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Abstract. Problem solving for physics concepts through consistency arguments can improve thinking skills of students and it is an important thing in science. The study aims to assess the consistency of the material Fluid student argmentation. The population of this study are College students PGRI Madiun, UIN Sunan Kalijaga Yogyakarta and Lampung University. Samples using cluster random sampling, 145 samples obtained by the number of students. The study used a descriptive survey method. Data obtained through multiple-choice test and interview reasoned. Problem fluid modified from [9] and [1]. The results of the study gained an average consistency argmentation for the right consistency, consistency is wrong, and inconsistent respectively 4.85%; 29.93%; and 65.23%. Data from the study have an impact on the lack of understanding of the fluid material which is ideally in full consistency argued affect the expansion of understanding of the concept. The results of the study as a reference in making improvements in future studies is to obtain a positive change in the consistency of argumentations.

1. INTRODUCTION

The ability of students to integrate knowledge aspects in isolation is a major factor in cognitive development. This capability allows students to focus and increase the understanding of the physics content element. The elements of physics content built by the construction of the development of knowledge based on understanding the situation of argumentations. [7] revealed that skills can argue to accompany students to understand the epistemology of scientific thinking and to uncover phenomena and proof of concept using thought. Reinforced the opinion [10], science not only find or memorize facts; but also how to build argumentations and consider how a phenomenon described. General direction used in construction to develop arguing students using analytical framework [14]. The main elements of a framework of skills Toulmin argued the claim, data, warrant, backing, and rebuttal. Toulmin Model framework adopted by many other researchers to characterize skill argue in science [6].

The analytical framework developed by loading argued skills to some ideas and facts how the student can reveal phenomena of physics in understanding the science of different contexts. Analysis of the context of science can be seen from the viewpoint of various interpretation and focus on the problem thinking activities. However, developments in the field have not been skilled for students to integrate different scientific contexts. It is pointed out that the students focus on providing solutions mathematically completion of the give physical meaning of the problem is given. Reaffirmed the results of the study [2] teachers spend more time to decrease in mathematical formulas. Students tend

to focus on solving problems in mathematical physics indicate less inconsistency in the conception of a student on a concept. Related to this, students should be able to utilize mathematical physics problems by linking theory with the given problem, so it looks justification argumentations although students use mathematical language. Justification argumentae contains supporting theory can be visualized in consistency argumentation. According to [3], the consistency of the response of students to understand the concept of physics requires a deeper understanding to see equality of physics problems which is outlined in a various ways. Consistency argues student of physics problems faced bring students a better understanding of the level.

The importance of facilitating learning constructing consistency in argumenting not to rule obtaining core skills of students. Core skills acquired through activities, 1) discussion, 2) experimentation, 3) observation, 4) scientific verifications of law through experiment, 5) to formulate and test hypotheses, 6) presentation and communicate the procedures and results of the study, 7) documented scientific activities, 8) identify and summarize information. Core skills with a learning environment that empowers consistency argued allegedly encouraging students to think independently. Based on the study of theory and problems of field, researchers have conducted studies to assess the consistency of the material Fluid argue student. The formulation of the problem in this research is How the consistency of the material Fluid Students Argumentation?

2. RESEARCH METHODS

This study is a preliminary study using a descriptive survey method. The data were obtained using a multiple choice test and interview based on the aim of seeing consistency student argued. Item test consists of eight items, each item, is displayed in the form of verbal, images and tables. The materials tested are fluid physics.

Categorizing consistency argued refer to students categorized as inconsistent if more than two pairs of test and students categorized consistently one completely consistent if all the test questions were given consistently and correctly. Categorizing argue consistency are assessed using a rubric quality arguments modified from [13], modified criteria of consistency of production argumentation [5]. Data were obtained from three universities by the number of consecutive samples: IKIP PGRI Madiun 25 students; UIN Sunan Kalijaga 52 students; and the University of Lampung 68 students.

3. RESULTS AND DISCUSSION

Items used in the study have been analyzed for validity and reliability. The trial items to 40 students at the University of Lampung are out of the main sample. Related to that obtained an average of 3.01 with ttabel tcount 2.02 indicates that the items were valid. Reliability of items in the category enough with probability value of 0.43 and a significance level of 0.05. The percentage of students based on the consistency of the study argue against the answers given are presented in Table 1.

Table 1. Percentage of Students Argue Consistency

Consistency Level	Percentage (%)		
	IKIP PGRI Madiun	UIN Sunan Kalijaga	Univ.Lampung
Consistency Right	2,78	7,17	4,61
Consistency with Right answer	20,7	30,7	38,4
Not Consistent	76,5	62,2	57

Table 1 presents the percentage level of consistency argues, generally students have absolutely lowest consistency 2.78%. This reflects a failure to understand the students' matter of understanding the concept. Related to that, do interviews to some students with the lowest level categories to dig problems happened. The summary of the interview that "students are accustomed to solve about a matter of using the mathematical equation because it is easier to finish than about the shape of

understanding". In addition, students also have low response capability in the pouring concepts into written form by giving the argumentations on the answers given.

Consistency argue demanding a greater understanding of students to see equality between the grounds answer choice answers. The tendency of students to guess very high in this study, it can be seen, none can provide the argumentation according to a key sentence in the given problem. According to [3], "the consistency of response of the students in understanding the concept of physics requires a deeper understanding of the students to see the equality of physics problems outlined in a various way". With a deep understanding will make students consistent with what was understood and believed to be true and to bring the level of understanding is better in view of various concepts of physics as outlined in various problems.

Consistency response Argumentations Correct Answer Student
Exposure results in consistency student response argues correct answers confirm that there needs to be a paradigm shift by planting a concept which integrated to provide students matter contains the basic concepts of physics to practice the skills of consistency argumentations. The data description of examples of student answers correct to argue the consistency of students is presented in Figure 1 and 2.
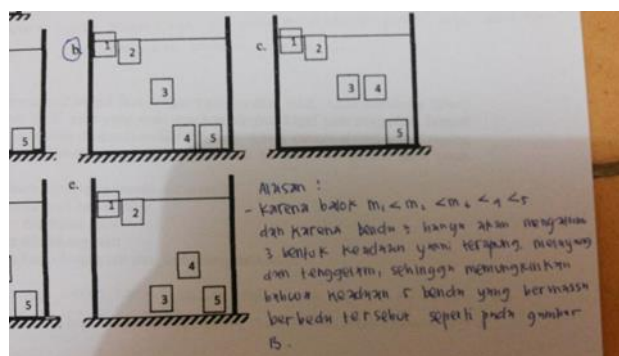

Figure 1. Example of correct answers students consistency (Source: Loveredu, et al, 2005)

Problems are given in Figure 1, the students asked to draw the final position of objects 1, 3, and 4 (the position of objects 2 and 5 have been determined). This problem requires an answer and right reason. Based on the average data of students chose answer b, while the written reasons have given argumentations according to the keywords which implicitly presented on the matter, the object has a mass of "varied". Figure 1 represents the answer and the reason for the student, "because the beam $m1 <m2 <m3 <m4, <m5$ and because the objects were just having three forms of state are floating, floating and sinking, making it possible that the state 5 objects have masses of different such as in the picture B ". The argumentation given still looks weak, the student should provide argumentations from the viewpoint of the density of objects and liquids. This is confirmed by the statement [8], that the sequence analysis of the most significant argumentation if it follows the pattern of claims, counter-claims responsive, and combines previous ideas. This is supported by the statement [4], presents the basic argumentation in the real-world applications with logical statements, it is very important for the development of science.

Related to this, arguing consistency students will be categorized above level 1 if students begin the analysis from the perspective of two objects a predetermined position and has the same density with liquid. Students can assume that the first thing definitely has a smaller density of objects 2 and 3 objects greater density of objects 2 so that the beam 3 will sink and the beam 1 will float part. Associated with the mass of the object "varied", the student should have a density to know 3 objects larger than the object 2, so that students can conclude that the object 3 sinks. Students are able to put forward three additional criteria of an argumentation declaration indicates that the student has a good

scientific literacy. In line with the [15] revealed that solving through consistency argumentation can increase thinking skills that are important ideas in science.

Student Response Not Consistency and Wrong

Weak consistency of the students indicated that learning is not a visualization field of physics, this has resulted in a fluid concept only refers to merely memorizing. Students have the tendency prioritize how to solve problems with mathematical equations without understanding the physical meaning of each of the equations used to solve problems. This resulted in the lack of understanding of the mastery of materials physics.

Consistency and student response does not indicate that any of the argumentations presented are not supported by the data to support the claim. The data description of a sample of students did not answer the consistency of arguing and one presented in Figure 2.
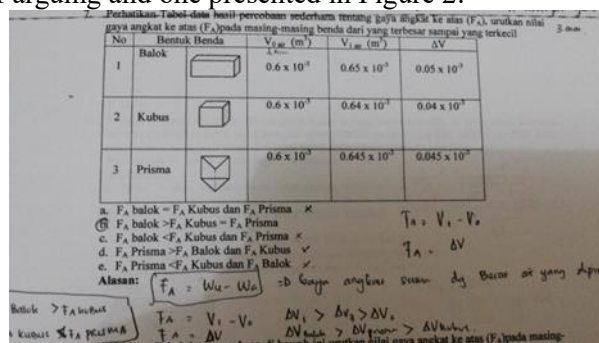

Figure 2. Example of a student answers incorrectly categorized as inconsistent and (Source: [1]).

The problems that are presented in Figure 2 relates to the upward lifting force (FA). Figure 2 is an example answer students chose answer b by writing reason only contains the mathematical equation without giving any physical meaning. Answers and the reasons given by students tends to guess and not consistent. This implies that student hardship reveal physical force from the equation. Supposedly written mathematical equation that can relate problems with the theory that implicitly disclosed in the matter. Students can start writing argumentations phases: 1) the students write the equation $FA = \rho gV$, with expressing meaning that the FA on each body area affected touchpad means the material to the water affects the shapes of objects FA experienced objects; 2) related to the equation FA, FA values consecutive beams 0:49 N; 0:39 cube N; and prism 0:04 N; 3) The student must be able to remember that the volume of the submerged object is obtained by reducing the volume of water before it dipped to the volume of water after it is dipped; 4) students should be able to identify that the volume, type of material and assumed the same types of objects Mass large, so if the mass of the same type, the third volume of the object assumed to be equal.

The ability to analyze measures indirectly about the completion of the student's consistency argue convincingly give reasons for the answer selected. Consistency requires a theoretical argumentation in justifying the interpretation presented in the matter. [12] revealed a positive effect on the consistency argue student conceptual change. The consistency argued stages working requires clear and measurable student to consider the logical structure. Low ability in understanding problem in the matter resulted in the lack of understanding of students to a physics concept.

[11] argues, students will not be involved in building the skills to argue unless they have a fundamental scientific literacy. In developing consistency argumentation contrasts with the scientific concept that will produce proper discourse. Basically, the students had the idea to try to solve problem but always to no avail, and sought to assert their own argumentations with weak statement. [17] reveal that when students are given directives explicitly in the argumentation, the opportunity to practice the science content, allowing students to more easily analyze the claim argumentation. Therefore, students can not be involved in the concept and theory argues consistency if you do not have the background

knowledge. This statement is in line with the results of the preliminary study [16] if the students only focus on empowering skills of argumentation (elements claim) without empowering other elements of argumentation skills, this affects the weak understanding of the concept of students. This means that students not only do not understand aspects of the task level of abstraction, but also the students have to struggle to understand quickly the construction of a task so that it can consistently argued.

4. CONCLUSION

Based on research data on average consistency argued for the right consistency, consistent with incorrect and inconsistent answers, respectively, are 4.85%, 29.93% and, 65.23%. The data obtained in this study illustrates the undeveloped construction of student knowledge. Should, consistency argued encourage students skillfully argued using Toulmin's argument pattern. Toulmin's argument pattern enables students can identify key statements as the basis for the level of argumentation Toulmin next element. That is, students need to understand more deeply the content if the questions given to them are abstractions. This has significant implications on learning how to promote the development of consistency argumentations.

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