Evaluation of the ability of students describe and perform the association relationships between components of physics in the event of a landslide with a mentoring approach

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Abstract. Awareness and understanding of the people about the environment and nature's behavior should be improved to anticipate natural disasters. The purpose of this research is to 1.) Knowing the capabilities of student groups in describing general knowledge of landslides based on real conditions in the field. 2.) Know the ability of students in describing and explaining the relationship context – the concept of natural landslide events. The research design used, namely treatment by subject. The subject in this study is the whole student participants in College Learning physics-based Environmental education IV semester of physics. The subject consists of 2 classes with a total of 60 students and the rest of the students are divided into 5 groups and each group consists of 12 students. The technique of data collection is done using task groups report student data analysis techniques using a percentage. The results showed that the score is nothing much obtained vary for each group, and shows there is an increase close to learn at this stage of the treatment, and treatment-3 with the mentorship approach. Based on the results of data analysis it can be concluded that the ability of students improved in terms of describing the General knowledge of landslides based on real conditions in the field. There is an increased ability of students in describing and conducting the association relationship context – the concept of landslides associated with the concept of physics through a mentoring approach.

1. Introduction
The area that has the structure of labile soil and are on mountain slopes and cliffs in General will be easy avalanche [1]. The frequency of earthquakes and relatively high rainfall, winds of Stormwind and the tidal wind West, North, and South could occur at any time result in the danger of landslides, erosion of the surface and the danger of flooding [2]. For the people who live in landslide-prone areas this is a serious problem because almost every year this area is beset by natural disasters that destroy the settlements, agricultural land, damaging public amenities which are ultimately It rises in material losses and casualties. The facts of the disaster that occurred during this indicates the need for knowledge of landslides for the community/student so disasters can be anticipated.

Awareness and understanding of citizens in preserving the environment is still lacking [3]. The community generally have the notion that the environment will always be able to restore the power support and sustainability function. This causes the public not to participate in the care for the environment and more aggravated again with fundamental issues such as poverty and underdevelopment. The principle of learning according to ministerial regulation Number 103 year 2014 explained that the participant learners is facilitated to find out, learners have to learn from a variety of sources and the learning process using a scientific approach. Popov
2008) shows that students can be trained to understand the concepts of physics through real world surroundings. Students can learn the logic of laws of physics that apply in nature.

The competence of graduates of high school students include the knowledge, attitudes and skills. In the implementation of the third realm of physics learning should be integrated (Minister of Education Regulation No. 65 year 2013)[4]. To achieve the competencies required of teachers referred to the graduate competencies are able to apply learning strategies appropriate to the characteristics of the material, the characteristics of the students and the availability of good learning facilities as well as facilities laboratory facilities, the natural environment such as waterfall and Lake Tondano, also the events of perintiwa nature of earthquakes, landslides, water cycle and so on can be used as learning resource that allows teachers to apply scientific learning. Limitations of teachers in terms of designing nature- based learning, low level of mastery learning models with a scientific approach to encourage researchers to undertake research that analyzed the ability of prospective teachers (student) described and does the association relationship components of Physics in natural landslide events with mentorship approach. Mentorship is a relationship in which a person more experienced or more knowledgeable help guide people who are less experienced or less knowledgeable. Mentors may be older or younger than the man who mentored, but he must have specific areas of expertise [5]. Eland-Fagenson at al [6] clarified that the mentorship and relationship structure affect "number of psychosocial support, career guidance, role modeling, and communication occurring in the mentorship relationship in which the protégés and mentors are involved. A mentor can act as a parent [7]. Mentoring is a process for the informal transmission of knowledge, social capital, and psychosocial support perceived by the recipient as relevant for the job, a career, or a professional development; mentoring requires an informal communication, usually face-to-face and over the last sustained period of time, between someone who is considered to have knowledge, wisdom, or more relevant experience (mentor) and someone who is considered have fewer [8-9]. Instructions from the learning interactions in small groups is very important in the development of activity-based learning students. Based on the results of the American Institute of physics, research also shows that a small group collaborative is most convincing for a learning environment [10].

2. Conceptual framework

Tulandi, 2016 [11] in his writings make it clear that learning the physics of nature around. Some cases on Physics not only can be explained through equation or formula, but it can be understood by the granting of direct experience to students to study the relationship between the causal factors that influence or control physical phenomena. Student mastery of the relationship factor with natural events and the capacity described the relationship with the concepts of context will provide reinforcement and mastery of physics concepts as a whole [12-13]. Many people including students and students who consider that physics is hard to understand either the present high public or even in College [14], most just memorize physics formulas without understanding the deeper concepts of physics. From experience, the problems that commissioned most of the students are working on are working together and on the other hand generally measure the success rate of students only measured from the ability complete the midterm exam and the exam of the semester. Very rarely a lecturer or teacher to evaluate student mastery of physics concepts of ability of connection with natural phenomena. A lot of things that can be done as a form of creativity in such a simple demonstration of learning with large objects which vary the rolling on inclined plane and crash into objects in the base of the inclined plane can be associated with impact large clots caused when landslides. The ability of students to explain the relationship of the concept of
Physics in natural landslide events such as motion in the incline, the force of friction, materials, energy, nature and others will reflect a deep understanding of physics and intact.

3. Method
The design in this study i.e. descriptive analysis methods with the purpose of analyzing and describing the ability of student groups and associate relations in describing the context of concepts fiska. The design of the research is to study the same subject (Treatment by Subject Design), with the goal of seeing ability student groups in understanding the material tasks and task especially in the process of describing and mengasosisi concept relationships Physics with natural landslide events. The scheme design of the same research subject (Treatment by Subject Design) (Dimitrov and Rumrill [15]).

The procedure starts with Research activities in the class with pegisian simulation format observations. Further observations and measurements in field to the location of landslide area and the data is then analyzed.

The subject is the entire student participants in College Learning physics-based environment (LPBE) 4th semester, majoring in physics, physics education, the status of the SCIENCE FACULTY, UNIMA, the academic year 2017/2018.

To find the percentage of data then use equations

\[
\text{% Assignment Product} = \left(\frac{\text{results achieved}}{\text{maximum value}}\right) \times 100\% \quad [16]
\]

4. Discussion
This research was conducted in two stages. Phase I activities i.e., evaluate the ability of the student and associate relations describe the general knowledge of Lake Tondano with concepts of physics associated with processed performed in mentoring approach where the observation format is filled by learners in this semester student physical education status of IV take courses of learning physics-based environment the even semester 2017/2018. The focus of this discussion is to see if the mahasiswa is able to identify and describe a phenomenon likely exists in the Lake Tondano, as there are waves, there are boat moves over the surface of the water, there is water hyacinth plants etc and connect it with the concept of physics. The number of students is entirely 60 people, divided in 5 groups each group there are 12 members. The results of the discussions and the work of students is tabulated in the table below.

**Table 1.** The average value of each group to describe the task

| Task description | The average value of group-1 | The average value of group-2 | The average value of group-3 | The average value of group-4 | The average value of group-5 | average | % results achieved |
|------------------|-----------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|---------|------------------|
| UT-1             | 0.4 1.5 3                  | 0.4 1.5 3.5                  | 0.4 2 3                      | 0.4 2 3                      | 0.4 1.5 3                  | 0.48    | 12 43 85         |
| UT-2             | 0.5 1.5 3.5                | 0.5 1.5 3.5                  | 0.6 2 3.5                    | 0.6 2 3.5                    | 0.5 2 3.5                  | 1.7     | 12 45 89         |
| UT-3             | 0.5 1.5 3.5                | 0.6 2 3.5                    | 0.6 2 3.5                    | 0.6 2 3.5                    | 0.5 2 3.5                  | 3.4     | 13 48 86.5       |
| UT-4             | 0.6 2 3.5                  | 0.6 2 3.5                    | 0.6 2 3.5                    | 0.6 2 3.5                    | 0.5 2 3.5                  | 3.5     | 13 48 87         |
| UT-5             | 0.4 2 3.5                  | 0.4 2 3.5                    | 0.5 2 3.5                    | 0.5 2 3.5                    | 0.5 2 3.5                  | 3.3     | 13 45 87         |
| average          | 0.48 1.7 3.4               | 0.5 1.8 3.56                 | 0.5 1.9 3.46                 | 0.5 1.9 3.5                  | 0.5 1.8 3.5               | 1.8     | 12 43 85         |
Chart. above 1.2. inform that at the first treatment (give power to the student by giving format to be filled) grades students are generally less, because when students in the class are requested fill formatting tasks and generally not yet ready. While that figure 1.1. below give information that the average student is nothing increased after the first treatment.

![Image](chart1.png)

**Figure. 1.** average per group at each treatment

After landing there are professors, students were asked to identify the cause of the landslide prevention efforts and the occurrence of landslides. More or less one hour do the observations, and observations and analysis are shown in the following figure

![Image](chart2.png)

**Figure 2.** Images. the value of the product groups for each treat based on observation in the field condition

In addition to General knowledge is to know the students, as well as the relationship of the context and concepts that need to be described. The following tabular data about average close to a group of students to the concepts of context description. In addition to General knowledge is to know the students, as well as the relationship of the context and concepts that need to be described.

The following tabular data about average close to a group of students to the concepts of context description. Components of a phenomenon that is described, among other related concepts of energy, gravity, collisions in motion, tilt, vibration and the concept of adhesion-cohesion. Activities at the stage-1 which is a simulation of filling format, greatly help the students get to experience their imagination about nature in particular natural Lake Tondano. When the forefront mahasiswa checked and given advice – advice and guidance by professors mahasiswa (as mentors) (treat-2), apparently the result of group work has increased.
Table 2. data % average product

| Group | average% product groups for each treatment |        |        |
|-------|------------------------------------------|--------|--------|
|       |                                          |  I     |  II    |
| 84.63 |                                          | 17.88  | 55.75  |
| 84.38 |                                          | 20.75  | 59.50  |
| 90.50 |                                          | 27.00  | 64.50  |
| 85.13 |                                          | 27.00  | 55.75  |

Continued with the same pattern on a treat-3 gives the results of each group that the answer is already good. On the stage 2 where observations conducted on landslide phenomena, a student is confronted with new natural phenomenon (not to mention the phenomenon of the Lake) and to the students asked described 3 things.

(1) public knowledge-related landslides, (2) describe the General knowledge of landslides based on real conditions in field, (3) describe the concepts of context. On a treat I where every group of students answer/describe the questions asked through the format, it turns out that the answer is not adequate as the data shown in Figure 1.1. And 1.2. Although students have got experience in stage-1, but due to this problem/phenomenon that the new group has yet to answer so convincing because it is only given a short time to answer questions. The increase began to appear after treadmen-2 and treadmen-3. By giving feedback (treadmen improvement against the task, students can improve their shortcomings and beyond at the meeting III students got the better results. This shows that the advice and direction given the time of supervision at each meeting runs smoothly. The research is in line with research conducted by Tulandi, d. 2016 [11]

5. Implications

On stage-1 research activities where students are asked describe natural phenomena in the Lake, which is a phenomenon the existence of waves, the boat moves over the water, the water hyacinth plants that move in the wind blowing but not falling, level depth rays the sun broke through the water that vary by location, all conducted under the guidance of a lecturer and running well. [11]. This helps students when under location to observe the events of the landslide. Students were able to observe, describe and explain in detail the events of landslides and demonstrating the interconnectedness of concepts of physics such as the energy, motion on the incline, the force of friction, adhesion and cohesion of soil while increasing water content of soil and so on. Through this research students gain new experience how these physics concepts are not understood as a partial theory and mathematical equations but the understanding of the whole concept and context. This is important in the learning in the classroom to not only focus on theories that are on the books but carry the menjalaskan theory of various natural phenomena. Physics curricula also need to see that the learning resources can be maximized through the utilization of the natural phenomena in explaining the concepts of physics.

The interesting thing here is that teamwork is already good, appreciate others’ opinions are reflected from the cohesiveness of their discussion. Some groups are able to develop their critical thinking ability. As an example the answers they wrote: when heavy rain so the water penetrates to the ground, the ground became wet and will be the mud when it rained a bit long and conditions like that style cohesion between molecules pull style i.e., a kind of faint, had been fused into a grain of soil and easily move down if the soil cliffs. The student group is also already understand that if these regions there are no plants in the form of a large, wooden or bamboo clumps, or trees and other trees enaw then will accelerate
the occurrence of landslides, so if there are rocks but not arranged in the pattern of mutual shore up from the bottom up to the top of the slope of the ground structure plus is not solid, these conditions will also accelerate the occurrence of landslides. Student groups have also been able to explain the relationship of the association context and concepts. By doing simple experiments like objects fall, the motion of objects on slides, and energy that caused landslides will be great if the ground moves with material in large quantities and at a relatively high location. Experience-experience in natural natural behavior in the students examine the matter to him in sharpening as a potential physics teacher competencies, because physics is needed to study the behaviour of nature in various forms of symptoms [17]. A description of the cause of the landslides that have already formulated by each group will improve the quality of learning. This is in line with the opinion of Marnita, 2013 [18] which says that scientific facts or concepts that are found by the students will be more persistent in memory compared to the material serve by his tutor. Through the learning model with the recurrent task of granting accompanied evaluation continuously will see the role of the teacher as a facilitator, mentor and consultant, teacher/lecturer as a friend.

An important implication of the results of this research also shows that thematic learning material development enables not only the activities in the classroom, but also outside the classroom by making observations in nature. Thematic learning assessment in not only emphasized on the cognitive standpoint but also in psychomotor and affective.

The purpose of this research is: know the ability of groups of students described a general knowledge of natural landslide events according to the observation field and to know the ability of Group of students doing the Association relations context-related concepts landslide phenomena. Based on the results of research and discussion, then the conclusions of this research can be expressed as follows. Through the stages of activity of student groups, they are able to describe the General knowledge of the landslide based on the condition of ril in field. Student groups are able to describe and perform the association relationship context of landslides associated with the concepts of physics.

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