

Mathematics Learning in The Era of Society 5.0; Terms of The Objectives and Ideology of Mathematics Education

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ABSTRACT: Challenges in the increasingly complex world of education are demanded in accordance with the existence of the era of advances in technological integration. In the era of society 5.0, the occurrence of modernization in mathematics learning is proportional to the needs of the millennial generation. The purpose of this study is to look at learning mathematics in the era of society 5.0 according to the goals and ideology of mathematics education. Furthermore, mathematics learning solutions in competing in the implementation of mathematics learning. The transformation of society 5.0 era makes it easier for students and teachers in learning mathematics where students are expected to be more influenced, think dynamically, be productive in realizing an exciting education. Mathematics learning can use ICT in accordance with the goals and ideas of Mathematics education where the experience of learning mathematics can develop children's creativity. So that the implementation of the ideology and goals of mathematics education in the Era of Society 5.0 are: mastery of digital technology, distributing cultural change, pedagogical development, personality-social competence, expansion of professionalism, and innovative-creative-adaptive.

Keywords: *Mathematics Learning, Goals, Ideology Of Mathematics Education*

INTRODUCTION

The rapid development of technology today gives birth to information anywhere so that there is no difference between one country and another. This is inseparable from the role of the internet (internet for everything) so that industry 4.0 was born and has even begun to enter the industrial era 5.0. Mathematics education in this era cannot be separated from the perspective of 21st century education. In this century, mathematics is increasingly needed in all fields of science such as physics, chemistry, biology, accounting, engineering, and psychology are also needed in all types of jobs (professions) such as accountants, doctors, traders, data analysts, and others. This requires schools to teach mathematics more broadly and purposefully than is currently underway (Minarni et al., 2020).

In the 21st century, the existence of mathematics education has a high quality in ability, innovative, competitive and collaboration according to the times.

Mathematics proficiency as a basic science and as a vehicle to hone thinking skills so as to achieve educational goals, because it allows humans to think logically and carefully so that an open and objective nature arises in various problems (Minarni et al., 2020)

Mathematics lessons are very important to be applied in the era of society 5.0 because it is one aspect of technological development, such as A.I (*Artificial Intelligence*) in today's era, there are many applications or programs that use mathematics. Based on observations in the field, that mathematics is often feared by students. This is due to several things, one of which is classroom learning, both monotonous learning and books that do not fit the curriculum. Based on this, of course, it is now a challenge for teachers in designing learning that can cause creativity, ethics and innovation.

Learning in the era of society 5.0 is related to changes in the learning system and the 21st Century which cannot be separated from the ideology and goals of education. Education is a means to equip oneself in facing the world not only about knowledge but from social, ethical, and adab.

Ideology is a belief / value that is believed by a social group in binding its social group for the common good. According to Marsigit (2018), ideology plays a central role in developing the curriculum because educational ideology provides guidance in decision making related to educational practices and policy plans related to subjects, projecting the future and needs of schools, and building *self-branding* through student behavior that is a product of the educational process. Through the ideology of mathematics education, it is known that mathematics education can be done in various ways, namely radical, conservative, liberal, and democratic.

Ideology is a view of life according to ideas / concepts in achieving something in curriculum development so that with principles / rules in decisions regarding policies form the subject matter and implementation of education. The ideology of Mathematics Education itself explains how mathematics education can be implemented both radically, conservatively, liberally and democratically (Ernest et al., 2016). Mathematical Ideological Models have primary elements and secondary elements (Marsigit, 2018).

METHOD

This study aims to describe how Mathematics Learning in the Era of Society 5.0 is viewed from the Objectives and Ideologies of Mathematics Education. The approach taken by researchers is by means of descriptive qualitative research. Qualitative research examines the natural environment so that the results are based on the interpretation of phenomena and are useful in qualitative research with various research methods (Nurhayati & Kusyani, 2022). The subjects in this study were Pure Intelligent Junior High School. Meanwhile, the observation method, as well as the study of literature as a data collection technique.

RESULTS AND DISCUSSION

Era Society 5.0

When changing the challenges of the teaching and learning process that is not only in the classroom, the entire education system can also be changed through the use of the Management Information system in schools. For example, digital-based educational services can be used for all activities in schools, both curriculum, financial reports, the use of media and tools as data delivery to the general public related to the design of activities and the vision and mission of the school. In 2019, society 5.0 was first notified by Japan (Sutiarso, 2019). The concept of Society 5.0 requires using the science of AI (*Artificial Intelligence*), robots, and Lots. The era of Society 5.0 emphasizes humans as users and technology as used. Society 5.0 emphasizes an easy and fast life. The example of society 5.0 is a robot that helps clean the house controlled by computers and the internet so that it is practical and automatic. With the use of technology humans obtain a good and comfortable quality of life. (Aaron, 2021).

Capricious interactions and boundless scope are millennial times (Rahman, 2019). The millennial age is growing up to follow the digital world and are experts with technology. Asef Bayat and Linda Herrera (Rahman, 2019) Changes in learning patterns, traditions, social life, and thinking progress due to Information Technology on internet-connected mobile phones.

Mastery of science in learning revolutionizes education against changes in sociological-psychological attitudes. Don Topscot (Rahman, 2019) in culture has 3 elements of the learning process, namely: interactive, participatory, and discourse according to the new learning paradigm in making it easier for students and teachers. So that students are more enthusiastic in learning. Student activity in learning internet-based technology can interact directly with friends, as well as experts according to their abilities. Classrooms that are not limited during the learning process, the teacher is only a facilitator, learning can be from anywhere the resources obtained and analyzing the information obtained in learning (Fadilah & Afriansyah, 2021).

Ideology of Mathematics Education

Ideology is a belief or value that binds one's own social groups (Ernest et al., 2016). Ideology is the ability of beliefs that are upheld by the values held by a certain social group to bind the group because it is considered a belief and doctrine about people in the world, social, and political, and is seen as the best way to achieve the end and goal (Harun, 2021).

Good implementation of ideology Mathematics education is radical, liberal and democratic that concerns ideas limited by time and space. However, the process of teaching and learning mathematics in schools emphasizes activities in finding patterns and relationships (Ernest et al., 2016). There are five ideologies of

mathematics education, namely: Industrial trainers, technological pragmatists, old humanists, progressive educators and community educators (Ernest et al., 2016).

Table 1.

General Description of Five Social Groups According to the Aspects Reviewed

Social Group Aspects Review	Industry Coach	Pragmatic technology	Old Humanist	Progressive Educators	Community Educator
Politics	Radical Right, New Cana	Meritokrati, Conservative	Conservative /Liberal	Liberal	Democratic Socialists
Views on Mathematics	Set of facts as well as provisions	Forming useful science without questioning	Purely structured knowledge	Mathematical views per individual	Konstruktivism social
Moral Values	Authoritarian 'Victorian values, alternatives, actions, self-help, activity, Moral Weakness, nautical, They are polluted	useful, practical thinking, diplomacy, 'wealth creation', Developer an Technologist	'layman' balance, order according to rules, Hierarchy, view' Monumenta,' hardly paternalistic	centered on someone, Caring, solidarity, Human values, guarding, Maternalistic, 'Romantic' view	Social Justice, independence, compatibility, fraternity, cordial care, participation and citizenship raan
Theory of Society	Careful Arrangement of Truths	Arrangement based on achievements achieved	Most importantly, the class divides several samples	Good lineup, Welfare Area	Fair order needs improvement
Children's Theory	When in elementary school, the child is like a loose angel and a plane that is sifar	Matros sifar, as well as frozen means, activists or futur managers	Shaping the views of elementary schools builds the cultural character of tarnes	Center child, radical school Children are like flowers that grow wild without sin	The flow of society: forming clay according to the environment, the big man who is lying
Theory of abilities	exclusive and Organized assets by action	Legacy competencies	The legacy of creation from the mind	Diverse awards	Cultural goods: not fixed
Mathematical objectives	Numeracy and community training bases containing compliance	Levels of equatorial mathematics and certification (company-focused)	Distributing MATH views (Math-centered)	Inventivity, experience through math (child center)	Sharp knowledge and democratic nobility

Learning Theory	struggle, action, education, mahfuz	Expertise, dexterity, effective professionalism	Perception and craftsmanship	Action, muffle, investigation	Questioning verdicts, deals
Theory of Teaching Mathematics	Absolute spread, drill, without additions	Mentors are capable of stimulation through career-interests	Frame, push, succeed in order	Self-ease, search, resisting disappointment	Dialogue, clash, questioning capacity and pedagogics
Rich Resource Theory	limestone and just considerations against calculators	Arms, microcomputer	Ocular support will be encouraging	Completeness of investigation	Socially Significant
Assessment theory in Mathematics	The usual external base tests	Stay away from cheating, external tests and certifications, streamlining profiles and	External review according to hierarchy	teachers led internal evaluation, dismissing emptiness	Diverse techniques, applications of social rumors as well as content
Theory Kebera Gaman Social	Class differences according to school, criptorasis, monocult uralist	Diverse curricula by future occpations	Varied curriculum with competence (mathematics -neutral)	Humanize Neutral Mathematics Using Local Culture	Accommodation of social and cultural diversity a necessity

Based on five ideologies Mathematics education in terms of social groups, the need for mathematical education idelology is reviewed from politics, views on mathematics, moral values, children's theory, learning theory, mathematical goals, mathematics teaching theory, mathematics assessment theory so that mathematics learning can face the era of society 5.0 which emphasizes human and technological changes quickly.

Implementation of Ideology and Educational Objectives in Mathematics Learning in the Face of the Era of Society 5.0

Mathematics as a vehicle in the progress of all children, so that the learning plan of mathematics as a language, creativeness and human beings in the mathematical experience that can solve problems and investigations. According to Ernest et al., (2016) Mathematics is part of the curriculum therefore the use of mathematics in schools is valuable.

The purpose of mathematics from educators is to develop children's creative power and mathematics learning needs (Marsigit, 2018). Two important things about the mathematical goals of the educator. First, the child's mathematical logical development can be seen through self-probing behavior. Second, advancing self-confidence, exploring the potential of rewarding self, and protecting children from negative knowledge (Ernest et al., 2016).

This is the need for the role of an educator in mathematics education. Mathematics Education which is in the nature of transferring and renovating students' knowledge, character and skills in the integration of subject concepts and extra-curriculars is useful for the character-based mathematics education curriculum. Based on the philosophy of everyone learning mathematics to be able to learn about the truth, have a relationship with God, human beings, the surrounding environment and the nation and the State (Marsigit, 2018), this is in accordance with the character values in the mathematics education curriculum.

Several philosophies that discover about mathematical learning, one of which is Thales who proves mathematically about measurement. Suaedi (2016) says Thales has made a brief hint of a measurement into mathematical evidence with phases as the current measurement material, such as proving some of the main postulates of geometry, including the postulate of both angles of the base of an isosceles triangle. The findings of this philosophy turn out to be many from everyday life such as calculation patterns that use numbers. In addition to thales, there are other scientists who have proven about backfilling, namely phythagoras. Phythagoras scientist with a postulate about a right triangle where the side plus the side in a right triangle is equal to the area of its hypotenuse (Marsigit, 2018).

Fuji (Nasution, 2018) humans in understanding things based on shapes (geometry) and properties (arithmetic). In other words, humans use the human five senses based on events and then enter into reason. The relationship between mathematics and ideology based on concepts, events and paradicma of knowledge. Mathematicians examine abstractly the material of infinity, probability, and number. In learning there is a relationship between immortality and infinity in the search for truth and the opportunity of the relationship between numbers and numbers (Clark in Nasution, 2018).

Learning in seeking the completion of mathematical tests with context can help stimulate mathematical realistic abilities (Puspaningtyas, 2019). According to Van Den Heuvel (Maskar, 2018) that mathematics learning must be in accordance with reality and relevant to the value of society. The sudden change of the problem cannot be handled with mathematical models because the mathematical process is harsh. Langke (2019) the generational style of religious education can be widely competitive. The change from the purpose of Education is not just to produce human beings who can compete in real life (Kholis, 2014). Entrepreneurship with an

innovative, creative, character and entrepreneurship spirit (Isrososiawan, 2013). Thus affecting the nation's economy.

Mathematics education changes ways in the learning process to students, namely: First, Active learning based on problem solving with the ability to analyze and solve problems with formulas (trial and error). Here the teacher as a facilitator, while the student as an active subject

Second, the change in the teacher's disposition during learning. The assumption that the teacher is the center of learning has changed to become a facilitator in the paradigm of the teacher as *centered learning* has changed to become a professional teacher in fostering and directing students in expressing opinions so that self-confidence arises, systematic thinking and can solve problems according to their knowledge. Third, learning resources are not only from reading books, but can be taken from those experienced by students, the internet, print, electronic, or other media (Kahfi, 2020).

Based on the above, Pujiawati et al. (2020) learning technology in mathematics education has 3 didactic functions, namely *Technology for doing*, *Technology for practicing skills*, and *Technology for developing conceptual understanding*. If all didactic functions can be performed in learning, it gives rise to contemporary and fun learning. Abdullah (2014) "*creative imagination*" is part of how to bring ideas together, so it is arranged into a fresh configuration.

In line with learning technology in mathematics education, it is necessary to optimize mathematics learning in the face of society 5.0. Learning mathematics requires creative innovation in learning so that it can be easily understood by students such as learning models and digital use. When conducting research at pure intelligent junior high schools by observation, there were several findings obtained by researchers. The school's first finding uses an innovative learning model so that students learn fun, the second finding is that the Pure Smart Middle School uses digital-based learning and the third finding that the school has blended into the culture towards mathematics. Based on the findings obtained, it is in accordance with the mathematics learning of the society 5.0 era which emphasizes technology. Society 5.0 which emphasizes technology, the need for integration into learning will give rise to a new, contemporary and exciting learning paradigm. This is in accordance with Bahri (2022) The need for an Education revolution in Indonesia in facing the era of globalization, the education section that has experienced a turnaround is: (1) Indonesian students in science education who take part in world science championships, olympics and robotics. In 2019 literacy, science, and mathematics are far different from other countries in Asia (Zuhair, 2021). (2) Inventorywork education requires an attitude that can be explained in producing modern ideas. Like students in developed countries Asia prioritizes education in the world of entrepreneurship making the country developed without natural resources. (3) Internet-based education requires means such as software and

hardware tools (Shodiq, 2021). (4) Higher Education has an important role in the maintenance, development, and pioneering of the application of science.

Modern education supported by the competence of educators is a mainstay for the implementation of education. Educators are required: have mastery of digital technology (Sagita & Khairunnisa, 2019), distribute cultural change, Pedagogical development (Lince, 2016), Personality-social competence. Fifth, Professional Development. Sixth, innovative-creative-adaptive (Kusumawati, 2020). This is in line with the implementation of the ideology and objectives of mathematics education.

CONCLUSION

Mathematics is a vehicle in the development of all children, so the mathematics lesson plan makes students creative and humane in the mathematical experience according to the process of solving problems and investigations. The concept of Society 5.0 requires using the science of AI (*Artificial Intelligence*), robots, and Lots. There are five ideologies of mathematics education, namely: Industry coaches, technological pragmatists, old humanists, progressive educators and community educators.

In mathematics education undergoes a change in students' knowledge, character and skills in the integration of subject concepts and extra-curricular is useful for a character-based mathematics education curriculum. Implementation of ideology and objectives of mathematics education in the Era of Society 5.0, namely: having mastery of digital technology, distributing cultural change, pedagogical development, personality-social competence, professional development, and innovative-creative-adaptive.

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