The implementation of group investigation learning model to equip students to think critically in addressing the hoax content of disaster on the internet

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Abstract. Nowadays, internet access can give not only positive influence but also the negative one. One of the negative influences is hoax news about natural disaster. This research aims to implement Group Investigation learning model in order to develop students’ critical thinking skills, so students can respond carefully on hoax news of natural disaster. The method in this research was Classroom Action Research (CAR). The result shows that; (1) the knowledge students have of the potential for natural disasters, does not guarantee that they can understand whether the disaster information is a hoax or not; (2) information about disasters needs to be investigated in groups for people of the same age as middle school students; (3) Students' confidence in a news is directly proportional to their actions to share a content through social media; (4) disaster information is something that needs to be considered in disaster learning.

1. Introduction

The internet has become an inseparable part of human life lately. The data from the International Telecommunications Union (ITU) in 2016 shows that 47% of the world's population uses the internet in daily life [1]. Indonesia ranks ninth as the largest internet user country, which is more than 66 million internet users. While data from the Ministry of Communication and Information in 2014 shows that internet users in Indonesia had reached 82 million people. Of the number of internet users, 80 percent of them are teenagers aged 15-19 years [2].

The internet has positive and negative effects. Current technological developments are like two blades that need special attention from all elements [3]. It is undeniable that behind the benefits of the internet, it also causes many harm and worrying effects, ranging from pornography, fraud cases, and violence that all originated from cyberspace, as well as false news and hate speech. All these problems, must get serious treatment so that the negative impact of the internet can be minimized. Moreover, internet usage in Indonesia is dominated by teenagers, in this case it is classified as middle school-age students who still need guidance from teachers and parents.

The internet can have a positive impact if it is used to support the learning process. Students can access various learning resources from the internet. Students prefer to learn to use social media rather
than books [4]. Students in the use of internet in schools need to be supervised by teachers, so that they can be directed to explore the internet positively.

The negative impact that often deceives students is about the truth of the news content. The content on the internet is often hoax. Students are easily consumed by issues in hoax content. The ease of people to express their opinions according to their thoughts, makes the people write something that is sometimes far from the truth and easily uploads them into writing or images to the internet. Students who usually study with the internet sometimes read something that is not true. The thing that needs to be avoided is that students easily share the hoax with their social media, even though this can violate ITE Law No. 19 of 2016, Article 28 [5].

Fake news after a disaster can cause panic and divert valuable resources from rescue efforts [6]. Since the 2016 US elections we have seen a lot of thought about the capacity of fake news to influence the election results, but there is little discussion about the dangers of fake news that causes mass panic after a disaster.\(^6\) Fake news follows the events of natural disasters, developing in the midst of confusion and chaos that engulfed the community. This may be more prominent in Indonesia - which has more than 100 million Facebook users, and is the third largest democracy in the world - but any country that is preparing for a disaster must face this risk [7].

The teacher as an educator has a role in directing students to not easily believe the news on the internet. Geography or geology teachers can provide critical thinking skills so students can distinguish which news about hoax natural disasters and which news is true. Geological learning is expected to equip students to think critically. Critical thinking skills need to be developed by geoscientists (geography and geology) to their students through the creation of the right learning environment.

The formulation of the problem proposed in this study is: How can the application of the Group Investigation learning model on basic geology subject provide students with critical thinking skills in responding to hoax news with natural disaster themes on the internet?

This study aims to develop students' critical thinking skills in addressing various hoax news of widespread natural disasters on the internet. These skills can be useful so students don't easily share news hoaxes. Students can also play an active role in explaining to friends or family and even the general public that a message on the internet is a hoax or not.

The benefits of this study are; (1) as the teacher's efforts in providing alternative disaster education; (2) increasing students' interest in reading, understanding the contents of the reading and thinking critically about the existing reading; (3) minimizing the circulation of hoax news regarding natural disasters.

Critical thinking is a skill that is very necessary for students to navigate the virtual world. Readings that exist in cyberspace can affect the nature, behavior and actions of students in the real world. Critical thinking consists of; (1) skill in formulating problems; (2) the skill of giving arguments; (3) deduction skills; (4) induction skills; (5) skills for evaluating; and (6) skills to make decisions and implement the decisions [8].

Critical thinking skills are used as a provision for students to become a critical and adept society. One of the competencies students must have in the future is critical thinking [9]. With critical thinking it is expected that students will avoid sharing false news, so that they participate in becoming citizens who use the internet positively.
The learning model applied in this study was Group Investigation (GI). This is based on the opinion of the Ministry of Communication and Informatics which states that a news can be known whether it is true or not through the investigation process. GI is a learning model that has four basic elements. The basic elements are "investigation, interaction, interpretation, and intrinsic" [10]. The specialty of GI is that all four elements are interconnected simultaneously. If there are some of the four elements missing, the GI does not work. GI is a systematic learning model that emphasizes the implementation of each element in it.

The first element is investigation. This is a characteristic of the GI learning model. Aside from being a characteristic of investigation, it is also a fundamental directive of the GI. The essence of this first element is "learning by discovery", which is learning through discovery. The findings were obtained through observation activities (inquiring) in depth a material obtained by students.

GI Learning Model is a group plan that aims to provide encouragement for student involvement during the learning process to run optimally [11]. States that GI is a group plan that aims to provide encouragement for student involvement during the learning process to run optimally. GI is based on cooperative learning with such an arrangement, for the purpose that students have detailed roles in a group.

GI is formed from small groups in a class that guides and encourages students to participate fully in learning. GI requires students to be able to have good skills while communicating. The final result of GI is the contribution of ideas originating from all group members and sharpening students' intellectual skills compared to individual learning. GI is based on cooperative learning with such an arrangement, for the purpose that students have detailed roles in a group.

Thinking is a skill. One of the thinking skills is critical thinking. In critical thinking there are three main activities, namely: analysis, evaluation, and argumentation [12]. These three things are forms of critical thinking skills.

Hoax news is more common when there is a disaster. Fake information is circulated on social media all the time. However, during emergencies, people more often check news and updates on WhatsApp, Facebook, and Twitter. During an emergency situation, people are also more vulnerable. People also share images during natural disasters because they want to feel like what disaster victims do, and they contribute to sharing information in certain ways. This is the same psychological motivation as gossiping. Often the information shared is wrong and is actually very dangerous. The best defense here is to be a good reader, and make sure the information you share is accurate. To do that, check who posted the information: are they reliable? You can also check and see if the photo was posted before: run a reverse image search on Google. People also must always check comments before reposting. Very often, if the photo or information is fake, someone will show it [7].

Responsibility also lies with public officials and emergency authorities. For example, the Houston police Twitter account is only attended by 60,000 people, in a city of more than 2 million [8]. That means some people will get updates on the devices they have, while most people don't get information directly from government agencies. Officials must be very active on social media, to ensure that the
hoax is quickly denied. Besides they must educate the public about where to get information that is verified before a natural disaster strikes.

People who have reliable information tend not to panic. Information must be considered as important as material provisions such as food, blankets and tarps[8]. During this time, disaster preparedness only focuses on material readiness, but forgets the readiness to receive information. In fact, information is the basis of someone making a decision to take action before, during, and after a disaster occurs. Decisions taken after reading news about natural disasters circulating the internet, must be accompanied by critical thinking skills.

2. Methods

The research that was conducted is a type of Classroom Action Research (CAR). CAS that was used as a reference is the design of Naish [13]. The CAR design is as follows:

![Figure 1. Design of CAR by Naish [14]](image)

The CAR cycle above has five steps. The first step is the teacher identifies problems related to the condition of students in the class under study. The teacher must choose specific problems from the various problems that occur. The problem examined this time is about various hoax news about natural disaster on the internet. Next step is the teacher looks back at the information related to the problem to be studied.

The second step is to develop a plan of action to be taken to overcome the problem. Action plan is in the form of making syllabus and Lesson Plan (RPP). In addition the teacher also needs to prepare content (articles) that will be the object of investigation by students. The teacher in the learning process then divides students into 8 groups. This is intended to make students investigate content in groups. This is the main activity of learning Group Investigation.
After obtaining various information, in the third step, teacher takes an action to overcome the problem in the class. Teachers in carrying out actions need the help of an observer to observe the learning process that occurs. The fourth step is the teacher analyzes the results of observations found by the observer while drawing conclusions from the learning process that has been carried out. The fifth step, the teacher takes further action based on the analysis and conclusions obtained in the first cycle.

This research was conducted at SMK Negeri 1 Binuang. The application of the Group Investigation learning model is carried out on Grade X Mining Geology. The material used as teaching material is geological style, because in the material there are various endogenous and exogenous geological styles that have the potential to cause natural disasters such as earthquakes, volcanic eruptions, tsunamis, landslides, and so on.

3. Results and Discussion

PTK is done after the teacher has made the initial observation. The initial observation aims to identify problems regarding students' critical thinking about hoaxes. The results of preliminary observations from Grade X of Mining Geology can be seen in the following tables:

Table 1. Number of Students who are Social Media Users

| No | Frequence  | Number of Students | Total | Percentage (%) |
|----|------------|--------------------|-------|----------------|
| 1. | Facebook   | 33                 | 33    | 100            |
| 2. | Twitter    | 33                 | -     | -              |
| 3. | WhatsApp   | 33                 | 33    | 100            |
| 4. | Others     | 33                 | 25    | 75,75          |

The use of social media in grade X of Mining Geology is dominated by Facebook and WhatsApp. No students use Twitter. Meanwhile, other social media that are widely used by students are Instagram. The content on Facebook about natural disasters can actually be checked by looking at the social media accounts of official institutions such as BMKG, BNPB, National Police, and so on. Meanwhile content circulating on WhatsApp is very difficult to handle. Most official institutions in Indonesia use Twitter as a means of providing information to the public. Though none of the Grade X of Geology Mining students use Twitter. This has the potential to make students spread hoax content.

Table 2. Frequency of Students Using Social Media

| No  | Frequence | Number of Students | Total | Percentage (%) |
|-----|-----------|--------------------|-------|----------------|
| 1.  | Often     | 33                 | 30    | 90,9           |
| 2.  | Seldom    | 33                 | 3     | 9,1            |
| 3.  | Never     | 33                 | -     | -              |

Social media is an unseparable thing for middle school age children. This can be seen in Table 2. that 90 percent of mining Geology students use social media frequently. Some even cannot separate from social media. This needs to be watched out by educators, so students receive the right news on social media.

Table 3. Frequency of Students Sharing Content on Social Media

| No  | Frequence | Number of Students | Total | Percentage (%) |
|-----|-----------|--------------------|-------|----------------|
| 1.  | Often     | 33                 | 25    | 75,75          |
Content on social media will easily be spread, and even have the potential to become viral. Hoax content is very dangerous if it is spread. The disseminating party can also be subject to the ITE Law article. The students of Grade X of Mining Geology have the potential to spread hoax content, and that will greatly endanger their future. This can be observed from Table 3, which shows that 75.75% of students often share news content. This amount is directly proportional to students who do not check the truth of the content. Students spread all the news they thought was interesting, without caring about whether the news is hoax or not. Table 4.

**Table 4. Students Who Checked The Truth of The News Before Sharing The Content**

| No | Action      | Number of Students | Total | Percentage (%) |
|----|-------------|--------------------|-------|----------------|
| 1. | Not Doing  | 33                 | 31    | 6,06           |
| 2. | Doing Check| 33                 | 2     | 93,94          |

The next observation was done by the teacher giving a case study to one of the hoax content to grade X Mining Geology students. Content is picked from Facebook, with the consideration that all students have Facebook. One example of this content can be seen in Figure 2. Students are asked individually to investigate existing content.

**Table 5. Student Responses to Hoax Content (Figure 2)**

| No | Students’ Responses | Number of Students | Total | Percentage (%) |
|----|---------------------|--------------------|-------|----------------|
| 1. | Hoax Content        | 33                 | -     | -              |
| 2. | No Hoax             | 33                 | 33    | 100            |
| 3. | Not Know            | 33                 | -     | -              |

The results show that many students think the content is true information. This is based on the following considerations; (1) The map of Java Island which is added with foreign scientific terms, makes almost all students consider the content is correct and not hoax; (2) Inclusion of official government institutions, namely BMKG; (3) Other considerations of students stating that this news is true is the presence of earthquake strength writing on the Richter Scale (SR).
Maps are a media that must be understood by students who are studying geology. Students already know that Java is indeed an earthquake-prone area, because it is located on the border of the plate. However, with this knowledge students even increasingly believe the hoax content is the right news. It turns out that knowledge alone does not guarantee students understand what they know. Students still have the potential to receive hoax news as a truth.

Profiteering the name of the official BMKG institution in the news makes students believe the truth of the news. As mining geology students, they should know that BMKG is an institution or body authorized to disseminate geological information regarding earthquake disasters. However, students have not been able to check the content of this news.

Scientific foreign terms make students believe that the content is true. In fact, students have learned about geological style material, which they have read and explained by the teacher. This means that students' ability to think critically is still not good.

This condition is a serious problem. Students who have just learned about geology can still receive hoax news as true news. Even though geology is a science to study natural disasters in the form of earthquakes. This means that disaster learning for middle school-age children must begin immediately.

The first stage which is in the form of finding this problem is then continued in the cycle stage of Classroom Action Research or Penelitian Tindakan Kelas (PTK). The stages were carried out in two cycles.

3.1. Cycle I

The cycle starts with planning actions. Action plan here is in the form of preparation of Lesson Plan (RPP). RPP is prepared using a Group Investigation (GI) learning model. GI syntax is applied to the core of learning. In addition to the determination of learning models, types of learning media and learning materials was also selected. The learning media used at that time was in the form of
screenshots of disaster hoaxes circulating in the community. From the screenshot, students conduct group investigations.

Figures 3. Hoax Content for Cycle 1

There were still students who thought that the content was correct. This is because; (1) the location of the area used as the object of the hoax is Java, students assume that indeed Java Island is prone to earthquakes; (2) Although not all students know stands for LIPI, but they believe that LIPI is an institution that is competent in predicting earthquakes; (3) scientific terms such as seismic and subduction, convincing them that this news is true. However, after investigating in groups, students who initially believed this news to be true became hesitant and intended not to share this news.

Students who considered this news is hoax are based on the time of the earthquake. Students believe that the earthquake cannot be known when it arrived. They still remember that in the lessons they have been through, the teacher has stated that until now there has been no tool that is able to predict when an earthquake will come.

Students also believe that the Bandung region which is in the middle and north of Jakarta on the north coast of Java should not be too worrying. According to them, cities in the southern coast of Java should be more vigilant. Moreover Bandung and Jakarta are not directly adjacent to the Sunda Strait, so they consider it safe from the threat of Mount Anak Krakatau.

Table 6. Student Responses to Hoax Content (Figure 3)

| No | Students’ Responses | Number of Students | Total | Percentage (%) |
|----|---------------------|--------------------|-------|----------------|
| 1. | Hoax Content        | 33                 | 26    | 78,79          |
| 2. | No Hoax             | 33                 | 7     | 21,21          |
| 3. | Not Know            | 33                 | -     | -              |

Students who consider picture 3 as hoax content, also stated that they would not share the content through their social media. While students who think the content is correct, have the intention to share it. This means that students who have made a reading on hoax content can also add more confidence,
that the news is a hoax or not. However what needs to be vigilant is that students who believe in hoax news as correct information will have the potential to spread it through social media.

### Table 7. Students’ Actions Toward Hoax Content (Figure 3)

| No | Students’ Responses | Number of Students | Total | Percentage (%) |
|----|----------------------|--------------------|-------|----------------|
| 1. | Spreading            | 33                 | 7     | 21.21          |
| 2. | Not Spreading        | 33                 | 26    | 78.79          |
| 3. | Criticizing          | 33                 | 0     | 0              |

### 3.2. Cycle II

This cycle is a continuation of the first cycle that has been implemented. In Cycle I there are still students who consider hoax content to be the right information and have the potential to spread it. This is what needs to be addressed in cycle II.

### Figures 4. Hoax Content for Cycle 2

### Table 8. Students’ Responses to Hoax Content (Figure 4)

| No  | Students’ Responses | Number of Students | Total | Percentage (%) |
|-----|---------------------|--------------------|-------|----------------|
| 1.  | Hoax Content        | 33                 | 33    | 100            |
| 2.  | No Hoax             | 33                 | -     | -              |
3. Not Know

All students consider the content in figure 4 to be a hoax. They can know this from the predictions of an earthquake and tsunami. All students already know that until now there are no experts and tools that can predict the occurrence of earthquakes. Students know that earthquake predictions must contain three elements; exact location; the exact time; and how strong its strength is. This implies that, even though they are led by hoax spreaders with religious content, they will not trust hoaxes as long as they have adequate understanding of natural disasters.

Adequate understanding possessed by students has an impact on students' actions in getting hoax news. No more students intend to spread the hoax news. Even existing students dare to criticize content they consider to be a hoax.

| No | Students' Responses | Number of Students | Total | Percentage (%) |
|----|---------------------|--------------------|-------|----------------|
| 1. | Spreading           | 33                 | 0     |                |
| 2. | Not Spreading       | 33                 | 33    | 100            |
| 3. | Criticizing         | 33                 | 2     | 6              |

4. Conclusion

The conclusions that can be drawn from the research that has been done as a disaster learning effort are; (1) the knowledge students have of the potential for natural disasters, does not guarantee that they can understand whether the disaster information is a hoax or not; (2) information about disasters needs to be investigated in groups for people of the same age as middle school students; (3) Students' confidence in a news is directly proportional to their actions to share a content through social media; (4) disaster information is something that needs to be considered in disaster learning.

The conclusion of the research results, then become the foundation for the researcher to give suggestion as follows; (1) the students must be involved in the learning which aims to improve critical thinking skill; (2) Learning about disaster must develop three aspects (knowledge, skill, and attitude) altogether; (3) The teacher needs to monitor students’ activities in using social media in order to avoid hoax about disaster; (4) The related institution such as BMKG, BNPB, LIPI, and others need to conduct cooperation with Kemendikbud (Ministry of culture and education) in arranging the learning about disaster at schools mainly about the truth of the disaster information.

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