Using Toulmin’s Argument Pattern Approach to Identify Infodemics in the Covid-19 Pandemic Era

S Admoko, N Suprapto, Suliyanah, U A Deta, H R Achmadi, E Hariyono, and Madlazim

Physics Department, Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia

E-mail: setyoadmoko@unesa.ac.id

Abstract. The emergence of various web pages and social media platforms that exist in today's digital information era makes it easy for us to access various sources of information and makes us flooded with information. This condition has the potential to result in the loss of our mental health. This is known by the World Health Organization (WHO) as an infodemic which is an excessive amount of information, both true and false, which makes it very difficult for people to find reliable news about the coronavirus, and has increased the spread of fake news, conspiracy theories, worldwide panic and confusion. WHO and all the governments of each country in the world have also carried out various efforts to break the chain of spreading fake news. But the spread of fake news around the world is faster than there is any control over it. Therefore, we need an awareness of each individual in order to equip themselves with the knowledge and skills in identifying fake news. Physics as a branch of science discipline cannot be separated from this fake news. One example of fake news about physics related to Covid-19 is the statement that the thermo gun used to measure body temperature is dangerous to human health because of its laser beam radiation. One alternative way that can be used to evaluate the truth of the news is by assessing the strength of the news argumentation. Toulmin's argument pattern has been widely applied to analyze the quality of an argument, which can be applied in evaluating the truth of a received news content. This paper aims to provide an alternative in identifying the "infodemic" in the Covid-19 Pandemic era in evaluating the correctness of information by applying the Toulmin Argument Pattern. This argumentation pattern distinguishes three fundamental components and three additional components of a coherent argumentative discourse. The main framework of this pattern in analyzing arguments consists of three main components: claim, data, and warrant. Where data provides the basis for determining claims, warrant acts as a logical reasoning bridge that connects data and claims. Three additional components can be added to construct a more complex pattern for analyzing arguments: backings, qualifiers, and rebuttals. Where backing is the part that provides additional evidence to strengthen the warrant. Qualifiers indicate the strength provided by the warrant in relating data to claims, while rebuttals indicate circumstances where the warrant in this condition is no longer valid so that the claim can be rejected.

Keywords: Infodemics, Toulmin’s Argument Pattern, Covid-19 Pandemic, physics fake news
1. Introduction

In the final days of 2019, a cluster of pneumonia cases of unknown origin in Wuhan, China, were reported to China's National Health Commission [1]. One week later, a new coronavirus (CoV) was isolated which is now called Covid-19 and is currently recognized as a public health emergency of international concern [2]. Fifty-nine days after the first case (27 February 2020), CoV-19 has reached 52 countries, with 82,785 infected cases and 2,817 deaths reported [3].

During epidemics, early diagnosis and treatment of infected cases and healthy protection are major concerns, [4] but countries have to face new challenges in controlling the epidemic in the 21st century, which include new lifestyles and fast transportation, causing the global spread of disease; the need for new means of control because traditional tools such as quarantine are no longer acceptable to the population; ensure access to fair care; and “infodemic,” which is defined as the rapid dissemination of all kinds of information about a problem so that the solution becomes more difficult [5]. Infodemics are a rebellious challenge along with the increasing use of social media and communication technology [6]. Covid-19 appears to be a true social media infodemic, compared to previous viral outbreaks (SARS and MERS). Concerns around Covid-19 in particular are exaggerated by social media. This has led to the spread of disinformation at an incredible pace, creating an environment of growing uncertainty that has fueled anxiety and racism both in person and online.

WHO has also implemented a Risk Communication and Community Engagement (RCCE) program on Covid-19, which divides countries into the following three categories: countries without cases, countries with one or more cases, and countries with ongoing Covid-19 transmission. RC is a dynamic, two-way art-science process that evolves as the outbreak develops. RC should be used as a strategy to minimize the spread of the epidemic by filling the ever-felt gap between what experts think they need to know and what they want to know [7]. The main element of RC is trust-based communication focused on people's perceptions of risk. The goal of RC is to minimize fear by making uncertainties clear as much as possible, to help people become prepared for changes in their routine lives in times of epidemics [8]. RC consists of three elements: first, honestly and clearly talk about what you know and what you don't know; second, listen to the community when it talks about their fears and perceptions; and third, managing rumors and infodemics as quickly as possible.

Meanwhile, the Ministry of Communications and Information of the Republic of Indonesia (KOMINFO RI) [9] suggested, what can be done to break the chain of spreading fake news, there are 4 things that need to be done, namely: (1) identify whether the news received is fake news or not. In identifying whether the news we receive is fake news or not, we need to recognize the characteristics of fake news well. (2) If we come across fake news, don't get involved with it. Don't comment and don't share further. Doing so will only help make the post more popular. (3) If the hoax is shared on social media, please report the post to the platform. If we know people who share fake news, send them a private message and let them know that the information they posted is likely fake. Send them these tips so they understand the risks (4) Contribute to sharing official information. Share updates from trusted official websites reporting Covid-19.

Among the four things that need to be done in breaking the chain of spreading fake news above, the first step is to identify whether the news we receive “fake news or not?” is a key step between the four steps. If a news is seen as a preposition of a claim, then we can judge the news based on the strength of the arguments provided by the news. Toulmin [10] provides a way for us to evaluate an argument, in which he argues that arguments need to be analyzed using a format that is richer than the traditional way with formal logic in which only premises and conclusions are distinguished. He has proposed a pattern for argument layout which in addition to data and claims differentiates between warrant, backing, rebuttal and qualifier. Through this Toulmin argumentation pattern, we will be able to judge the truth of news or information based on the quality of the six argument components provided by the news. Furthermore, how Toulmin's argumentation pattern in assessing the truth of information will be discussed in the following sections.
2. Literature Review

2.1. Infodemic in the Covid-19 Pandemic era

With the emergence of various social media platforms and networks that exist in the current digital information era, it is easy for a person to access various sources of information and be flooded with information that has the potential to result in loss of mental health. This is known by the World Health Organization (WHO) as an infodemic which is an excessive amount of information, both true and false, which makes it very difficult for people to find reliable news about the coronavirus, and has increased the spread of information. fake, conspiracy theories, worldwide panic and confusion. The ongoing digitalisation makes infodemics a very increasing challenge for researchers as the use of popular digital communication technology and social media has substantially accelerated the spread of information: This trend is also reflected in the spread of misinformation related to the Covid-19 pandemic [11] [12] [13]; this has caused widespread fear, panic and uncertainty around the world when compared to the infodemics that emerged from previous pandemics [14] [15].

The WHO social risk communication and social media teams or the Indonesian Ministry of Information and Information are working 24 hours a day to track and respond to rumors, misinformation and myths "to identify the most common rumors that have the potential to harm public health, such as preventive measures or wrong remedies. " They are trying to counter this hoax by providing evidence-based information. However, false information is making the way around the world faster than the virus in such a way that the WHO has "declared misinformation and fear to be some of the biggest challenges they face with this new coronavirus."

Based on an official report issued by the Ministry of Communications and Information of the Republic of Indonesia on March 13, 2020, it has submitted 204 hoax issues about the corona virus. This report has been clarified with the address of the news source, explanation of the disinformation about the news and confirmation from the authorities regarding the news information. This is done with the aim of breaking the chain of spreading fake news about Covid-19 so that solutions to handling Covid-19 become easier to do.

Some of the reasons why this disinformation and misinformation around Covid-19 can occur, including the spread of false information from: (1) individuals as criminals seeking to gain profit, (2) state and state-supported actors seeking to advance geopolitical interests and (3) opportunists who wish to discredit official sources. Spreading misinformation about Covid-19, even though it is not always a criminal act, has a very serious impact, endangers public health and directly affects people's lives. This could put people at risk for: (1) promoting counterfeit products and services (eg fake Covid-19 tests and vaccines) (2) promoting false feelings of security (eg misleading information about treatments) and (3) promoting suspicion of official guidelines and sources that we should trust.

The government, in this case KOMINFO RI, has provided several pointers to avoid this fake news, including doing the following things in evaluating the news we receive:

1. Watch out for provocative titles

Hoax news often uses sensational, provocative headlines, for example by directly pointing fingers at certain parties. The content can also be taken from official media news, it's just that it is altered to create a perception according to what the hoax maker wants.

Therefore, if you come across news with provocative titles, you should look for references in the form of similar news from the official online site, then compare the contents, whether they are the same or different. That way, at least you can reach a more balanced conclusion for the reader.

2. Pay attention to the website address

For information obtained from the website or including a link, pay attention to the URL address of the site in question. If it comes from a site that has not been verified as an official press institution - for example using a blog domain, then the information is doubtful.

According to the records of the Press Council, in Indonesia there are around 43,000 websites in Indonesia that claim to be news portals.

Of this number, less than 300 have been verified as official news sites. This means that there are at least tens of thousands of sites that have the potential to spread fake news on the internet that must be watched out for.
3. Fact check
Notice where the news comes from and who is the source? Is it from an official institution such as the Ministry of Health, Kominfo, Corruption Eradication Commission or Indonesian National Police? It's best not to be quick to believe if information comes from mass organization activists, political figures, or observers.

Pay attention to the balance of news sources. If there is only one source, the reader cannot get the full picture.

Another thing that needs to be observed is the difference between news based on facts and opinions. Facts are events that occur with testimony and evidence, while opinions are the opinions and impressions of news writers so that they have a tendency to be subjective.

4. Check the authenticity of the photo
In today's digital technology era, not only text content can be manipulated, but also other content in the form of photos or videos. There are times when fake news creators also edit photos to provoke readers.

The way to check the authenticity of a photo is by using the Google search engine, namely by dragging and dropping it into the Google Images search field. The search results will present similar images on the internet so they can be compared.

5. Join an anti-hoax discussion group
On Facebook there are a number of anti-hoax fanpages and discussion groups, for example the Anti-Slander, Incitement and Hoax Forum, the Indonesian Hoax Buster Fanpage & Group, the Indonesian Hoaxes Fanpage, and the Lifeboat Group.

In these discussion groups, netizens can also ask whether information is a hoax or not, as well as see the clarifications that have been given by other people. All members can contribute so that the group functions like a crowdsourcing that uses the power of many people.

Besides the method suggested by KOMINFO RI above, there is another way that can be used to evaluate the truth of the information we receive, namely assessing the strength and weakness of the news arguments we receive.

2.2. Toulmin’s Argument Pattern
The linguistic viewpoint of the analysis of infodemic speech (including fake news, propaganda, troll messages, etc.) focuses primarily on linguistic signals that convey the factuality, claims, opinions, beliefs, or status of beliefs. Early work to distinguish liars from truth-givers attempted to identify those cues directly (for example, liars use fewer self-references and more other references, avoid causal terms, use more negative emotion words, and reveal characteristic syntactic patterns).

An alternative way of testing the truth of a news statement does not focus on direct linguistic cues but is rooted in ancient rhetoric (syllogism) and concentrates on discourse pragmatics. This approach is based on the great work of Stephen E. Toulmin [10]. He introduces the so-called Toulmin’s Argument Pattern which distinguishes three fundamental components and three additional components of coherent argumentative discourse. According to Toulmin, claims (theses, conclusions) can be derived from information (data) by utilizing inference rules (warrants). These standard deductive reasoning schemes can then be supplemented with supporting evidence (supports, usually common norms, sets of values, moral standards, etc.) adding additional evidence mostly to warrants but also to data. The strength or certainty of the information can then be adjusted by the modal qualifier at each stage (such as “most”, “maybe”), while exclusive conditions (rebuttals) can be declared to indicate exceptions to the general rule. Due to its high level of idealization, Toulmin's Pattern of Argument has driven research in many fields - from formal logic and artificial intelligence [16] [17] to pragmatic-focused linguistics [18] and computational linguistics [19] [20].
Toulmin’s argument pattern has been widely applied to analyze the quality of an argument, which we can apply in evaluating the truth of the information we receive. Some experts who apply the Toulmin argumentation model include Erduran and colleagues [21], Clark and Sampson [22] and Osborne and colleagues [23].

In his book titled The Uses of Argument [10], Toulmin has identified six key elements for analyzing the pattern of an argument: claim, data, warrant, qualifier, rebuttal, and backing. An initial skeleton of a pattern for analyzing arguments is composed of the three main elements: claim, data, and warrant. Claim (C) is the “conclusion whose merits we are seeking to establish” and data (D) is the “facts we appeal to as a foundation for the claim” [10]. While data presents what a specified claim is based on, a warrant acts as a bridge between data and claim. Warrants may be written very briefly, such as ‘If D, then C,’ or be made more explicit, such as ‘Given data D, one may take it that C.’

Figure 1 lays out this fundamental pattern of an argument, along with an example in parenthesis. The relation between the data and the corresponding claim is symbolized with an arrow, while the warrant that authorizes us to take a step from the data to the specified claim is indicated immediately below the arrow [10].

![Figure 1. A Basic Skeleton of Toulmin’s Argument Pattern [10]](image)

It might not be sufficient to simply specify claim, data, and warrant to establish a sound argument. Specifically, Toulmin argued that, “warrants are of different kinds, and may confer different degrees of force on the conclusions they justify.” It may thereby be necessary for one to provide an explicit reference to the degree of force which a particular piece or set of data confer on a specified claim in virtue of a warrant. Built upon the basic skeleton as shown in Figure 1, three additional elements can be added to compose a more complex pattern for analyzing arguments: qualifiers, rebuttals, and backing. Qualifiers indicate “the strength conferred by the warrant” on connecting the data to the claim, while conditions of rebuttal indicate “circumstances in which the general authority of the warrant would have to be set aside” [10].

Alternatively, backing presents statements that provide support for warrants. Figure 2 presents a typical complex skeleton of a pattern for analyzing arguments, which contains all six elements, with the example in parenthesis.
The Data consist of certain facts that support the Claim. The Warrant is an inference license according to which the Data support the Claim, while the Backing provides in turn support for the Warrant. A Rebuttal provides conditions of exception for the argument, and the Qualifier can express a degree of force that the Data give to the Claim by the Warrant.

According to Verherij [24], good points of Toulmin’s work were his emphasis on the following:
1. In argumentation, the warrants of arguments (in the sense of inference licenses) can be at issue and their backings can differ from domain to domain.
2. Arguments can be subject to rebuttal in the sense that there can be conditions of exception.
3. Arguments can have qualified conclusions.
4. Other kinds of arguments than just those based on the standard logical quantifiers and connectives (for all x, for some x, not, and, or, etc.) need to be analyzed.
5. Determining whether an argument is good or not involves substantive judgments and not only formal.

2.3. Evaluating the truth of the news based on Toulmin’s Argument Pattern
The use of Toulmin's Argument Pattern as a tool to evaluate the truth of a news will place TAP as a perspective in analyzing parts of the news. Where the news sections will be grouped into six argumentation components, namely data, claim, warrant, backing, qualifier and rebuttal. The application of TAP to teach truth this time will be applied to news related to physics content and also related to Covid-19, namely news related to the hand gun thermometer.

This news comes from a YouTube channel with the link: [https://youtu.be/L79jhm8PmSM](https://youtu.be/L79jhm8PmSM) in this video upload there are two people talking and saying that the hand gun thermometer can damage brain tissue. "Because the hand gun thermometer is to check hot wires. The laser is used to check hot wires not for human temperatures," said one of the interviewees in the
video. "They sell equipment, but we are being fooled. Our heads are shot by lasers, we don’t know how the impact on the brain structure is," he added. Based on the news above, the argumentation components of the news can be mapped as the main argumentation diagram below:

**Figure 3. Application of A Complex Skeleton of Toulmin’s Argument Pattern** [10]

Based on the grouping of the argumentation components from the news in Figure 3, an assessment of each of these components can then be carried out as follows:

**Data**
The use of thermo guns is widely used in various public places such as super markets and office buildings.
**Data Assessment:**
The argumentation component for the data presented is correct and is a fact obtained based on existing facts.

**Claim**
A hand gun thermometer that is used pointed at the forehead can damage brain tissue
**Claim Assessment:**
The argument component for the climax presented is not supported by a warrant and a strong backing where the claim should be that the thermo gun used is aimed at the forehead is not harmful to health and does not damage brain tissue

Warrant

1. Because the thermometer's hand gun to check hot wires.
2. The laser is used to check hot cables not for human temperatures
3. Our head is shot by laser, we don't know how the impact on the brain structure

Warrant's Assessment:
The given warrant is not in accordance with the facts and working principles of the hand gun thermometer:
1. Hand gun thermometer is a device that actively receives infrared radiation emitted by an object, a hand gun thermometer is not a measuring device that emits radiation to the object to be measured, then receives reflected radiation that is re-emitted from the object.
2. The use of a laser in some old hand gun thermometers is used to indicate which point the temperature will be measured. Some of the latest hand gun thermometers, especially for body temperature, don't use lasers, they are afraid of being dangerous if they hit the retina of the eye.
3. The laser on the hand gun thermometer only functions like a laser pointer, its low energy does not cause damage to the organs it is exposed to and is dangerous to the brain.

Backing

1. The youtube link address https://youtu.be/L79jhm8PmSM is not an official institutional address.
2. The speaker is an economist

Backing Assessment:
1. This news is of doubtful content because it does not come from an official address.
2. The source of this news does not have a specialization in the field of physics in the application of the hand gun thermometer, so that the statement of the claim that he delivers is doubtful.

Qualifier

It can be estimated the impact of using a hand gun thermometer

Qualifier Rating:
The estimated impact given is only an assumption that is not based on a strong warrant and backing

Rebuttal

Except for not using a laser, the thermo gun will be safe to use, even though it is pointed at the forehead, it does not damage brain tissue.

Backing Assessment:
The conditions applied to this rebuttal have been met by the working system of the thermo gun. Where in the working system the sensor on the thermo gun only actively receives infrared radiation emitted by objects but does not emit laser light.

Based on the results of the assessment of the content of the news on each component of the arguments above, it can be seen that the level of truth of the news which states "Hand gun thermometer which is used directed at the forehead can damage brain tissue" is very low. This can be seen from the results of the assessment for each component, almost all of them get negative results, only the data can be declared true. Where claims are not supported by correct theoretical knowledge of science, those who convey the claim do not have the appropriate scientific background and expertise to the substance of the news. Therefore, we can conclude that the news is fake news and deserves to be rejected

3. Discussions

Assessment of the truth of a news with the TAP approach above is done by testing the truth of each component of the news argument. This will work best if the characteristics of the six components of
argument (data, claim, warrant, backing, qualifier, and rebuttal) are well recognized. In detail, the steps in testing the truth of a news can be done as follows:

1. Ensuring the existence of the news is indeed found at the source mentioned at the source address
2. Looking for information about the identity of the person who makes the claim is clearly known, including the educational background and expertise of the source of the news claimant.
3. Identify each component of the argument from the news into Toulmin's argumentation pattern and describe all components of this argument into a diagram of Toulmin's argumentation pattern, so quickly the news argument can be understood.
4. Examine the data used whether it is in accordance with the facts and can be confirmed from other sources.
5. Testing the warrant by examining the logic of the syllogism given whether it is connected between the variables that do have the correct causality based on correct scientific theory, principles or laws.
6. Testing the backing by looking at the credibility of people conveying the claim of the news, whether the scientific background of the claim maker is in accordance with the scientific substance of the claim he makes. Whether the claim that is made has been based on the theory, principle or law of correct science.
7. Testing the qualifier imposed by the examiner by observing the limitation of the requirements for the validity of the claim given whether it is correct
8. Testing the rebuttal by looking at the terms and conditions given will result in counter claims that have been based on true and strong warrant and backing.
9. Make conclusions based on the results of testing all components of the argument to make a decision whether the news received is true news or fake news.

From the description of the steps for testing the truth of the news above, it is clear that the use of this approach does not rule out the methods that have been given by the government (Kominfo) in recognizing fake news. All the methods suggested by the government (Kominfo) can be accommodated in this approach and can be included in the various arguments for the existing TAP structure. This shows that by using the TAP approach in assessing the truth of the news, it is possible to place news components more precisely into the structure of a complex, structured and systematic argumentation pattern so that it is easy to understand.

4. Conclusions

Based on the description above, information can be obtained that by using the TAP approach as a truth-tester of an infodemic news, several facilities and advantages will be obtained including: (1) the assessment of the truth of the news does not ignore other ways, precisely by using the TAP approach, other ways can constructed into the approach pattern. (2) the placement of the news component is more appropriate into the structure of a complex, structured and systematic argumentation pattern so that it is easy to understand. (3) the assessment of the truth of the news can be more detailed into all components of the argument from the news that is being tested (4) the assessment of the news is not only based on the sentence structure on the construction of the arguments given but also emphasizes the substance of the news content that is carried out when assessing the warrant and the backing of the news. With the various advantages mentioned above, it can be concluded that this TAP approach is very suitable to be applied to test the truth of a news.

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