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Mathematic Learning With Contextual Approaches In The 21st Century

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Abstract. The various problems faced by teachers in the 21st century are very complex, in the other problem is teachers must understand the demands of skills in the 21st century that are applied to students. One solution that can be used is mathematics learning using a contextual approach. This study used a qualitative approach that presents a complete design in verbal and numerical form and presents a learning that is appropriate in the 21st century, the research methods based on the ADDIE model (Analysis, Design, Develop, Implement, and Evaluate). Data collection techniques using observation, interviews, and documentation. The results of this study offer a design of mathematics learning with a contextual approach with the following steps: (1) observing; (2) analyze; (3) solving problems; (4) communicating.
Keywords. *21st Century; Contextual Approach; Mathematics Learning*

Abstrak. Berbagai problematika yang dihadapi guru pada abad ke 21 sangat kompleks, disisi lain guru harus memahami tuntutan keterampilan pada abad ke 21 yang diterapkan pada peserta didik. Salah satu solusi yang dapat digunakan adalah pembelajaran matematika menggunakan pendekatan kontekstual. Penelitian ini menggunakan pendekatan kualitatif yaitu menyajikan gambaran lengkap dalam bentuk verbal dan numeric dan menyajikan desain pembelajaran yang sesuai pada abad 21, metode penelitian berdasarkan model ADDIE (Analysis, Design, Develop, Implement, and Evaluate). Teknik pengumpulan data menggunakan observasi, wawancara, dan dokumentasi. Hasil dari penelitian ini menawarkan desain pembelajaran matematika dengan pendekatan kontekstual dengan langkah berikut ini: (1) mengobservasi; (2) menganalisis; (3) memecahan masalah; (4) mengkomunikasikan.
Kata kunci. *Abad 21; Pendekatan Kontekstual; Pembelajaran Matematika*

1. INTRODUCTION

Education is one of the determinants of the decline of civilization in a nation (Abad- & Anwar, 2018). Learning is one of the important aspects that is done consciously by students and educators. Various approaches or methods have been used by educators in order to improve the quality of learning so that learning objectives can be achieved to the maximum. Learning methods developed are usually adopted from old methods that are collaborated with new methods or media according to the times (Purnomo & Ratnawati, 2016). However, the learning methods use to improve critical and creative thinking skills are still minimal to be studied and implemented while the learning process. So, the students' critical and creative thinking abilities are still below minimal (Mahmuzah, 2015; Nahdi, 2015).

Therefore, education is an important role in creating a generation that is able to compete in the pace of scientific development, not least in the mathematics learning (Sujadi, 2018). Seeing the facts, the problematic in education is more especially in the learning of mathematics today is very complex (Suryadi, 2013). The problem does not only come from students who often do not understand mathematics learning, but also from educators who are less creative in presenting learning to make it more interesting and easier for students to understand the material.

Some facts are found that there is no synchronization between material and application in everyday life. It need integration in the learning process requires teachers to be more innovative in using the learning strategies. Some problems such as the lack of enthusiasm of students in learning mathematics causes the learning goal obtained are not optimal (Agustyaningrum & Suryantini, 2003). Even though the various demands that students have in the 21st century are very diverse (Darling-hammond, 2014; Kivunja, 2014). The demands of the 21st century educator must collaborate on critical thinking skills, creativity, collaboration and communication in a balanced manner (Bray & Tangney, 2016)

According the information before, the need for learning strategies that are in accordance with the characteristics of mathematics learning, one of which is the learning process needs a contextual approach, so that the learning process has a good meaning and is experienced by students themselves (Fauziah, 2005). The learning process is very influential the results of student achievement theoretically and practically. For this reason, an in-depth study needs to be done as an effort to innovate the mathematics learning process.

The majority of teachers have not yet integrated contextual learning in the classroom. As one of the solutions offered by researcher is contextual approach in mathematics learning. Contextual learning is learning that refers to the whole situation, background, or environment related to the student's self (Pranowo, 2014). The basic principle of learning using a contextual approach is that students can develop a mindset that is responsive to the surrounding environment and makes them more active and their learning more effective and efficient (Asra, 2008).

This approach can bring students to be close to real life, so students are encouraged to be able to apply it in their daily lives (Tamaji, 2019). Mathematics learning materials will be more meaningful for students if they learn the material through the context of their daily lives and experiences.

The four pillars of education initiated by UNESCO as a special UN agency that deals with matters relating to education, science and culture also form the basis for developing a contextual approach. The four pillars are: Learning to know, learning to do, learning to be, and learning to live together (Sigit Dwi Laksana, n.d.). *First*, learning to know implies that students are encouraged to gain as much knowledge as possible, through the learning experiences provided by the teacher. By encouraging students to learn to know, students are expected to learn how to learn. So students can become independent and learn from their own mistakes. In this regard Saga Briggs in his article said that "allowing ourselves to make mistakes and being wrong is essential to staying curious and motivated". Therefore, the teacher must prepare a good learning experience for students so that students can learn independently. *The second* is learning to do, this implies that students must feel and do their own learning experiences so that learning can be more meaningful for students. In this case Benjamin Franklin said:

Tell me and I forget.
Teach me and I remember,
Involve me and I learn.

Third is learning to be, this pillar emphasizes the importance of training and educating students to become independent individuals and achieve what they aspire to. In this case, students are free to express and actualize themselves while still under the guidance of the teacher. Fourth, is learning to live together, this fourth pillar instills students' awareness that they are social beings who live in society and are part of a pluralistic society. For this reason, including in this case is cooperation between students in achieving common goals. In line with this, one of the followers of the reconstructional flow, Bloom (1987), in his proposal to overcome differences in the ability of students in language learning, including can be done by "small groups of pupils helping each other" and "more advanced pupils helping weaker pupils ".

In accordance with the statement above, it is known that the contextual approach is very possible for teachers to be developed in the classroom or the assignments that students do outside the classroom (Sugandi, 2018). This is one form of integration that needs to be done by teachers in using contextual approaches in accordance with the principles and foundations in mathematics learning. On the basis of some of the facts above, the researcher wants to put forward the process of learning mathematics using a contextual approach so that later it can be adopted in the process of learning mathematics.

2. METHOD

The research method used is the library research method. Data taken from books, papers and journals related to the topic discussed. In addition, researchers also conducted interviews and observations to obtain data on problems in the field.

3. RESULTS & DISCUSSION

Contextually comes from the word context which means "relationship, context, atmosphere, and state of context". Thus, contextual learning is defined as learning related to a particular context. Learning with a contextual approach is an approach to learning that is based on the theories of constructivism, cognitivism and learning in the 21st century. Therefore, learning with a contextual approach is as required and the rules of the three learning theories. A description of the contextual approach can be explained at points as follows:

A. Goal

In accordance with its objectives, learning is a process of gaining new knowledge. Knowledge is not just a process of transferring a set of facts and concepts that must be known to students, but students are able to construct knowledge in real life experiences.

The contextual approach is based on the philosophy of learning, namely constructivism. Constructivism is a learning process that requires students not only to memorize, but students are required to construct knowledge.

Students will learn better if what they learn is related to events and activities that occur around them (Zahorik John A, 1995). This approach helps the teacher associate the material being taught with facts that occur in students' real lives. Furthermore, encouraging students to be able to create a relationship between the knowledge possessed by the application in the daily lives of students.

B. Basic Principles of Contextual Learning

The basic principle of contextual learning is that students are expected to be able to develop thinking patterns that are responsive to the surroundings and make students more active when learning and create effective and efficient learning.

In detail the basic principles of contextual learning are as follows (Asra, 2008) :

1. Problem Solving.
2. Getting to know teaching activities occur in various contexts such as home, community and workplace.
3. Teach students to monitor and direct their learning so be an active and controlled learner.
4. Emphasizing learning in the context of student life.
5. Encourage students to learn from each other and learn together.
6. Use authentic judgment.

To apply the contextual approach it can be done in six ways:

1. Responsive to cultural development

   Educators must understand the local culture in order to understand the habits of students and the surrounding community.
2. Stimulate students to become active, creative and innovative learners

   In this case, learning using a contextual approach can stimulate students to become active, creative and innovative learners.
3. Think at a higher level

   Students will be invited to positions where students will think more critically and can also be invited to be able to solve problems.
4. Give students the opportunity to apply knowledge

   Students are invited to apply the knowledge they learn in real life activities, in order to train students to understand the surrounding environment.
5. The learning is cooperative

   This learning will invite the students to interact with each other and work together in solving the given problems.
6. Meaningful learning

   Learning that brings students to real experiences will create meaningful learning that will motivate students in learning.

C. Steps for learning with a contextual approach

This is an analysis of 21st century skills in the process of learning mathematics.

21st Century Skill Elements	**Student Activity**
Critical thinking	Students is given a challenge by educators to solve mathematical problems related to social arithmetic (buying and selling, profit, loss, etc.) by going to the market.
Creativity	Learners are asked to make buying and selling transactions.
Collaboration	Between students will carry out the buying and selling process which will produce problems in arithmetic such as profit, loss, percent, etc.
Communication	Students are asked to present the results of the experiments they get after conducting buying and selling activities

D. Matters that must be considered in using the contextual approach

1. Educators only act as facilitators

   Learning with this contextual approach requires students to be more active and able to find new discoveries, and the educator only acts as a guide.
2. Learning must be fun and not boring

   Contextual approach learning should invite students to learn that stimulates enthusiasm because learning associates with real life.
3. Integrated learning

   The material taught is interrelated with facts that are in real life.
4. students must be active and educators must be creative

   student activity is very demanded here, so students can make new findings regarding the material being taught. Correspondingly, educators are also guided to be more creative in order to stimulate students to be more active.

E. Strengths and weaknesses of using a contextual approach:

Strengths of the Contextual Approach:

1. Learning more meaningful and more real.

   The students are required to be able to capture the relationship between learning experiences in school with real life. This is very important, because it can integrate the material obtained with real life, not only for students the material will function functionally, but the material learned will be firmly embedded in the memory of students, so it will not be easily forgotten.
2. More productive learning

   Where a student is guided to find his own knowledge. Through the philosophical foundation of constructivism students are expected to learn through "experiencing" rather than "memorizing".

Lack of Contextual Approaches:

1. Educators are more intensive in guiding. Because educators no longer play a role as an information center. Educators work as class managers and act as a team that works closely with students to find new knowledge and skills. Students are seen as individuals who are developing. A person's learning ability will be influenced by the level of development and breadth of the experience they have. Thus, the role of educators is not as an instructor or "ruler" who forces the will but the educator is the mentor of students so that they can learn according to the stage of development.

2. Learners can have difficulty in solving problems because students are required to be able to contract their own knowledge, only with the guidance of educators. Educators will no longer provide full information to students because students must be more active.

4. CONCLUSION

In mathematics learning, the teachers are required to conduct teaching and learning processes with methods or approaches of learners that are interesting for students. This is done with the aim of achieving the learning objectives of mathematics. Creating an atmosphere and conditions of mathematics learning that is fun and not monotonous is one of the factors determining the success of students in learning mathematics. Methods and approaches of learning that are monotonous and frightening and even rigid need to be shunned so that students do not hate the material being taught.

Mathematics learning can be created with a pleasant atmosphere and is more effective and efficient by using a learning approach that can facilitate students to understand learning material by linking the subject matter of teaching with the real life context of the students. This approach is known as a contextual approach.

Mathematics learning with a contextual approach will be more interesting to learn because it connects the material learned with the real world of students' daily lives. Learning that teaches it is connected to the real world will be understood faster and will be easier to remember and will feel lighter. So that learning mathematics is no longer considered difficult and boring.

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