

## **Improving Problem-Solving Ability Through Culture-Based Learning Model Of Tudang Sipulung**

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**Abstract:** *This study aims to describe the problem solving ability of students in the subjects of General Biology. Learning model used culture-based prawn shrimp. Subjects in this study are students semester 1 majoring in biology education academic year 2014-2015 Muhammadiyah University of Makassar and the object of research is the ability problem-solving and student responses with a culture-based model of shrimp ponds. Data analysis techniques used are average, percentage and likert scale. The results of this study indicate that based on the average student problem solving ability after using the BTS model is 84.4 with excellent qualification. Recapitulation of student response indicate that from six statement there are dominant statement that strongly agree that statement of BTS teaching model motivate student to work in group, and two dominant statement agree that learning with BTS model can explore ability and train student problem solving. Students agree that learning with BTS model makes students more active and more memorable because in the model of learning BTS students construct knowledge independently.*

**Keyword:** *Problem Solving, Culture-Based Learning Model of Tudang Sipulung.*

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### **I. Introduction**

Biology as part of science is knowledge acquired through systematic steps or called scientific methods. When there is no formal education, people learn it by interacting directly with nature, then gradually the results are recorded and communicated with the crowd. Experts construct their observations and investigations into knowledge that can be communicated with others. Thus it is clear that from the beginning in the study of biology has been referring to the scientific process and the framework of science thinking.

Paradigm shift in education followed by paradigm shift in biology learning. The new paradigm of education, according to susanto (2010) (1) that is (1) learners are expected to master cognitive skills and science process skills, (2) learners are expected to master life skills to solve life problems, (3) learners facilitated to build The concept itself, (4) teachers / lecturers are expected to be facilitators in learning, and (5) authentic assessment is more widely used than the assessment with standardized tests. In addition, the present biology learning ideally not only teaches biology facts, concepts and principles to learners, but also expects the students to be able to take a scientific perspective to build their own concept through the exploration of nature around (Permendiknas RI Number 22 Year 2006). The lecture process needs to be adjusted to the learning that can foster the required competencies in the knowledge age. Learning in question is a lesson that gives to the students the empowerment of its metacognitive ability, namely in the form of problem solving and critical thinking. Research related to the relationship of declarative knowledge and procedural knowledge in the process of problem solving has been done. Problem solving is one type of intellectual skill that is higher in degree and more complex than other types of intellectual skills (Gagne, in Dwiyoogo, 2008b). The results show that declarative knowledge and procedural knowledge are not two separate forms of knowledge, but both are interconnected (Gagne, 1985; Eggen & Kauchak, 1994 in Dwiyoogo, 2008b) (4). When learners solve problems, there is an interactive relationship between declarative knowledge and procedural knowledge. Before performing procedural actions (procedural knowledge in production form), learners who are solving a problem must track their existing knowledge relating to the problem to be solved (declarative knowledge in prepositional form). Knowledge that has been stored in memory is a manifestation of declarative knowledge, while the implementation of tracking measures in sequence ranging from problem representation, finding solutions, up to evaluation of the solution is a manifestation of procedural knowledge.

Problem solving is a capability, which is a capability gained through learning. Problem solving as a capability, is the most complex learning outcome in the realm of intellectual skills (Dwiyoogo, 2008b). It further said that the ability to apply, analyze, synthesize, and evaluate is a high-level thinking ability that will form problem-solving abilities. The learning features that empower the problem-solving skills are highly relevant to the philosophy, goals and content learned in biology learning. Susanto (2000) (5) states that philosophically biology learning should reflect a process that trains students thinking critically, solving problems according to authentic situations. The biology learning philosophy that emphasizes the empowerment of critical thinking and

problem-solving skills also forms part of the embodied traits in empowering problem-solving skills. The Directorate of Education Personnel (2008) (6) states the objectives of biology learning that is developing experience to be able to propose and test hypotheses through experiments, and communicate the experimental results orally and in writing. This objective confirms the learning effort through a process that provides hands-on experience with biological objects, and attempts at experimental and follow-up activities take place through oral and written presentations. As the characteristic of problem solving skills is also a hallmark of Biology learning goals. Biological material consists of living creatures and their environment, while the biological learning process that comes from biological objects can be done by providing problems related to biological objects. Stemming from the problem biological knowledge will be constructed as new knowledge or justify existing biological knowledge. Therefore it is highly correlated between biology learning and the orientation of empowering problem solving skills.

Syntax of culture-based learning model Tudang sipulung consists of 4 stages, namely stage 1 orientation and motivation, stage 2 reconstruction, stage 3 small group discussion, stage 4 presentation and evaluation. Each phase is substituted with the dominant aspects of the dominant shrimp culture. Stage 1: the orientation and motivation stage. At this stage, the lecturer conveys the purpose of the lecture and motivates the students. Orientation and motivation directed is an effort to realize the value of siri 'and lempuk. In this stage 1, the initial knowledge of the student's lecture is related to the material to be discussed, so the students have initial knowledge. This process is in line with the constructivist theory. Stage 2: the reconstruction phase, at this stage the culture of the shrimp involved is siri ', tongeng, lempuk, and abbulosibattang. At this stage the students were reconstructed by a group of 3 people and led by a group leader. Potential aspects of siri 'in this process refers to the desire of the students to reconstruct the knowledge and responsible, kegeng aspect underlying the desire to be serious and honest in doing the task, lempuk is a person's behavior in the process of musyawarah must behave honestly and correctly, abbulosibattang lies in a sense of solidarity To solve problems together and sipakatau appreciate the opinions of others. Related to the purpose of reconstructing, this is supported by constructivist theory. The construction theory carried out in groups is supported by the theory of Piaget and Vygotsky. Phase 3, small group discussion phase, aspect involving siri ', tongeng, lempuk, abbulosibattang and sipakatau. At this stage, small group discussions and facilitation by lecturers by providing questions related to the learning objectives and knowledge of the students, this is in line with the theory of Vygotsky, Thorndike, and Gagne. Stage 4, class presentation and evaluation stage, aspect involving siri ', tongeng, lempuk, abbulosibattang, and sipakatau. At this stage the lecturer is the facilitator of the students in communicating the results of small group discussions in class presentations, and evaluating group performance results. This process is in line with Piaget's theory, and constructivist theory. The construction of knowledge to be achieved through the discussion process is supported by Bruner's theory. Cultural-based learning is a strategy for creating a learning environment and designing a learning experience that integrates culture as part of the learning process. The learning process based on local culture is based on the recognition of culture as a fundamental and important part of education and knowledge development. This research is expected to empower student problem solving ability in biology learning process in college.

## II. Method

This research was designed and implemented by descriptive observational method. Subjects in this study are students majoring in biology semester 3 years lessons 2014-2015 which amounted to 25 people. Objects in this study is the ability to solve the problem of biology of students by using a model of culture-based learning shrimp claws. Data collection techniques in this study in the form of tests and questionnaires. Form of test in the form of a description to find out the ability of problem solving biology of students. Questionnaire in this research is used to know student response to learning with culture-based model of shrimp snails. Data on students' biology-solving abilities were obtained based on the final evaluation test scores. The scoring criteria for each problem solving indicator in the following table.

**Table 1**

Rated aspect	score	Information
Understanding the Problem	0	Students are not able to formulate the main issues and not able to reveal the facts
	1	Students are less able to formulate the main issues and do not reveal the facts
	2	Students are able to formulate the main issues and reveal the facts
Planning a Settlement	0	Students are not able to plan problem solving
	1	Students are less able to plan problem solving and do not use supportive theories
	2	Students are able to plan problem solving and use supportive theories
Implement the plan	0	Students are not able to work on the problem according to the original plan and are unable to express a clear argument
	1	Students are less able to work according to the original plan, and are

	2	unable to express a clear argument Students are able to work according to plan and are able to express clear arguments
Memeriksa kembali hasil yang diperoleh	0	Students are not able to draw conclusions
	1	Students are less able to interpret the results of the discussion obtained then draw conclusions less precise
	2	Students are able to interpret the results obtained and make conclusions appropriately

The value of the troubleshooting ability obtained is then qualified by the following table:

**Table 2** Qualification Troubleshooting

Value	Qualification
85,00 - 100	Very good
70,00 - 84,99	Good
55,00 - 69,99	Enough
40,00 - 54,99	Less
0 - 39,99	Very less

Student response is analyzed by using likert scale. The answer of each instrument item using Likert scale with choice strongly agree, agree, hesitate, disagree and strongly disagree. For the purposes of quantitative analysis the answers are scored.

**Table 3**

Reply item SS (strongly agree)	Given a score of 5
Item answer S (agree)	Given a score of 4
Item answer RR (hesitant)	Given a score of 3
answer item TS (disagree)	Given a score of 2
Answer items STS (strongly disagree)	Given a score of 1

### III. Result

Research on biology learning using culture-based learning model of shrimp snails, conducted in 5 meetings consisting of four meetings for the implementation of learning and a meeting for student's biology problem solving abilities.

Syntax is the activity phases in a model embodied in a series of learning activities. Thus the syntax will indicate the activity both by teachers and learners. Each syntactic phase is substituted for the dominant aspects of the dominant shrimp culture supporting the achievement of the instructional impact of the model. Learning activities begin with preliminary activities directed based on siri 'and lempu values, ie reconstruction and motivation of early knowledge of students associated with the material to be discussed, so that students have initial knowledge. This process is in line with the constructivist theory. The core activities, lecturers provide direction to explore the initial concept obtained by students from previous learning, this stage students reconstruct group knowledge consisting of five people and led by a group leader. Potential aspects of siri 'in this process refers to the desire of mhasiswa to reconstruct knowledge and responsible, kegeng aspect underlying the desire to be serious and honest in doing the task, lempuk is a person's behavior in the process of musyawarah must behave honestly and correctly, abbulosibattang lies in a sense of solidarity To solve problems together and sipakatau appreciate the opinions of others. Core activities of lecturers explores student knowledge by asking students to observe the drawings or problems contained in the student worksheet (LKM). The next stage lecturers focus students to discuss the group solve problems contained in the MFI, then lecturers provide a challenge to present the results of discussion. In closing activities of the class presentation and evaluation stage, aspects of siri ', tongeng, lempuk, abbulosibattang, and sipakatau are involved. At this stage, the students communicate the results of small group discussions in class presentations, and evaluate the results of group performance. Empowerment of problem skills in this research includes four aspects: (1) understanding the problem, (2) making a problem solving plan, (3) , And (4) interpret the results obtained.

The average value of each aspect of troubleshooting ability can be seen in the following table.

No. Student	Troubleshooting capabilities before using the BTS model	Qualification	Problem-solving abilities after using the BTS model	Qualification
1	62	Enough	80	Good
2	58	Enough	77	Good
3	71	Good	94	Very good
4	64	Enough	79	Good
5	64	Enough	82	Good
6	62	Enough	76	Good
7	68	Enough	89	Very good
8	74	Good	85	Very good
9	65	Enough	78	Good
10	73	Good	90	Very good
11	72	Good	80	Good
12	74	Good	92	Very good

13	66	Enough	86	Very good
14	70	Enough	85	Very good
15	67	Enough	80	Good
16	74	Good	94	Very good
17	75	Good	86	Very good
18	73	Good	92	Very good
19	77	Good	87	Very good
20	71	Good	82	Good
21	67	Enough	78	Good
22	69	Enough	88	Very good
23	63	Enough	74	Good
24	78	Good	96	Very good
25	70	Good	80	Good
<b>Average</b>	<b>69</b>	<b>Enough</b>	<b>84,4</b>	<b>Very good</b>

Based on the average student problem solving ability after using the BTS model is 84.4 with excellent qualification. This is in line with the findings of increased inter-intrapersonal research of students' ability through integration of local cultural values in learning (7) (Wardhani, et al., 2013). Questionnaires contain questions relating to student responses to biology learning using BTS learning models. Result of recapitulation of student response can be seen in following table:

**Table.** Recapitulation of Student Response

No	Question	Number of Respondents Answer					Total Score
		SS	S	RR	TS	STS	
1.	Biology Learning with BTS Model can make me more exploring my ability	9	12	3	1	0	104
2	Biology learning with BTS model makes me more active in learning	10	8	6	1	0	102
3	Biology Learning with BTS Model makes General Biology material easier to remember	7	11	5	2	0	98
4	Biology Learning with BTS Models motivates me to work well in groups	14	9	2	0	0	112
5	Biology Learning with BTS model trains me to express my opinion	11	10	3	1	0	106
6	Biology Learning with BTS model trains me to solve problems in biology learning	5	12	8	0	0	97

Table recapitulation of student responses shows that from six statements, there are dominant statement that strongly agree that statement of BTS teaching model motivate student to work in group, and two dominant statement agree that learning with BTS model can explore ability and train student problem solving. Students agree that learning with BTS model makes students more active and more memorable because in the model of learning BTS students construct knowledge independently. This is in line with Ristianas (2015) (8) statement that application of culture-based model of shrimp-based shrimp can improve students problem-solving abilities.

#### IV. Conclusion

Based on the results of research on students semester 1 academic year 2014-2015, university muhammadiyah Makassar, obtained the following conclusions:

1. student problem solving abilities in this research cover four aspect that is comprehension aspect masalah is in qualification very good, aspect make problem solving plan is in qualification good, aspect of executing problem solving plan and interpret result obtained is in enough qualification. Student problem solving skills are in good qualification.
2. There is improvement of problem solving ability of student, before using model of BTS learning average value 69 on qualification enough, after using BTS average learning model 88 on excellent qualification.

#### References

- [1]. Susanto, P. 2010. *Pengembangan Strategi Pembelajaran Biologi; Bahan Ajar Untuk Pendidikan Profesi Guru*. Malang; Jurusan Biologi FMIPA Universitas Negeri Malang
- [2]. Gagne, R.M. 1985. *The Condition of Learning and Theory of Instruction*. New York: Holt Rinehart and Winston.
- [3]. Dwiyojo, W.D. 2008b. *Pembelajaran Visioner*. Bekasi: Media Visioner.
- [4]. Dwiyojo, W.D. 2008b. *Pembelajaran Visioner*. Bekasi: Media Visioner.
- [5]. Susanto. 2000. *Pengembangan Strategi Pembelajaran Biologi; Bahan Ajar Untuk Pendidikan Profesi Guru*. Malang; Jurusan Biologi FMIPA Universitas Negeri Malang
- [6]. Wardhani et all. 2013. *Pembelajaran Nilai-nilai Kearifan Lokal Sebagai Penguat Karakter Bangsa Melalui Pendidikan Informal*. Jurnal Penelitian Pendidikan. ISSN: p.1412-565X **Jurnal Penelitian Pendidikan** is issued by Lembaga Penelitian Dan Pengabdian Kepada Masyarakat (LPPM) Universitas Pendidikan Indonesia
- [7]. Ristianas, Evi. 2015. *Model Pembelajaran Biologi Berbasis Budaya Tudang Sipulung Dalam Menumbuhkan Kemampuan Pemecahan Masalah dan Berpikir Kritis Mahasiswa*. Prosiding Seminar Nasional ke-2 Biologi/IPA dan Pembelajaran. ISBN: 978-602-73915-4-3