

Teachers' Perceptions in the Development of Student Worksheets (LKPD) Based On Discovery Learning To Improve System Thinking Ability

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Abstract

The purpose of this study is to analyse and explain the Development of Based Student Worksheets Discovery Learning- to Improve System Thinking Skills for Junior High School Students. The method used is a descriptive method. The sample of this study includes one hundred and ten junior high school teachers from 90 different schools. The data was collected using a questionnaire, while the data analysis technique used proportions. The results showed that the Development of Student Worksheets (Lkpd) Based on Discovery Learning to Improve the System Thinking Ability of Junior High School Students. The teacher does not yet know the very high category system thinking ability, The existing worksheets have not trained students' ability to think systems and are also included in the low category because teachers have not assessed students' ability to think critically. It can be concluded that (Lkpd) Based on Discovery Learning To Improve System Thinking Ability is needed by teachers and students to Improve System Thinking Ability of Junior High School Students.

Keywords

teachers' perceptions; of student worksheets; discovery learning; system thinking ability



I. Introduction

The ability to think systems is a way or skill of thinking that focuses on the interconnection of components, feedback structures, causality from components that synthesise them into a single unit (Sange, 1990; Assaraf & Orion, 2005). Systems thinking is an epistemological approach that focuses on identifying, modelling, and predicting complex systems as entities rather than isolated phenomena (Sommer & Lücken, 2010; von Bertalanffy, 1973). The systems thinking approach is very important for various actors both at the global level, such as policy makers, governments, researchers, and companies, and at the individual level (Jacobson & Wilensky, 2006).

Systems thinking or (complex) systems learning has recently received a lot of attention in science education research. Systems thinking helps students organise their thoughts in meaningful ways and makes connections between seemingly unrelated problems interrelated (Clark et al. 2017).

The ability to think systems is very necessary because when students have this ability, the process of relating one material to another will be easier. Systems thinking can contribute to the development of students' understanding of dynamic living systems (Schuler et al. 2017). This ability is needed in education considering that the provision of knowledge in schools still focuses on isolated facts rather than systemic relationships and processes from time to time. Although noted as important, integration of systems thinking in education is still limited. This is in line with research conducted by Gilissen et al. (2016).

The system thinking ability of the Indonesian nation is still low. This is supported by the reality that occurs daily in the community, for example the flood disaster that occurred in Kalimantan and East Nusa Tenggara in early 2021. Throughout 2019, 286 disaster events occurred in Jember Regency. Consisting of 15 floods, 22 landslides, 86 strong winds, 67 fires, 35 forest and land fires, 39 droughts, 1 abrasion and 21 earthquakes, which disasters were caused by natural factors and the lack of people's system thinking skills are still low. , such as many people still cutting down forests illegally, littering in river areas (Kompos.com: 2019).

Garbage is a cultural problem because of its impact on various aspects of life, especially in big cities such as what happened in the Special Capital Region (DKI) Jakarta. Poor handling of waste has an impact on the environment, causing various problems ranging from health problems to floods. Waste production in DKI Jakarta continues to increase every year. In 2010 the average waste production in 5 (five) DKI Jakarta areas reached 6,139 tonnes per day or 2.4 million tonnes per year (Bappeda DKI Jakarta, 2013), and in 2014, waste production increased again by 30% to 8,000 tonnes per day (Khairany, 2014). The large volume of waste is caused by the large number of people living in DKI Jakarta. According to Soemarwoto (2001) in Rohani (2007) that the increase in population and income will lead to a consumptive lifestyle, so that it can have an impact on increasing the waste produced.

Nowadays, many learning models have been developed that can be used in the learning process. The selection of the right learning model plays a very important role in increasing interest and enthusiasm for learning for students to be more active and achieve maximum understanding of concepts. The discovery learning model was first introduced by Jerome Bruner who emphasised that learning should be able to encourage students to learn what they already have (Rifa'I & Anni, 2011: 233). According to Bruner's view in Markaban (2008: 10) learning by discovery is learning to find, where a student is faced with a problem or situation that seems odd so that students can find a solution.

Discovery learning provides opportunities for students to participate actively in building the knowledge they will acquire. Student participation directs learning in a learning process that is student-centred, active, fun, and allows information to occur between students, between students and teachers, and between students and the environment. The discovery learning learning model is based on constructivist learning theories (Anyafulude, 2013: 2)

II. Research Method

This research was conducted in December 2020 in ninety junior high schools with a total sample of 110 teachers. The research method uses a descriptive survey method, describing information that occurs in the field about the use of LKPD to measure students' system thinking ability. The type of data in the form of descriptive data was obtained based on questionnaires. The data were analysed using manual scoring, each item checked was interpreted by the teacher as agreeing with the statements and questionnaires. Calculating the percentage of each item in the questionnaire using the formula [20] and presenting the criteria according to

Table 1. Interpretation of the percentage of the questionnaire

Percentage	Criteria
80.1 - 100.0	Very high
60.1 - 80.0	High
40.1 - 60.0	Medium
20.1 - 40.0	Low
0.0 - 20.0	Very low

III. Results and Discussion

Results of data analysis This study concludes that in general,-based LKPD Discovery Learning in learning activities has not yet been applied. This can be seen in Table 2.

Table 2. Perception of-based LKPD Discovery Learning to Measure System Thinking Ability

No.	Statement	Yes (%)	No (%)
1	Agree Sir / Madam that in learning the teacher's job is to train the thinking skills of students?	98.2	1.8
2	Have you trained students in thinking skills in teaching?	27.3	72.7
5	Have you ever heard/read/know about the ability to "think systems"?	26.4	73.6
6	Do you think that students need to be trained to think systems?	90.9	9.1
7	<i>Do you use worksheets in teaching science?</i>	93.6	6.4
8	In your opinion, do the existing LKS train students' ability to think systems?	23.6	76.4
9	Is it necessary to develop worksheets whose contents train students' ability to think systems?	92.7	8.2
Average			

Question No. 3 (Example of practising thinking skills)

Never : 45 people (40.90%)
 Already : 19 people (17.27%)
 Making media : 1 person (0.90%)
 Isay and multiple choice tests : 1 person (1, 81%)
 Reads a printed book and explains : 1 person (0.90%)
 Don't know : 1 person (0.90%)
 Discussion : 32 people (29.09%)

Question no 4. (If you have not trained skills think students, why not)

Don't know how : 77 people (70%)
 Too many students : 19 people (17,27%)
 Still teacher centred : 2 people (1,81%)
 Already : 12 people (10,90 %)

Based on Table 2. It can be seen that the percentage of answers "Yes" and "No" has a significant difference in each question. Only a small number of teachers know about systems thinking in the "high" category and the current LKS has not trained students' ability to think systems in the "low" category.

Based on Table 2. it can be seen that the teacher agrees to train students' thinking skills in learning assignments 98.2%.

29.09% of the methods applied by the teacher can help students understand science, the methods that are often used are discussions and lectures. The teacher knows that students need to be trained to think systems 90.9%, but the teacher does not apply it in the class with a percentage of 26.4% because it is considered a new thing and is not used to implementing the learning strategy.

Systems thinking helps students organise their thoughts in meaningful ways and makes connections between seemingly unrelated problems interrelated (Clark et al. 2017).

The teacher agrees that the development of LKS which contains the contents of training students' ability to think systems in learning is a requirement for 21st century abilities with a percentage of 92.7%. However, the current LKS has not trained students' ability to think 76% so that even though the teacher has used the LKS it will not live up to expectations. So, the teacher agrees on the need for the Development of Discovery Learning-Based Student Worksheets to Improve System Thinking Skills for Junior High School Students.

Teacher's Perception of Learning the need for Development of Student Worksheets (Lkpd) Discovery Learning To Improve the System Thinking Ability of Junior High School Students.

Based on the analysis of the data in Table 2, it can be seen that most of the teachers in applying the lecture strategy/method can help students understand science material. Science or IPA is the study of phenomena in the universe. Science obtains the truth about facts and natural phenomena through empirical activities that can be obtained through laboratory experiments or the outdoors (Depdiknas, 2006: 3). Application of the lecture method is less attracted the attention of learners for IPA is considered a difficult subject, abstract and elusive so not maximal in assessing the ability of student collaboration

This shows the necessary repairs on the activities of science teaching in the classroom, in order to overcome this problem is to improve the quality of the learning process . One approach that can be used to support learning is through the Development of Student Worksheets (Lkpd). Discovery Learning To Improve System Thinking Ability of Junior High School Students, because i learning this systems thinking can contribute to the development of students' understanding of dynamic living systems (Schuler et al. 2017). This ability is needed in education considering that the provision of knowledge in schools still focuses on isolated facts rather than on systemic relationships and processes from time to time. Although noted as important. integration of systems thinking in education is still limited. This is in line with research conducted by Gilissen et al. (2016).

Learning by using Discovery Learning can also change the learning atmosphere which is dominated by the teacher (teacher centre learning) by using the discussion method which should be student-centred learning (Student centred learning) so that it can improve students' thinking skills.

The 2013 Curriculum Development Guidelines state that science learning at the junior high school level is carried out on an integrated basis. Science learning in junior high school is not a scientific discipline, but is developed as an integrative science subject. Integrative science has the meaning of combining various aspects, namely the domain of attitudes, knowledge, and skills. As an integrated science, education is application oriented, developing thinking skills, learning abilities, curiosity, and developing caring and responsible attitudes towards the social and natural environment.

The learning process should take place interactively and inspiringly (Permendikbud, 2016) so that students can develop their activities and creativity (Mulyasa, 2009). Learning should not only be memorising facts or information, but an experienced process occurs (Sanjaya, 2010), so that educated humans are formed who have the ability to understand and adapt to their environment, are able to become agents of change and are able to anticipate something that will happen (Hatimah, 2006). Learning that is only oriented to mastery of the material has proven to be successful only in short-term remembering competitions (Faridah, 2012). In line with that, the existence of learning resources can also increase learning activity and creativity (Mulyasa, 2013). The teacher in addition to acting as a facilitator also plays an important role as a designer of learning resources (Permendiknas, 2006).

The ability to think systems is very necessary because when students have this ability, the process of relating one material to another will be easier. Systems thinking can contribute to the development of students' understanding of dynamic living systems (Schuler et al. 2017).

According to Syaifuddin Sagala (2005:68), the learning approach is the path that will be taken by teachers and students in achieving instructional goals for a particular instruction. Learning with a scientific approach is a learning process designed in such a way that students actively construct concepts, laws or principles through the stages of observing (to identify or find problems), formulate problems, propose or formulate hypotheses, collect data with various techniques, analyse data, draw conclusions and communicate concepts, laws, or principles found.

IV. Conclusion

The conclusion in this study is that some teachers do not know about systems thinking skills (73.6%), teachers have not trained students with thinking skills (72.7%) and teachers agree with the Development of Based Student Worksheets (Lkpd) Discovery Learning- to Improve System Thinking Skills for Junior High School Students. (92.7%).

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