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Abstract. The quality of arguing to learners of floating and sinking material can be assessed by using the rubric of an argumentation assessment skill as an alternative assessment. The quality of the argument is measured by the ability of learners to express the claim in a structured manner in order to maintain the claim with supporting data. The purpose of this study was to develop an argument skill rubric based on the preliminary study results which showed a gap between demands and reality related to the students 'floating and sinking students' argument skills. This research was conducted in one of State Senior High School Bandar Lampung. The study population is all students of senior high scholl class XI. Research sample was taken by randomly obtained by 20 students. The research used descriptive survey method. Data were obtained through a multiple choice test both grounded and interview. The results were analyzed based on the level of students' argumentation skills that had met the criteria which developed in the assessment rubric. The results of the data analysis found that the learners are in the range of levels 1 through 3. Based on the data the average learner is at the level of quality argument "high" for component I and the quality of "low" argument for component 2. This indicates learners experience difficulty which making alternative statement supported by reference in accordance with the initial statement submitted. This fact is supported by interviews that learners need a structured strategy to design alternative statements from shared reading sources to support the preliminary statements presented.

1. Introduction

The skill of argument is assumed to be one of the benchmarks of the achievement of the objectives of science learning because learners are able to produce new knowledge through the presentation of preliminary statements as the initial provision of learning. Some scholars have argued, with the reform of learning arguing skills to be a new framework of learning goals that reflect high-level thinking skills [1];[2];[3]. In this regard, learning that focuses on arguing skills requires not only shifting learning goals but also requires teachers to have new and different roles. Teachers need to design learning and assessment to develop students' argumentation skills. This is supported by an expert statement: teachers need to develop instructional designs that include argumentation skills and engage students in developing them [4]; [5]. However, previous research has shown that: teachers have difficulty and have limited ability to integrate argumentation skills in learning [6];[7]. As a result, learners only focus

on empowering the claim elements and the lack of constructive knowledge of learners related to the skill of arguing this has an impact on the weak understanding of the concept of floating and sinking matter[8];[9]. The skill patterns of arguments produced by participants students in the preliminary study which demonstrated a lesser diversity of knowledge than students' in terms of the disclosure of a pronouncement (statement), in line with the results of [10] research, that the quality of poor students' argument is attributed to the ignorance of learners in terms of skill elements argue.

Learning that explores alternative concepts of learners and tested with tests designed to empower argumentation skills becomes a challenge for students' to maximize their ability. Students' of science from the point of view of "alternative concepts" are able to understand the learning patterns that involve the internalization of concepts developed as a conflict of knowledge process, where the introduction of such knowledge conflicts is contained in tests containing statements that trigger learners to think. [11] stated that conflicts of knowledge in students' enable learners to make structured statements by classifying and categorizing various problems. Structured knowledge conflicts can be solved by the learner into a picture of the students' able to put the conceptual knowledge at the heart of understanding of science. This is supported by the results of a study of [12], conceptual knowledge can be related to the development of students' argumentation skills. In this regard, assessment instruments with assessment rubrics can facilitate the development of the quality of arguing students' to trigger the emergence of conflicts of knowledge in students'.

An assessment rubric can measure the quality of arguing students' requires clear and measurable criteria. The arranged rubric is focused on the emergence of new knowledge of students' until the emergence of a rebuttal statement that produces an alternative statement. The compiled criteria contain coding schemes to assess the quality of arguing students'. Some experts reveal that: the quality of arguing students' can be judged by a set of criteria including: statements that consider the reasons, the reasons in the statement are acceptable and relevant to alternative statements, the reasons for supporting alternative statements, and the quality of the reasons given in the statements [13]; [14]. The criterion of quality argumentation that can measure the quality of arguing students' has a positive effect in fostering argumentation skills in the development of science learning. Therefore, researchers conduct development research in order to explore the operational and measurable criteria that can measure the quality of the process of arguing students'. This study begins by analyzing elements of argumentative skills from [15] argumentation scheme to map out the criteria of arguing skills for floating and drowning materials. The problem formulation in this research is how to develop the structure of argument skill rubric that is able to measure the quality of arguing students' of floating and sinking material as an alternative assessment?

2. Experimental Method

This research is part of the research of developing an argumentation skill assessment instrument that aims to produce an assessment instrument capable of measuring the skills of high school students' argument floating and sinking material. The development of a skill assessment rubric for floating and sinking material begins with developing a framework of assessing needs oriented to argument skills. The broader objectives resulted in a useful and practical argument scoring tool rubric for the teacher. The study population is senior high school students. The sample of research is class XI amounted to 20 people. Data analysis using qualitative descriptive is based on the structure of the component supporting the argumentation skill. The developed sections were divided into 3 main sections developed using key components of the modified Toulmin argumentation scheme to measure: 1) the process of analyzing data (claim, data, warrant and backing); 2) the ability to analyze alternative statements using various references; 3) the ability to determine the condition that claims can be true (qualifiers) and / or alternative claims (rebuttal).

3. Result and Discussion

This study has identified the quality of arguing students' related to its relevance to the concept of floating and sinking. The conceptual connectivity with argument skills begins by analyzing the difficult concepts of floating and sinking material when applied to [15] argumentation scheme. In addition, analysis of the basic needs of constructing rubrics for assessing students' argumentation skills

has been analyzed. The quality analysis of students' arguments is made against the component skill knowledge test of argument for floating and sinking material. The total quality score argued based on the test results will be correlated to levels 1 through 4 for the quality of the students' skills of the skill

The process of cultivating the skill of arguing in judgments is inseparable from the relationship between thinking and perspective that: 1) argues as an important act of building knowledge; 2) argue to build science learning; 3) explicitly combine arguments in judgment as one of the competencies to be developed within the science class; And 4) argue as a vehicle for promoting students' ability to justify the relationship between data and claims as well.

3.1. Development Structure Of Rubric Argumentation Skills

Argumenting skill is a skill that facilitates explanations of internal representation of the phenomenon, scientific principles and cognitive activity of learners when building knowledge of science. The perspective skill perspective that facilitates students' to understand the pattern of science knowledge and understand the phenomenon requires rubrics to determine the quality of arguing students'. The step in developing the instruments of argumentation skills in this development study refers to the perspective of producing students' capable of: 1) uncovering scientific proof in constructing good arguments; 2) make key components argue; 3) analyze and evaluate knowledge; 4) prepare for further learning. Based on that perspective, students' argumentation skills can grow effectively with guidance and support. This is supported by several expert statements, guiding students to build arguments within the framework of writing and assessed by applying TAP analysis makes it easy to distinguish the quality of students' arguments [10];[16]. In another paper, [17] revealed that assessing the written arguments of learners by seeking valid justification in terms of content knowledge. Based on the theoretical study the researchers used the coding for each component to argue in the item in order to facilitate the analysis of the quality of arguing the students'.

3.2. Process Analyzing Statements (Claim, Data, Warrant and Backing)

That is, simple argument structures such as in the form of data, warrant, backing, and claim can be observed in statements which is presented by students' in context [18]. The use of Toulmin's argumentation scheme in this study concentrated on the description of the ability of students' to write statements on the given problem. The resulting statements are analyzed through rubrics containing components arguing claims, data, warrants and backing; Sample statement produced by Students A and B presented in Figure 1 and 2.

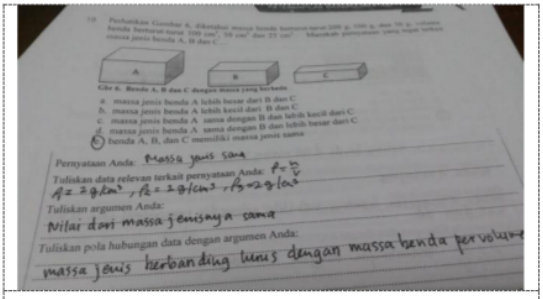

Figure 1. Figure Statement of the Student A

The statements presented by Students A and B generally contain conceptual knowledge related to classification, category, generalization. The mastery of the factual knowledge of each Student A and B statement is characterized by the ability to classify data, classify data based on similarity features, or on the basis of differences; Showing the strength or weakness of a statement, recognizing principles, concluding, mastering theory, showing examples, and recognizing structures.

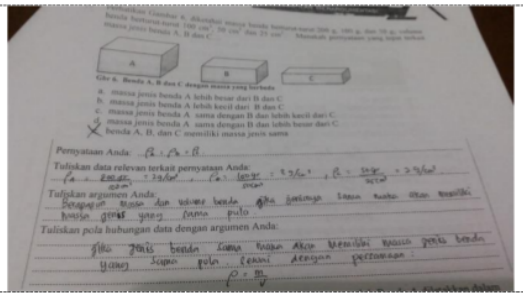

Figure 2. Figure Statement of the StudentsB

"The mass of the type is straight to the mass of pervolume objects (alternative claims supported by reference)". Structurally students A has been able to analyze the process of formation of statements with the support of simple reasons. The quality of statements presented by students' A is analyzed by using the first component of development results included in categories capable of selecting statements and writing down the reasons as an alternative statement supported by scientific knowledge (claims, data and warrant) and obtaining a score of 3.

Furthermore the statement presented by Student B "$\rho_A=\rho_B=\rho_C$ (by selecting the answer option e: objects A, B, and C have the same type of mass)" $\rho_A=200g/100cm^3=2g/cm^3$, $\rho_B=100g/50cm^3=2g/cm^3$, $\rho_c=50g/25cm^3=2g/cm^3$ (statements containing data); "regardless of mass and volume of objects if the same type would have the same mass of dose (alternative claim based on data); The same will have the same mass of the same kind of thing in accordance with the equation $\rho= m/v$ (alternative claim supported by reference). "Structurally students B has been able to analyze the process of formation of statements with the support of a simple reason.The quality of statements presented by Student B is analyzed By using the rubric of component I of the development results included in the category capable of choosing the right conclusion statements and provide the reasons and provide more information about the relationship of alternative statements and choice of reasons as well as contacting N concepts and theories of the given problem (claim, data, warrant and backing) and get a score of 4.

The statement of students' A and B indicates that the quality of argument has been structured in which: the resulting statement is supported by the data and some references; the disclosure of data contained in the problem is written clearly and in detail and able to write the physical meaning of each data statement written ; an alternative statement is constructed through the activity of identifying the provided statement, looking at the mass equations of the object and the volume of objects presented in the drawing and capable of uncovering the constituent material; and student B can build connection between claim, data, warrant and backing even at weak level. The quality structure arguing students' A and B illustrate there is a connection between the elements of arguing skills so that learners A and B can be categorized as having good knowledge. The results of the data analysis provide an illustration of the extent to which learners A and B are able to empower their arguing skills, and make it easier for teachers to provide feedback to other undeveloped argument components.

Assessment strategies using rubrics that contain in detail each argumentary skill that the students'have to master can overcome the difficulties of learners making reasonable statements based on reasoning. Teachers can use specific strategies to prepare the task of argumentation [4]. The developed rubric provides an opportunity for teachers to conduct feedback in order to encourage learners to consider the preliminary statements which is presented in the preparation of alternative statements. As a result, students' not only focus from one side of the argument but also one statement during the problem. This is supported by the results of [6] that an alternative statement using the reasoning structure considers the initial statement to encourage a simple alternative statement.

Feedback based on data analysis is important in order to improve students' argumentation skills. It is known that the skill of argument does not come by itself but should always be given training and feedback in the learning process. This statement is supported by the results of [17] research that the quality of arguments generated by learners as a learning material in order to integrate the skills to

argue in learning. Another study suggests that feedback activities help students develop epistemological perfection of science [19]. Thus, the effort to integrate argumentation skills and meaningful feedback activities in the learning process of science has many potential benefits for learners to improve their documented skills. This is consistent with the expert's assertion that argumentation skills can be empowered if teachers can perceive each idea and respond to any statement given by students' [20].

3.3. Process Analyzing Alternative Statements Using Various References

The results of further research focused on the ability of learners in describing the ideas set forth in an alternative statement. An example of the best alternative statement from learners to be samples in this study are Students C and D. Alternative statements produced by Students C and D are presented in Figure 3 and 4.

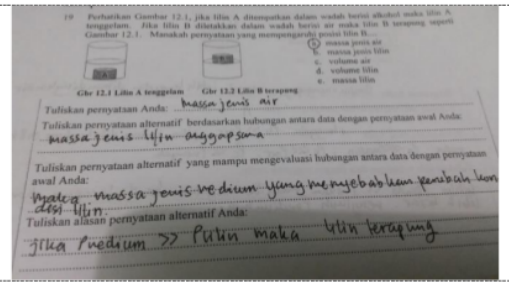

Figure 3. Figure Statement of the Students C

For the problems presented above, learners should direct their initial statement on "water density". Based on the initial statement will bring up an alternative statement "objects whose density is smaller than water will float. An object whose mass is larger than the density of the water type will sink. Based on this the wax will float in water because the wax has a density smaller than water and the volume of water has a mass greater than the volume of wax. Students' can prove this by placing the volume of wax and water volume that has an arbitrary balance. This balance will show that water has a mass greater than a candle ". One of the reasons for the emergence of an alternative statement: "floating objects at different levels in the water because most of the regular objects immersed in fluid have an upward force of fluid until they are in balance with the gravity of the object, and then the object will be at the equilibrium level The same between the two forces acting on the body ".

The statement presented Student C in figure 3 "mass water type (simple claim)"; The wax mass is considered equal (statements containing data); "Then the mass of the type of medium that causes changes in wax conditions (alternative claims based on data); "If $\rho_{medium} >> \rho_{wax}$ then floating wax (alternative claim supported by reference)". Structurally students A has been able to analyze the process of formation of alternative statements contained in the problem. Student C in figure 3 has been able to read data that there are wax-type mass, mass of media type and mass of water type in the problem. Data that can be analyzed by student C as material to write alternative statement. Alternative statements compiled by student C are still categorized as weak or at level 2 where the alternative statement is appropriate and gives a reason (referring to the initial statement (claim and data) with score 2.

Furthermore, the statement presented by Student D in figure 4"wax mass is less than the density of the alcohol (by choosing option answer b: the mass of the wax type (simple claim)": when the waxy mass is less than the density of the alcohol the candle will float as it is inserted in the container contains alcohol (a statement containing data); "if the waxy mass is larger than the mass of the alcohol type, then the wax will sink (alternative claim supported by reference)"; based on buoyancy, drowning

and archimedes law (alternative claiming grounds) Structurally students D have been able to analyze the process of formation of alternative statements with the support of simple reasons.

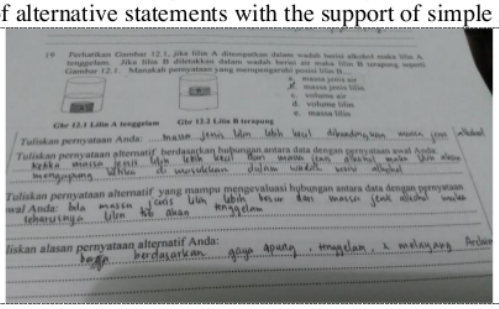

Figure 4. Figur Statement of the Student D

The quality of statements presented by Student D analyzed using the rubric of development results included in the category of appropriate alternative statements and provide reasons for the conclusions that describe relationship between alternative statements and choice of reasons (Claim, dat A, and warrant) and given a score of 3.

As one unity of alternative statement presented by students C and D describes the quality of argument is higher than the statement that only supported data and warrant. Alternative statements by explaining the reasons show that learners have been referring to the correct scientific theory behind the concept. An alternative statement concerns new knowledge that learners have as a result of a conflict of knowledge in the minds of learners. Alternative statements that include cognitive conflict in the thinking of learners indicate that the quality of arguing learners has been structured and illustrates more information in mind. This is consistent with the results of [21], that the quality of arguing learners is possible from the initial statement with the reasons underlying the identification of ideas from the appropriate references. Toulmin's argumentation scheme used as a reference in designing the quality assessment rubric in this research has four levels which are described as the main elements: claim, data, warrant and backing. The findings obtained in this study indicate the need to facilitate the ability of learners to attend opposite positions in order to maintain a contentious position in the matter.

4. Conclusion

Based on data analysis of research results, the average learner for component I was able to achieve score 3 with high category. Meanwhile, for component II the average of students able to achieve score 2 with low category. it is caused by: lack of knowledge about the problems presented, lack of experience in formulating preliminary statements having an impact on the formulation of alternative statements, and reference limitation. Conceptually the cause of the achievement of the score of students' on components I and II resolved by activating and providing an overview of knowledge related to the problems tested.

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