Cendikia : Media Jurnal Ilmiah Pendidikan, 13 (2) (2022) pp. 232-238

Published by: IOCSCIENCE

Cendikia : Media Jurnal Ilmiah Pendidikan

Journal homepage: www.iocscience.org/ejournal/index.php/Cendikia

The Influence Of Mathematics Learning Media On Students' Creative Mindsets Based On Philosophy Of Science

Ririn Diyannita Sasanti[1], Siti Masitoh[2], Mochamad Nursalim[3]

[1,2,3]Educational Technology Study Program, Universitas Negeri Surabaya, Surabaya, Indonesia

ARTICLE INFO

Article history:

Received Sep 19, 2022
Revised Oct 6, 2022
Accepted Oct 22, 2022

Keywords:

Education
Innovations
Mathematics
Learning media
Philosophy of science

ABSTRACT

Improvement in the quality of education, one of which is indicated by improving learning outcomes, cannot be separated from efforts to improve learning innovations in learning media are very much currently, especially in the field of mathematics with the existence of learning media eating the creative and innovative mindset of students is developing well. The use of teaching aids in the learning process in students is very helpful in increasing the understanding of concepts and skills in the subject matter taught, especially mathematics lessons, in philosophy of science and education there are several aspects that are the basis of learning media, namely aspects of ideas and facts, as well as abstract and concrete both theoretically and practically. The approach of philosophy of science and education ontologically, epistemologically, and axiologically in the development of learning media if summarized in accordance with their practical objectives, will be able to form practical values that lead to the ability of student learning outcomes.

Corresponding Author:

Ririn Diyannita Sasanti,
Educational Technology Study Program,
Universitas Negeri Surabaya,
Jl. Lidah Wetan, Lidah Wetan, Kec. Lakarsantri, Kota SBY, Jawa Timur 60213, Indonesia
Email: riri.dawam@gmail.com

INTRODUCTION

The world of education in Indonesia, especially primary to secondary education, is warmly using curriculum independence, something that is considered quite new and valuable in Indonesia. Some news in television and online media and statements, some teaching colleagues in formal schools, that the current school curriculum is still not fully running smoothly, this is more due to differences in analysis from the teachers concerned, which is still unfamiliar to our teachers. Learning in general is undergoing conflicts and developments as an impact or influence of the global era, the development of science and technology, art and culture. The gradually continuous changes determine the future of the nation, besides that there is a need for improvement and adjustment of the national education system, including the improvement of the independent curriculum used today.

One of the main driving machines in education in schools is the implementation of an effective and efficient learning process in the classroom, in other words Active, Innovative, Creative, Effective and Fun Learning with the ascent of Contextual Teaching and Learning (CTL), which is a learning approach that emphasizes the process of full student involvement to be able to find the material learned and connect with real-life situations so as to encourage students can apply in their lives. Through this learning process, it has actively included students, it is hoped that it will occur, among others: 1) the transfer of knowledge from education to students optimally, 2) the value of life, humanity and faith values, and 3) as a vehicle for the growth and development of the creative power, taste and feelings of each student, through an effective and efficient learning process in schools will help and encourage physical growth and development and spiritual, the condition for the development of various abilities and skills of the learners, the learning process can take place properly if supported by conditions and a conducive school environment situation. Mathematics, according to Ruseffendi (Heruman; 2008), is a language of symbols;deductive science that does not accept proof inductively; the science of patterns of order, and organized structures, ranging from undefined elements, defined silliness, keaximas or postulates, and finally to postulates. Meanwhile, the essence of mathematics according to Soedjadi (2000), namely having abstract objectives, relying on agreement, and a deductive mindset.

The learning process in the concrete phase can go through concrete, semi-concrete, semi-abstract and subsequently abstract stages. Any abstract concept that the student just understood needs to be immediately reinforced, in order to settle and last a long time in the student's memory, so that it will be inherent in his mindset and pattern of action. For this purpose, it is necessary to learn through deeds and understanding, not just memorization or remembering facts, because this will be easily forgotten by students. The Chinese proverb says, "I hear then I forget, I see then I know, I do then I understand". Bruner (Heruman, 2008) reveals that in mathematics learning, the student must find for himself the various knowledge it requires. 'Discovering' here is primarily to find again '(discovery), or it can also find a whole new one (invention). Therefore, to students the material is presented not in its final form and is not told how it is completed. In this learning, the teacher must be more much of a mentor acts as opposed to being an informer.

Teachers consciously plan their teaching activities systematically by utilizing all potentials for the benefit of teaching, thus the essence is that increasing student learning achievement is to improve the learning model packaged in the learning process. Science is regarded as memorization not as knowledge that describes, explains, and predicts the symptoms of nature. In this context, the philosophy of science makes clear the existence of science that requires other knowledge as a means of thinking and a means of scientific communication. These tools include language, logic, mathematics, statistics, and other data analysis techniques. therefore, although ilsafat contains thinking activities, but not every thinking activity means philosophy or philosophizing.

RESEARCH METHODOLOGY

The type of research used in this study is a literature study. Literature study according to Syaibani (2012) is any effort made by researchers to collect information that is relevant to the topic or problem that will or is being studied. The information can be obtained from scientific books, research reports, scientific essays, theses and dissertations, yearbooks, encyclopedias, and written sources both printed and other electronic. Literature studies are a technique carried out by conducting studies through the collection of references from books, articles, magazines, newspapers, and online media. The references that have been collected are then sorted out according to the topic to be discussed. In literature studies, synthesis is also carried out, namely re-describing with its own language the opinions or theories of experts contained in reference sources. The preparation of this article uses references obtained through online media, such as website pages, blogs, articles, modules and electronic books

The main features of literature studies according to Zed (2008) include:

1. Researchers are directly dealing with text or numerical data and not with direct knowledge from the field or eyewitnesses in the form of events, people, or other objects.
2. Library data is ready-to-use meaning that researchers do not go anywhere except to deal directly with source materials that are already available in the library.
3. Library data is generally a secondary source, meaning that the researcher obtained the material from the second hand and not the original data from the first hand in the field.
4. Library data conditions are not limited by time and space.

RESULTS AND DISCUSSIONS

Mathematics and Mathematics Learning

To date, there is no uniform opinion regarding the notion of mathematics. Some people think that mathematics is nothing more than counting using formulas and numbers. However, just as music is not just singing, mathematics is not just counting or struggling with formulas and numbers.) posits that mathematics is concerned with ideas, their structures and their regulated relationships with abstract concepts. While gives 3 kinds of elementary understandings of mathematics as follows. 1.Mathematics as the science of numbers and spaces. 2. Mathematics as the scientific study of the classification and construction of various imaginable structures and patterns 3. Mathematics as an activity carried out by mathematicians. from the various opinions that seem to differ regarding the notion of mathematics, the same characteristics can still be drawn. According to Soedjadi (1999:13), the characteristics of mathematics are: having abstract objects, relying on agreement, having a deductive mindset, having symbols that are empty of meaning, paying attention to the universe of speech, and being consistent in its system. According to Bell (1981: 108), mathematical objects consist of facts, skills, concepts, and principles. Here is a description of these mathematical objects.

1. Facts Facts are all agreements in mathematics, like mathematical symbols. The student is said to understand the facts when he has been able to name and use them appropriately.
2. Skill Skills are operations or procedures that students are expected to master quickly and precisely. A student is said to master a skill if he or she can demonstrate the skill appropriately, can solve various types of problems that require that skill, and apply the skill to various situations.
3. Concept A concept is an abstract idea that allows one to determine whether an object or event is an example or not an example of a concept. Students are said to master concepts if they are able to identify examples and non-examples of concepts.
4. Principle The principle is a series of several concepts together along with the relationship (linkage) between the concepts. The student is said to master the principle if he can identify the concepts contained in the principle, determine the relationship between concepts, and apply the principle to a particular situation.

Soedjadi (1999: 138) stated that mathematics is one of the basic sciences, both its applied aspects and its reasoning aspects have an important role in efforts to master science and technology. This means that to some extent, mathematics needs to be mastered by all Indonesian citizens, both in their application and mindset. That is an important reason why mathematics needs to be taught at every level of school. Given the vastness of mathematics material, it is necessary to choose certain mathematics materials that will be taught at the school level. The selected mathematics material was then called school mathematics. School mathematics is the elements or parts of mathematics that are selected based on or oriented towards the interests of education and the development of science and technology. Thus according to Soedjadi (1999: 37), school mathematics is not the same as mathematics as a science in terms of its presentation, mindset, limitations of its universe, and the degree of its abstractness. To facilitate its delivery, the presentation of mathematical items must be adjusted to the approximate intellectual development of students, for example by lowering the level

of abstractness, or within certain limits using an inductive mindset, especially for students in low-level schools, given that they have not been able to think abstractly and use a deductive mindset.

Mathematics learning at school is not only intended to achieve the objectives of mathematics education of a material nature, namely to equip students to master mathematics and apply it in everyday life. But more than that, mathematics learning is also intended to achieve the goal of mathematics education that is formal, namely to organize students' reasoning and shape their personality. The learning of mathematics should be designed in such a way that it is not only intended to achieve goals in the cognitive sphere, but also to achieve goals in the affective and psychomotor realms. Good mathematics learning is not only intended to educate students, but is also intended to produce students with good personalities. This is understandable, because according to Soedjadi (1999: 173), not all students who receive mathematics lessons will eventually continue to use or apply the mathematics they learn. Whereas almost all students need good reasoning and personality in everyday life. In this regard, the task of the math teacher is very strategic. He is required to be able to design mathematics learning in such a way that it can help students in developing their attitudes and intellectual abilities, so that the products of mathematics learning appear in a systematic, critical, creative, self-disciplined, and personally consistent mindset. So far, mathematics learning in schools prioritizes the achievement of material mathematics education goals, but pays less attention to the achievement of formal mathematics education goals, namely to organize students' reasoning and shape their personalities. This can be understood, considering that there are not a few teachers who carry out learning solely to convey the subject matter or transfer knowledge.

According to Bishop (2000), values in mathematics education is the deep affective qualities which education fosters through the school subject of mathematics. Values in mathematics education are an important component in mathematics learning in the classroom. Those values can be taught to students both implicitly and explicitly in the learning of mathematics in the classroom. For example, through a series of problem-solving steps in mathematics, students are trained to be critical, careful, coherent, analytical, rational, and efficient In the mathematics learning that teachers have developed so far, the purpose of mathematics education that is formal, namely to shape the reasoning and personality of students, is expected to be achieved by itself. Through mathematics learning, it is hoped that students can automatically be disciplined in their reasoning, can think critically, logically, carefully, analytically, coherently, systematically, and consistently in attitude. Such mathematical learning planning according to Soedjadi (1999: 66) is called by-chance learning planning. Such learning is of course still necessary. However, along with the rapid development of mathematics and the need for mathematics and its mindset in various fields, teachers need to deliberately design learning that allows to actively teach educational values in mathematics to students. Such learning planning according to Soedjadi (1999: 66) is called by-design learning planning. The teacher deliberately designs mathematics learning that allows there to be activities that can support the growth and development of students' personalities. The values that are taught to students in the classroom wherever possible also include those that develop in society in general. For example, through discussion activities, students are trained to appreciate and criticize the opinions of others, value agreement, and practice expressing opinions with strong argumentation

Learning Media

In general, media can be interpreted as anything that can channel information from the source of information to the recipient of the information. Media is one of the components in the communication process. The components in question are the source of information, information, and the recipient of information, and the fourth component is the media. If one of these four components is absent, then the communication process is unlikely to occur. Thus, the media will only be meaningful if the other three components are present. The definition of learning media is not much different from the understanding of media in the communication process. According to Schramm

(Prastati, 2001), learning media can be interpreted as messenger technology (information) that can be used for learning purposes.

Meanwhile, according to Briggs (Prastati, 2001) learning media is defined as a means to convey learning content / material. The means in question can be in the form of hardware or software. Learning tools in the form of hardware include whiteboards, rulers, terms, scales, and number game cards. Meanwhile, examples of facilities categorized as software include student activity sheets (LKS), task sheets, instructions for mathematical games, and computer programs. The use of learning media is inseparable from the use of learning methods. Learning methods are deliberate procedures designed to help students learn better and to achieve learning objectives. The relationship between learning media and learning methods in learning activities is described as follows.

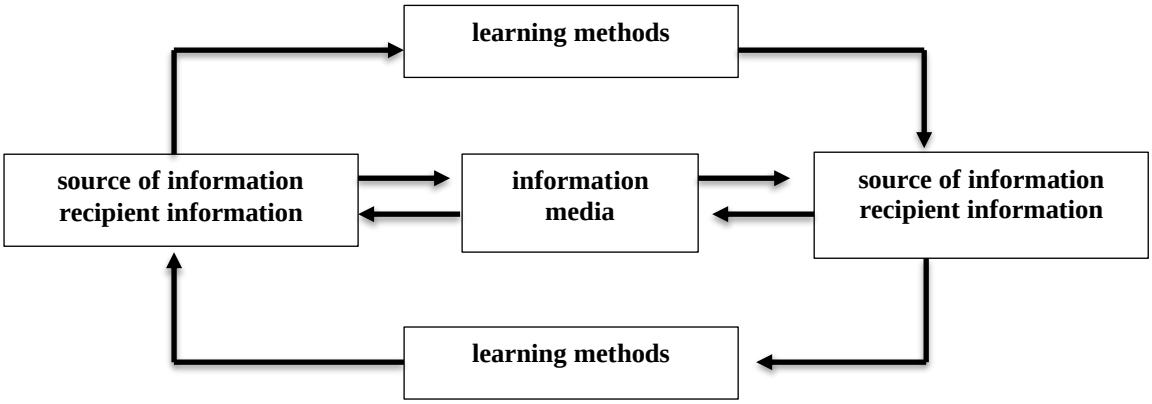

Figure 1.
Relationship of learning methods in learning activities

For example, suppose the teacher carries out learning activities in the classroom using a projector through discussion activities, then the projector is a learning medium, while discussion is a learning method that is deliberately designed to carry out the learning process as well as possible. There are different ways to classify learning media. In general, learning media can be classified into two parts, namely technological product tools used to display messages/information called hardware such as television projectors, cassette recorders, and programs/messages that are displayed through these tools called software, such as slides, movies, video cassettes. divides learning media into three types, namely audible media, visible media, and movable media. Of the three types of learning media, the most complete is motion audio-visual (there are images, sounds, and motion). Meanwhile, divides the media according to the number of audiences served as follows

1. Media for large audiences, such as television, radio, and the internet.
2. Media for a small audience, such as sound film, silent film, video tape, slide, radio, audiotape, audiodisc, photos, whiteboard, chart, and projector.
1. Media for individuals, such as print media (hand-out), and computer assisted instruction (CAI)

Learning media can function as a visual aid in learning activities, namely in the form of tools that can provide students, among others, to encourage learning motivation, clarify and facilitate the delivery of abstract concepts, and increase the absorption or retention of student learning learning media can be functioned as follows.

1. As a teaching aid (dependent media) The effectiveness of media use depends on the way and ability of the teacher to use, for example, images, and transparency.
2. As an independent media, media is designed, developed, and produced systematically, and can channel information directionally to achieve certain goals, for example: radio, television,

film, and video. The advantage of this model is that the teacher can give a lot of time to students who really need it, students become active, students can learn at their own pace.visual experience to students among others to encourage learning motivation, clarify and make it easier

Creative Mindset

A mindset is a set of beliefs or ways of thinking that influence a person's behavior and attitudes, which will ultimately determine the level of success of his life. belief determines a person's way of thinking, communicating and acting. Thus, if you want to change your mindset, what must be changed is belief or a collection of beliefs. ,Prayitno, (2002) says that ―The views that people adopt for themselves greatly influence the way the person directs life‖. This means that a person's beliefs or beliefs have powers that can change thoughts, consciousnesses, feelings, attitudes, and others, which ultimately shape his current life. Creative Thinking is connecting ideas or things that were previously unrelated. In the reality of modern techniques arise interesting mottoes (jargon) or typical terms that become the language of a certain group. Likewise, Creative Thinking is no exception, which has four distinctive words, namely imaginative.

The Nature of the Philosophy of Educational Sciences

Philosophy of education . emphasis on planning, implementation, and evaluation in education. In opinion (Karim, 2014) education . is a study of history that includes the nature of the basics, psychology, student learning processes, and the way teachers teach and the expected objectives of learning.. In general there are several studies related to education . namely: 1) basic properties ; 2) the history of development ; 3) the psychology of learning ; 4) learning theory.; 5) curriculum development; and 6) curriculum implementation. Specifically the philosophy of education . leads to the philosophy of constructivism. According to (Burhanudin, 2013) learning . is the process of forming understanding. The opinion is supported by Bettencount (1989) who states that learning . not only imitating and reflecting on the theory being studied but also forming understanding. The process of forming this understanding is due to the activeness of students in the learning process. Fisher and Lipson (1986) in research on misconceptions found that in learning. involves an active and constructive role. Constructivism had a major influence on misconceptions as demonstrated by the many studies on misconceptions.

The idea of constructivism was put forward succinctly by von Glaserfeld and Kitchener (1987), who stated that knowledge is a real construction of activity, which builds cognitive schemes of knowledge formed by the structure of conception based on one's experience. In this construction process requires the ability to: 1) remember, 2) re-express, 3) compare, 4) distinguish, 5) choose, 6) understand, 7) apply, and 8) analyze. In education related to the individual learning process, construction begins with building a memory of the concepts learned, then continues by re-expressing concepts in their own words until they are able to apply and analyze. This stage certainly corresponds to the stage of development of human thinking as conveyed by Piaget who stated that cognitive development consists of motor sensory, pre-operational, concrete operations, and formal operations. The construction process will also be able to run effectively if it is supported by learning media as a means and learning resource.

CONCLUSION

Philosophy is an overarching truth that is often disputed with the truth of science of a relative nature. Because the truth of science is only reviewed in terms of what can be observed by humans. Philosophy becomes the source of all human activities or colors all the activities of society and based on the experienced life experiences. it is known that mathematics is actually able to raise the problem of the concept of everything in philosophy that has been hidden. The problem has to do with something that does not have the nature of Ada, both in reality, mind, and possibility. The

mathematical approach provides a solution to the problem by using symbolization methods, so that things that were previously considered unable to have a visible nature.

References

Ainun, (2020). Studi Kepustakaan Mengenai Landasan Teori Dan Praktik Konseling Naratif, Jurnal Mahasiswa Univeristas Negeri Surabaya

Burhanudin, (2013). Pengertian dan Ruang Lingkup Filsafat Ilmu.https://afidburhanuddin.files.wordpress.com

Eduard, K, Samuel, U, Cartes, A, R dan Mesak, R (2021). Peningkatan Hasil Belajar Siswa Melalui Media Pembelajaran Kreatif Roda Pada Materi Segiempat Di Kelas VII SMP Kristen Batuputih, Jurnal pendidikan Indonesia (Japendi) Vol.2 No.12 Desember.

Flanagan, John S, Rita S (2004). Counseling and Psychotherapy Theories in Context and Practice: Skills, Strategies, and Techniques (1st Edition). New Jersey: John Wiley & Sons

Hudojo, Herman. (1988) mengajar Belajar Matematika. Jakarta: DEPDIKBUD.

I Ketut, D, I gede, M, K, I Made, A, S, (2020). Blended Learning, Inovasi Strategi Pembelajaran Matematika di Era Revolusi Industri 4.0 Bagi Pendidikan Tinggi, PRISMA, Prosiding Seminar Nasional Matematika

Jimi, A, Siti, M, Mochamad, N, (2022). Development Of Learning Media For The Formation Of Characteristics Based On The Philosophy Of Science, Cendekia: Media Jurnal Ilmiah Pendidikan, 182-187

Kurnia, R, Y, Lely, K, (2016). RME SEBAGAI ALTERNATIF PENDEKATAN PEMBELAJARAN MATEMATIKA UNTUK MEMBANGUN GENERASI KREATIF DAN BERKARAKTER, Proceeding International Seminar on Education 2016 Faculty of Tarbiyah and Teacher Training

Mardinal, T, Dinda, G, Tiara, D, L (2022). Arah Orientasi Filsafat Ilmu di Indonesia,Jurnal Pendidikan Sekolah Dasar,Vol.3. No. 1 Hal 159-168

Nurhayati, Dimitri, M, (2021). Analisis Sentimen Berbasis Aspek Dengan Deep Learning Ditinjau dari Sudut Pandang Filsafat Ilmu, JUMANJI, Vol. 4. No. 2, Hal 70-85, Februari

Rilliandi, A, P, (2022). Studi Komparatif Pendekatan Matematika dan Filsafat Dalam Menganalisis Permasalahan Konsep "segala sesuatu", Jurnal Filsafat Indonesia, Vol. 5. No. 1

Rina, K, Usep, K, (2016). Penerapan Model Pembelajaran Kooperatif Tipe Student Teams Achievement Division (Stad) Berbantuan Media Komik Untuk Meningkatkan Kemampuan Berpikir Kreatif Matematis Siswa Smp. UJMES, Vol. 01. No. 02 Juli

Syaibani, R. 2012. Studi Kepustakaan, (Online), (http://repository.usu.ac.id/ bitstream, diakses 14 Oktober 2022)

Sangadji, Etta, M, Sopiah. (2010) *Metodologi Penelitian*. Yogyakarta: C.V Andi.

Soedjadi (1999). Kiat Pendidikan Matematika di Indonesia (Konstatasi Keadaan Masa Kini Menuju Harapan Masa Depan). Jakarta: Ditjen Dikti Depdikbud

Suwardi, Masni, E, F, Rohayati, (2014). Pengaruh Penggunaan Alat Peraga Terhadap Hasil Pembelajaran Matematika Pada Anak Usia Dini. Jurnal AL-Azhar Indonesia Seri Humaniora, Vol.2 No. 4 September

Zed, Mestika, (2003), Metode Penelitian Kepustakaan. Jakarta : Yayasan Obor Indonesia