Exploring students' argumentation skills using Instagram-based learning

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Abstract. Instagram is one of the most popular social media for teenagers to get information through pictures and short videos. Instagram users often provide comments in response to the information obtained. Instagram can be used in online-based learning during the Covid 19 pandemic. This study aims to explore students' argumentation skills using Instagram-based learning and measure student satisfaction responses in using Instagram as a learning medium. The type of research used is descriptive quantitative. Respondents used in this study were 25 students of SMA Multazam IBS Semarang. The results of the study that obtained argumentation skills after learning to use Instagram were 56.13 with the indicator giving support getting the largest value of 82.00 and refutation having the smallest value of 44.00. The percentage of students who argue is 76%. Student responses to learning using Instagram 53% strongly agree, 40% agree, 6% disagree, the remaining 1% disagree.

Keywords: Instagram, argumentation skills, comic.

I. Introduction

Physics is a branch of science that studies natural phenomena. This subject is more exact so that some students do not argue much when studying it. Some students think of physics as mathematics which consists of formulas. In fact, physics is a set of concepts that are explained quantitatively.

Exchange of opinion in learning physics is needed to support learning optimally. Argumentation is very useful in dialogue and interaction in learning science, especially physics [1]. This argumentation skill is required so that learning is centered on the teacher. Still, students can also justify or refute that the concepts explained are not in accordance with the realities of life. Students are considered to have argumentation skills if they meet the indicators: claims, data, justification, support, and refutation [2]. Not all students have to argue verbally but can also use writing [3].

Argumentation skills can be developed through various lessons. Learning by using problems can stimulate students to argue [4]. With this problem, some students will be interested in providing input in solving the problems given. The same finding found a significant difference in improving mathematical argumentation skills of students who were given problem-based learning and those who were not given treatment [5].

During this pandemic, information and communication technology-based learning is very much needed by both teachers and students. Teachers are expected to be able to design learning media as an innovation in distance learning [6]. This learning media must be an intermediary in improving student learning outcomes. For this planned learning to run well, there needs to be a collaboration between teachers, students, and parents [7].

In this 21st century, the development of science and technology has given rise to various applications, including social media. Among all various social media, Instagram is one widely used application by the public, especially among teenagers. Among teenagers, Instagram is more popular than Facebook [8]. Facebook

used to be a social media platform often researched [9]. The same thing was experienced by Twitter which became an interest for researchers to find the effect of using social media [10]. At the same time as a survey of 20,000 educators, Instagram has not been widely used in education circles [11]. However, from 2014 to 2020, Instagram users increased fivefold from 200 million to one billion active users [12]. Instagram will be considered to be an important social media in the future. The feature of sending messages; Uploading stories, photos, and videos with various effects attracts millennials. Instagram, which has only been used as a social media, needs to be developed for its benefits, one of which is learning media. Social media has a positive impact because this application can share information and create new ideas and concepts related to learning [13].

Instagram has received attention in informal medical education, especially when explaining anatomy and dentistry [14]. However, in primary and secondary education, the use of Instagram as a learning medium is still limited [15]. The popularity of Instagram among students should be an important reason for a teacher to use it as a learning medium. In addition to several features that can be used as learning media, teachers do not need to teach students how to use them.

A comic is a picture book that contains a story. The pictures are interesting, and the writing is a little bit so that the reader can finish a story shorter than short stories or novels. Comics can be used as learning media that contains material content to be delivered. Good packaging of pictures and content will attract students to study in pandemic conditions. Wahyuningsih's research [16] shows that students have a very high interest in participating in learning with illustrated comic media.

This study aims to explore students' argumentation skills through Instagram-based learning, which contains comics, pictures, and videos, and to measure student satisfaction responses to using Instagram as a learning medium.

II.   Materials and Methods

The type of research used is descriptive quantitative. This research was conducted in the 2020/2021 academic year. The subjects in this study were students of SMA Multazam IBS Semarang and as many as 25 students of class XI. Global warming is the material used in this study. This material was chosen because it is conceptual and contextual. The material is delivered in comics, pictures, and videos (see Figure 1).

The learning method used is to discuss the problems presented in each uploaded content. The content created is adjusted to the indicators of argumentation skills: claims, data, justifications, supports, and rebuttals [2]. The instruments used are in the form of essay tests and questionnaires. Essay questions will be displayed on each content based on argumentation skill indicators. There were nine problem content discussed during the lesson consisting of 3 comics and six videos plus one instructional demonstration image content and 1 task image content that students did after learning. The issues raised are described from the basic competencies that students must master and adapt to the indicators of argumentation skills, including understanding global warming (data); the process of global warming (refutation); global warming symptoms (claims); the greenhouse effect (justification); CFC gas (disclaimer); vehicle pollution (support); forest fires (data); ozone layer (justification), and countermeasures on duty (support). The supervisor has corrected the questions given. Students' answers to each question are then updated based on the scoring rubric made from a range of 0-3 points. The percentage of the number of students who answered was analyzed using the following formula:

$$P = \frac{s}{n} \tag{1}$$

where P is the percentage of the number of students who answered/commented, s is the number of students who answered, and n is the total number of students.

While the average score of students on each indicator was analyzed as follows:

$$J = \frac{\sum a}{pt.n} \times 100 \tag{2}$$

J is the average score of all students in each question, $\sum a$ is the total number of points for all students in each question, pt is the highest point determined, and n is the total number of students.
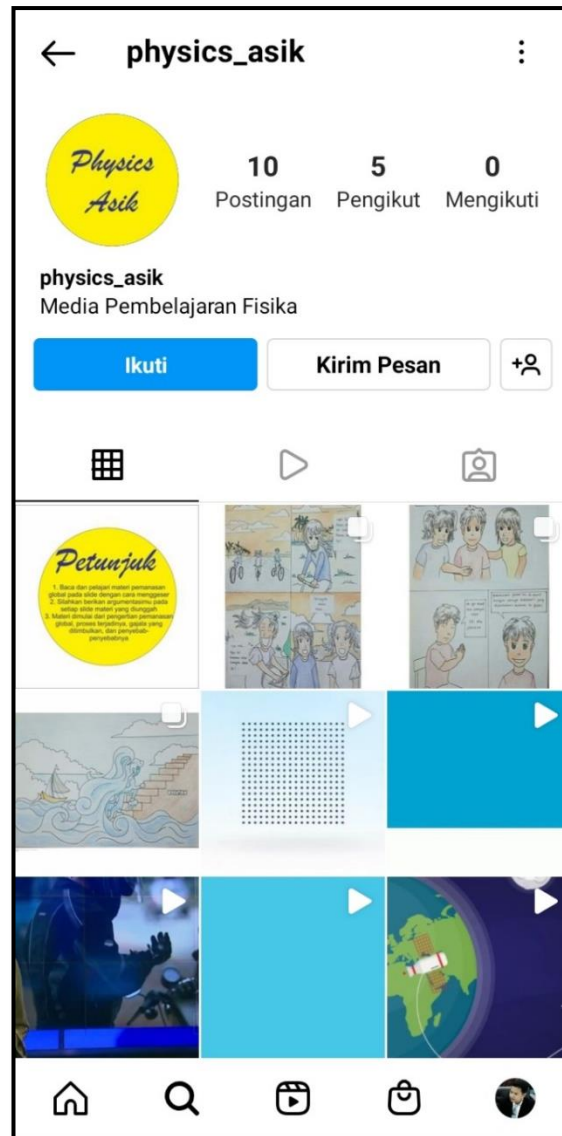
Figure 1. Instagram-Based Media Display

After learning, questionnaires are given to assess student responses to student satisfaction with Instagram as a learning medium. The responses are intended to determine the level of student satisfaction with the Instagram learning media that has been done to be evaluated for further action. The response contains options: strongly agree, agree, disagree, and disagree. The questionnaire was analyzed based on the percentage of student responses to each statement, including appearance, content, motivation, and correlation to the developed argumentation skills. Data were then analyzed using the following formula:

$$P = \frac{s}{n} \times 100\% \tag{3}$$

Information:
P = percentage of student responses
s = number of students who chose
n = total number of students

III. Results and Discussion

Argumentation Skills

Skills Students' argumentation skills in learning using Instagram media are shown in the written comments (Figure 2). The analysis of students' argumentation skills is shown in Table 1.

Table 1. Results of Analysis of Argumentation Skills

No	Indicator	Percentage Answering (%)	Average Value
1	Claim	92	60,00
2	Data	74	49,33
3	Justification	62	45,33
4	Support	90	82,00
5	Disclaimer	62	44,00
	Overall average	**76**	**56,13**

Based on Table 1, the overall percentage of students who argue on each upload on Instagram is 76%. 34% of uploads on Instagram are not given comments/arguments. The factor that affects the number of students who argue is the length of learning that is less than optimal. In this learning, students are given 45 minutes to understand the material presented through comics, pictures, and videos, after which each student must argue on the problems given by each upload. Students feel that the time given is not long because understanding the material, let alone giving arguments to the nine problems given, takes more time.

Figure 2. Arguments on Instagram Media

Claims

The images presented in this claim indicator are floods, forest fires, melting polar ice caps, and floods. Students are asked to claim the symptoms of global warming that often occur in Indonesia. In this question, students should give a claim of one sign of global warming that often occurs. However, on this question, some students answered as long as "let's all, let's increase the absorption area." Some other students have provided claims along with evidence and guaranteed opinions on why they chose one of the symptoms of global

warming. A person is said to have been able to form a claim if it is supported by evidence and a guarantee of opinion to support the claim he made

. Judging from the percentage, the number of answers is already large, although not 100% of students answered. However, some students responded casually in terms of the average value and commented that they did not understand the questions asked, as shown in Figure 2. Some students could only theorize but could not provide evidence [18]

Giving Data

The presented comic tells the story of three friends who are cycling during the day. One of them stated that the temperature in their area had increased. Then there is an explanation that the increase in the Earth's temperature is due to global warming. Students are asked to provide data on global warming in the last 100 years. Most of the students did not offer data from good sources, but they argued from their minds, so the arguments were less reliable because they were not given valid data. On this question, collectively, students scored 53.33.

The second question is presented with video data and facts about forest damage in Indonesia for ten years from 2007 to 2016. Students are asked to provide data on how many times Indonesia has experienced forest fires and which areas have experienced the most forest damage. In this question, most of the students commented that there had been a lot of forest fires but did not provide quantitative data, so it still needed to be explained further. Students in this question have commented on which areas often experience forest fires, such as Sumatra and Kalimantan. In this question, the collective score obtained is 45.33.

The original student answered without providing a clear reference in the data indicator. Some of the data provided are just guesses. Some of them answer randomly that do not match the questions asked. Based on these factors, students only got an average of 49.33 on the data indicators. This small value is also influenced because there are 36% of students do not argue. Online learning using Instagram does not have a good effect on providing data for arguments. The application of online learning has a negative impact on the results of writing argumentative essays in the big data era [19].

Justification

Two questions are given in the indicator of justification, namely, relating to the greenhouse and the ozone layer. The greenhouse effect question is given a brief explanation regarding the definition, the process of the occurrence of the greenhouse effect, and solutions to reduce the greenhouse effect. Participants were asked to confirm whether the greenhouse effect was also caused by using glass in homes and buildings to make light reflect into the atmosphere. Most of the students confirmed that the glass installed in homes and buildings resulted in the greenhouse effect. Even though this is not true, that term describes the Earth's condition, which has a greenhouse effect. The sun's heat is trapped by the Earth's atmosphere. Gases in the atmosphere, such as carbon dioxide, can hold the sun's heat which causes the heat to be trapped in the Earth's atmosphere. In this question, the score obtained by students is 48.

Students are given a video related to the ozone layer in the second question. Students are asked to justify whether planting trees can reduce the erosion of the ozone layer. Most students confirmed that planting trees can reduce the occurrence of depletion of the ozone layer. This is certainly true. Planting trees is one of the efforts to mitigate the lack of the ozone layer because trees can absorb carbon dioxide, so neutralizing the air will be difficult to do. In this question, students collectively scored 42.67.

On the indicator of justification, the percentage of students who argued was 62%. At least students discuss because they must really understand the concept or condition in justifying. In the justification indicator, students are asked to explain the definition of whether the use of glass in the house is the term greenhouse effect. Some students can define correctly. However, some of the students still answered randomly. The average value obtained from the two questions on the justification indicator is 45.33.

Support

In the support indicator, students are given 1 question and 1 task. In the question, students are given a video related to the heaviest pollution that occurs in Indonesia. Students are asked to provide support comments for reducing pollution. Most of the students have given positive support, including cycling, public transportation, and reforestation. In this question, students got an average score of 76.

Furthermore, on the assignment, students were asked to make simple efforts to reduce global warming by taking photos and uploading them on their respective Instagram and supportive comments and tagging the @physics_asik account. Most students have done it in various ways, including sweeping, reducing the use of air conditioning, walking to reduce motorized vehicles, and so on. On this assignment, they collectively got a score of 88.

Arguments in the form of support got the highest average score of 82.00 with a percentage of the number of students who answered 90%. In this indicator, most students can provide arguments in the form of support for overcoming the problem of global warming. Each student can give at least two efforts to overcome global warming.

Disclaimer

In the disclaimer indicator, students are given two questions. In the first question, students are given a comic that tells the process of global warming. Students are asked to explain whether water vapor in the hydrolysis process causes global warming. Students only give ten comments from 25 respondents on this question. They mostly do not understand; this is evidenced by comments unrelated to this question. They should refute the statement that water vapor in the hydrolysis process does not cause global warming. In this question, students get the smallest score, which is 16.

Students are given a video related to CFC gas in the second question. Students were asked to comment whether humans should stop using air conditioners and refrigerators because they contain CFC gas, eroding the ozone layer. Students have given good rebuttals; they argue that it is better to reduce if they have to finish because it can interfere with the fulfillment of human needs. In this question, students got a collective score of 72.

In the case of refutation, students were asked to explain whether water vapor in the hydrolysis process affects global warming. In this concept, students are given material in the form of comics. The lack of material conveyed in comics results in students not understanding the concept. The comics here can only briefly explain the process of global warming. Students need to look for other references to get a complete understanding. This difference in reference results in a difference in the experience received. At least the percentage of students who answered the disclaimer indicator impacted the average score obtained was also small, namely 44.00.

Response Satisfaction in Learning

The percentage of student satisfaction responses in learning to use Instagram is shown in Table 2.

Tabel 2. Percentage of student responses in learning using instagram

No	Statement	SS (%)	S (%)	KS (%)	TS (%)
1	Enjoys learning to use media Instagram	72	28	0	0
2	The Instagram media used is interesting and not boring	72	20	8	0
3	The material presented in Instagram is easy to understand	40	56	0	0
4	The images and videos presented can explain global warming in everyday life	52	48	0	0
5	Instagram Media Content can explain the concepts of global warming that previously were not understood	40	52	4	0
6	The terms and content of images and videos found on Instagram media are easy to understand	40	48	12	0
7	Text in Instagram media can be read clearly	44	32	20	4
8	Sentences in Instagram media are easy to understand	40	52	4	0
9	Instagram media provide motivational enthusiasm in learning	84	12	4	0
10	Instagram media can inspire li argumentation skills and providing an understanding of global warming	44	48	4	4
	Total Percentage	**53**	**40**	**6**	**1**

Based on Table 2 there are 12% disagree with terms on Instagram that are easy to understand. Some pictures require students' interpretation skills to understand what is being conveyed. The image is a rising sea level in discussing global warming symptoms depicted by water that resembles a human being climbing a ladder to land.

There are 20% who disagree, and 4% disagree that the text on Instagram is easy to read. The response was that the word balloons written in the comics were small, and some were not clear because they were handwritten. Moreover, if this media is opened using a cellphone with a small screen, it will cause students difficulties in learning.

This Instagram media motivates the spirit of learning, with a percentage of 84% strongly agreeing and 12% agreeing. Comics make it easier to convey and receive material on subjects that are considered difficult [20]. The use of comics media correctly made learning more fun to create a more effective and conducive classroom atmosphere [21]. The overall response was that 53% strongly agree with learning to use Instagram, 40% agree, 6% disagree, and the remaining 1% disagree. It can be concluded that learning using Instagram media was responded to well by students.

IV. Conclusions

The conclusions obtained in this study are argumentation skills after learning to use Instagram of 56.13, with the support indicator having the largest value of 82.00 and refutation having the smallest value of 44.00. The percentage of students who argue is 76%. In response to student satisfaction in learning to use Instagram, 53% strongly agree, 40% agree, 6% disagree, and 1% disagree.

Based on the results of this study, there are several suggestions for further research. Learning that explores argumentation skills should be given a long enough time. Making learning media using comics should be written clearly, and the material presented should be presented in full.

Acknowledgments

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