rofiqul Umam, M.Sc was born in Bandar Lampung City, Indonesia. He holds M.Sc (Master of Science) in the Physics Department, Gadjah Mada University, Indonesia in 2016. Currently, he is a research student in School of Science and Technology, at Kwansei Gakuin University, Japan.

Affiliation: School of Science and Technology, Kwansei Gakuin University. **E-mail:**

egk71822@kwansei.ac.jp **Phone:** (+81)8087288103

Orcid Number: 0000-0002-7095-5967

SCOPUS ID: 57211227175

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