The Claims Statements from Viral Videos for Instrument Development to Assess Argumentation Thinking Skills

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Abstract. The final goal of the research that is being carried out by researchers is to produce empirical data in the form of a profile of the argumentation ability of chemistry education study program students in assessing the phenomena of daily life that are exposed to viral on social networks/media. To achieve that goal, it requires the identification stage and the formulation of a claim statement that is written in the video. Thus, the goal to be achieved at this stage is to obtain a list of claim statements that will be used as a stem in the preparation of questions to assess the ability of the argument or counterargument of the test objectives. The method used is content analysis. There were 11 claim statements have been successfully formulated and the uses in the preparation of argumentation questions. The formulated claim statements are grouped into two statuses, namely true claim statements and false claims statements from a scientific perspective. The two groups of claim statements can then be taken into consideration by researchers for two designations. The first designation is to determine the types of questions to be developed, namely questions of argumentation and/or questions of counter argumentation. The second designation is the preparation of a rubric in scoring students' argumentative abilities.

Key word: argumentation thinking skill, claim statement, viral videos

1. Introduction
In 2019 in Indonesia there was a dichotomy between a number of people into “Kecebong” group and “Kampret” group who blaspheme each other. The two groups often make "claims" of victory and the saddest thing is the "claims" without any evidence. This situation is one proof that the Indonesian people do not have sufficient argumentative skills. Educational institutions including Universitas Negeri Surabaya have the obligation to produce scholars who "If you make a claim, always include appropriate evidence to strengthen the claim submitted and be able to explain the suitability of the evidence included with the claim that has been submitted. To be able to do this requires argumentation thinking skills [1-3]. These experts do not differ in defining argumentative ability. The ability of argumentation is a thinking skill that a person possesses in constructing knowledge claims that are supported by evidence and corroborated by reason when assessing a phenomenon. The ability of argumentation is divided into four components of ability, namely (1) the ability to make claims, (2) the ability to show evidence, (3) the ability to formulate reasons (an explanation for supporting evidence for claims), and (4) the ability to formulate counterarguments [4], [5]. A person's expertise in preparing or submitting a claim is not enough.

A Structured Lecture Materials (SLM)–Physical Chemistry 3 has been developed to practice argumentation skills (AS), which are then acronymed with SLM-PC3 AS [6]. The SLM-PC3 AS that was developed has met the requirements of validity, practicality, and effectiveness to train argumentation skills in Chemistry Education Study Program students, Faculty of Mathematics and Natural Sciences Universitas Negeri Surabaya. SLM-PC3 AS is suitable to be used to practice argumentation skills in students.

Argumentation skills are part of 21st century thinking skills that need to be trained on students. The ability of argumentation does not develop by itself in line with human physical
Argumentation skills are a moderator of critical thinking skills [9], [10]. Critical thinking, argumentation, and problem solving are one unit [11]. Problem solving skills are among the main abilities of the 21st century [12-14]. Argumentation skills are very suitable to be trained through science learning [15]. Learning science through scientific argumentation has a positive and significant impact on students' argumentation skills and conceptual understanding [11]. It is a statement that still requires verification or verification.

Argumentation skills training in Physical Chemistry learning has a positive impact on students' argumentation skills. The argumentation ability score is above a score of 70 [16]. To evaluate whether the exercise has internalized in the cognitive structure of students, it is necessary to measure the ability of argumentation with the topic of chemistry in life or contextual phenomena that are viral in society through social networks. Optimism for the internalization of argumentation skills in students' cognitive structures is based on the results of previous research on science process skills. There were 91% of students' science process abilities in contextual topics (which occur in life) are determined by the ability of scientific processes on the topic of physical chemistry [17].

The problem that will be solved through this research project is "what is the profile of chemistry student argumentation skill in assessing daily life phenomena that are exposed to viral on social networks?" The aim of the research was to produce empirical data in the form of chemistry student argumentation skill profiles in assessing the phenomena of daily life exposed to viral on social networks/media. This empirical data is then induced to develop a premise or statement that arguing skills training in lectures affect the cognitive abilities of students in assessing chemical phenomena in life. The results of the research can be used for making academic papers for recommendations on learning policies.

To describe the argumentation ability profile, steps are taken (1) formulation of argumentation ability indicators, (2) collection and selection of viral videos containing chemical knowledge content, (3) content analysis to identify and formulate claims expressed in the selected videos, (4) developing instruments for assessing students' argumentative abilities according to the claims that have been formulated, (5) measuring the argumentation skills of the research target students, and (6) describing the profile of students' argumentative abilities in assessing the phenomena of daily life exposed to viral on social networks/media.

This article is the result of a content analysis in the form of identification results and a claim statement formulated in the selected video. The ability to formulate a claim statement is one of the indicators in argumentation skills. Claim formulations will be classified into two groups, namely true claims statements and false claims statements. True claims are used for the preparation of argumentative questions, while false claims are used to formulate counterargumentation questions. The objective to be achieved at this research stage (elementary objective) is to obtain a list of claim statements that will be used as a stem in the preparation of questions to assess the ability of argumentation or contra-argumentation.

The formulation of the argumentation ability indicator refers to Chin & Osborn and Acar [4], [5]. The formulation of an indicator of argumentation ability is that students can (1) write a statement which is a claim prepared in providing an assessment of a phenomenon, (2) write some appropriate evidence to strengthen the claims that have been compiled, (3) formulate a statement to explain the suitability of the evidence submitted in substantiating a claim that has been drafted or approved, and (4) writing a statement and including the reasons put forward to say that a claim is false. Indicator four is only active when students have to reject a claim.

The formulation of the indicators above is also used as a basis for selecting or determining a video containing a chemical claim statement that will be used as a stem rather than an argumentation question. The videos that will be selected are collected from social networks. There are six types of social media, namely collaboration projects, blocks and microblogs, content, social networking sites, virtual game world, and virtual social world [18]. Social networking sites are applications in which there is a permission for users to create personal information and to be able to connect and/or connect with other people. Personal information can be in the form of photos or videos. An example of this kind of site is Facebook. Information, photos, or videos on this site can be downloaded by everyone and then shared via Whatsapp to other parties, both individually and in groups (Whatsapp group). The video that will be selected or determined as the source of the claim statement is taken from the Whatsapp group.
Content analysis is carried out to identify and formulate claims expressed in selected videos that disseminate chemical content or information. The characteristics of the method of disseminating information through social networks are: (1) the message conveyed is not only for one person but has a wider range, (2) the message is delivered freely or without having to go through a gatekeeper, (3) the message delivered tends to be faster than other media, and (4) the message recipient determines the interaction time [19]. As a result of these characteristics, social media users can freely edit, add and modify text, images, videos, graphics, and various other content models. This condition is very likely to produce misleading information. The opportunity for the development of misleading information to the public can occur because of the content developer intentionally or by accident, the content developer does not have a correct understanding. With mobile phone devices, text, images, videos, graphics, and various other misleading content models can circulate very quickly anywhere and anytime. Based on this understanding, content analysis will produce a list of video names or links, express claim statements that can be true or false. The true claim is then used as material to formulate argumentation questions. Wrong claims are used as material for the preparation of counterargument questions. Selection of claims used in the preparation of questions also considers the feasibility of being carried out by students, data or evidence for acceptance or rejection of claims is not difficult for students to obtain.

2. Method
Identification and formulation of the stated claim statement in the selected video uses content analysis techniques. Content analysis is research that is in-depth discussion of the content of information contained in a mass media [20]. All objects under study will be mapped in the form of writing/symbols and then interpreted one by one. In audio media, researchers still have to listen to it and still have to write down important things that are identified [20]. Likewise with visual media, researchers must look at the existing visualization and take notes.

In this study, the researcher saw and listened to all selected videos and recorded the identification results of the stated claim statements in the video. Based on that note, a claim statement was formulated which would then be used as a stem in the development of an instrument (question) to measure the argumentation ability of the research target students.

3. Results and Discussion
From a number of videos that have been viral on various Whatsapp groups that provide chemical information, 11 videos have been selected which are then viewed and listened to (content analysis) in order to identify and formulate a claim statement. A list of videos and claim statements that will be used as a stem in the development of instruments to assess students' argumentative abilities is presented in Table 1.

| No. | Video Name | Claim Statement | Use for Argumentation | Contra Argumentation |
|-----|------------|-----------------|-----------------------|---------------------|
| 1.  | Dish soap  | The amount of foam is related to the washing power of the soap. | ✓ | ✓ |
| 2.  | Soft Drinks and Mentos Candies | There will be a dangerous chemical reaction if you consume soft drinks with mentos candy. | ✓ | |
| 3.  | Coconut Shell Smoke Becomes Medicine for Covid 19 | Coconut shell contain acidic substances. | ✓ | |
| 4.  | Iron Test on Various Bottled Water Products | The water to drink from one of the products is boiled water with nails in it. | ✓ | |
The following is the narrative of the results of the content analysis to detect a claim statement from a video entitled "Dish Washing Soap," which was taken from the Whatsapp social network and went viral in the community. This video was made by someone with the initials GP. One of the GP’s statements is “the amount of foam is related to the washing power of the soap.” The claim statement in video number 1 can be used to compile argumentation questions and counter-argumentation questions. That is, this claim statement can be asked for student assessments in two alternative questions that allow students to give different answers. The first question, using the key phrase, is "Do you agree with the claim statement that GP said?" Students who agree with the GP claim, are declared to have full argumentation skills (score 100) when students can (1) write evidence to strengthen the claim statement and (2) write an explanation (narrative) of the relationship between the evidence/data submitted in strengthening their agreement with claim. Students who disagree with the claim are declared to have full argumentation skills when students can (1) write strong evidence to reject the claim statement and (2) can write explanatory statements to say that the GP’s statement is false.

Actually, the claim statement made by GP is false. A brief discussion of this assessment is narrated as follows. The main principle of action of soap is the attraction between the molecules of dirt, soap, and water. In the process of washing/removing dirt on clothes or dishes, the soap and water mixture will come in contact with dirt, which is generally fat. Soap has polar and non polar groups. Soap molecules have hydrogen chains, for example CH₃(CH₂)₆ which acts as a tail and is hydrophobic (doesn't like water) and binds to organic matter (fat), while COONa⁺ as a head is hydrophilic (likes water) and will bind and dissolve in water. Thus the dirt fat is released from the material being washed. When surfactant molecules (the active ingredient of soap) come to the surface of the water, their hydrophobic tails stick out of the water as the groups try to move away from the water. Surfactants added to soap can damage the surface tension of water because the distance between water molecules increases so that soap molecules can force their way between them. When air is introduced by stirring water, the surfactant molecules line up to form a thin layer where water molecules are in the soap layer. This condition is known as soap bubbles or foam. Different types of surfactant molecules produce bubbles of different sizes and colors. Soap lather is related to the presence of soap but not to cleansing power. Foam shows how soap molecules are attracted to water and not how strong they attract dirt [21], [22]. That is, when the student tested disagrees and can
display evidence and explanation as above, then this student can be declared to have full argumentation skills (score 100).

The claim statement that was identified and formulated from video number 2 can be used as a stem in the preparation of the counterargumentation questions, because in fact the claim statement as written in Table 1 is not true. A brief discussion of this assessment is narrated as follows.

The second video provides information about the reactions that occur between Mentos candies and the various types and colors of soft drinks. This phenomenon was originally believed to have occurred due to an acid-base reaction to produce carbon dioxide gas. As is well known, Coca-Cola and other carbonated drinks are acidic because they contain carbonic acid (H$_2$CO$_3$). If a base is added to it, for example baking soda, there will be a reaction that produces large amounts of carbon dioxide gas, causing a burst/eruption.

Researchers from the Department of Physics and Astronomy, Appalachian State University, USA, conducted a series of experiments to deny that there was no chemical reaction between the material from the soft drink and the material from mentos gum. The important information presented here is related to the experiments conducted in which researchers conducted a surface morphological analysis of Mentos candy using SEM (Scanning Electron Microscope) and analysis of its surface roughness using an AFM (atomic force microscope) [23], [24]. The two research groups found that there was no chemical reaction that occurred in the mint material, but was a mere physical event. When you add Mentos candy to the soda bottle, a drastic release of carbon dioxide gas occurs. Although the surface of the Mentos candy looks smooth, at the microscopic level the Mentos candy is full of holes, peaks, and craters, like a miniature version of the surface of the moon. These holes, peaks and craters are referred to as nucleation sites. The contours of the Mentos surface provide a surface for carbon dioxide bubbles to form, and allow carbon dioxide gas to form so much faster that it seems like an explosion has occurred. So, what is true is that there is no chemical reaction between the material from soft drinks and the material from Mentos candy. The existing claim statement is suitable for the preparation of counterargument questions.

The same discussion can be made for the third claim statement and so on. Understanding of the claim statement is scientifically true or false is very necessary. The certainty of the true or false status of the existing claim statements has at least two benefits in the preparation of an instrument to assess students' argumentative abilities. The first benefit, the developer has a strong scientific basis when deciding whether to compile a question of argumentation or to compile a question of contra-argumentation, or to arrange both. The second benefit, the developer will not make mistakes in scoring the proven target argumentation ability. The question developer must give a full score (score of 100 for example) when students reject scientifically false claims, and include supporting evidence and scientific explanations.

4. Conclusion

Content analysis has been carried out on 11 viral videos on social networks (Whatsapp) containing chemical content to identify and formulate a corresponding claim of statement. It has also succeeded in formulating 11 claim statements and their designation in the preparation of instruments to assess students' argumentative skills. The formulated claim statements are grouped into two statuses, namely true claims statements and false claims statements from a scientific perspective. The two groups of claim statements can then be taken into consideration by researchers for two designations. The first designation is to determine the types of questions to be developed, namely questions of argumentation and / or questions of counter argumentation. The second designation is the preparation of a rubric in scoring students' argumentative abilities.

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