

# Network Analysis of News Spread on YouTube in Korea: Focus on the Death of Kim Jong-un

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**Abstract:** In a situation where social media has established itself as a platform for the spread of fake news, this study raises the need to investigate the role that various news producers actually coexisting on social media play in the process of spreading fake news. This study collected data from YouTube videos NodeXL, useful for analyzing user behavior on social media was utilized -to collect YouTube videos that were highly relevant to rumors of Kim Jong-un's death. This study classified news producers into mainstream media, personal current affairs channels, and personal general channels, and looked into which groups had influence before and after the discovery of fake news. Mainstream media served as a transmitter of fake news, personal general channels and personal current affairs channels unrelated to political issues were found to have participated in spreading rumors of Kim Jong-un's death. Even after the rumor was debunked, private channels still spread rumors of Kim Jong-un's death. Even after it was confirmed that Kim Jong-un was alive, several news producers were found to be actively involved in the production and spread of fake news. This research suggests that misinformation can persist long after it has been discredited in public discourse, highlighting the need for robust fact-checking mechanisms across private channels as well as mainstream media.

**Keywords:** Social media; Diffusion; Network analysis; Fake news; Youtube

## 1. Introduction

In political communication, social media serves as a platform for producing various political information in a highly interactive environment and serves as a platform for users to easily acquire political information at the same time (p. 42) [1]. According to the results of the 2021 Social Media User Survey conducted by the Korea Press Foundation, YouTube has established itself as a channel for acquiring news and current affairs information” in Korean society as well as a channel for spreading fake news (pp. 78–79) [2].

Prior to the advent of social media, mainstream media was the main body that produced and disseminated agendas. In social media, as opinions expressed by individuals receive attention (agenda of readers) and mainstream media reports on readers’ agenda (media agenda), a pattern of readers’ agenda is spreading [3]. In this process, issues do not spread sequentially, but typically and explosively spread simultaneously [4]. Gilafi et al. (2022) argued that the emergence of social media in the process of setting political agendas weakened the gatekeeping authority of traditional media and increased the capacity of various actors to shape agendas [5]. The authors analyzed the connection among the actual traditional media, social media, and party agendas. The result indicated that the agendas spread while influencing one another, and no specific agenda was seemingly dominant. However, in the case of environmental issues, the social media agenda of a party was found to lead the issue more than did the traditional media agenda.

After the advent of social media, various news producers manufacture news on social issues, which presents the advantage of guaranteeing the diversity of opinions in society as a whole. Alternatively, it raises a problem, that is, ensure the quality of messages is difficult (pp. 73–79) [6]. Importantly, the production and spread of fake news have also accelerated with the advent of social media (pp. 79–97) [7]. The reason is that anyone can produce information without professional knowledge, and information spreads quickly through

sharing in digital social networks. In the process of spreading information through digital social networks, individuals are involved in the spread of fake news through their immediate responses (pp. 31–34) [7].

Studies that examine social media as a platform for disseminating false information explain that fake news spreads through confirmation bias [8] in which people seek information consistent with their beliefs and attitudes [9]. Scholars purport that conservative users are more exposed to conservative posts through the recommendation algorithm and are separated from progressive users while being influenced by conservative opinions [10]. In this process, social networks lead to political polarization by connecting like-minded people (pp. 288–296) [7].

In this situation, this study focuses on news producers to determine which one influences the process of the formation of social opinion as political information spreads through social media. Specifically, This study examines the degree of influence of mainstream media on YouTube, which has established itself as a medium for acquiring news and information on current affairs. This study intends to determine whether or not personal media, in fact, exerts a major influence. This study investigates which entities spread messages delivered by news producers before and after the identification of fake news on YouTube, which is also considered a platform for spreading fake news. In line with the trend during this digital age in which news consumers do not simply consume but also actively participate in the process of forming and disseminating public opinion [11], this study particularly aims to examine the process of sharing and disseminating news through social media.

The development of communication technology has rendered possible the production of news on various platforms and has enabled individuals to actively consume news. The diversified platforms have also influenced the content of messages produced. Shoemaker and Reese (1996) have explained the factors that influence news content using a layered model. Media content is influenced by a range of different dimensions, from the personal level, such as gender, level of education, religion, and the race of the reporter (journalist); to the organizational level, such as news practices and the nature of news organization; to the social level, such as cultural characteristics of the society in which the news organizations belong; to the extra-organizational level, such as government, advertisers, and audiences; and to the broader national and ideological level. [12]

Deuze (2003) highlighted the emergence of various online media due to changes in the news production environment [12]. The degrees of coordination and control of editors and whether or not users can participate in news production were the two axes of the study. Moreover, it classified online media into that with high control, high user participation in news production, and with moderate levels of editorial coordination and control (index-type media) such as news search sites. The current study categorized social media on the basis of the classification of Deuze [13].

First, examples of media with high levels of editorial coordination and control are news organizations in which educated journalists write articles and select news through gatekeeping; the social media of traditional media can be considered to belong to this category. Therefore, the current study labeled the social media operated by traditional media as media social media (hereafter, media). Alternatively, if the levels of coordination and control of the editor are low, and user participation in news production is high, this category can be regarded as a personal channel [13]. According to the nature of the topic, personal social media that focuses on current issues is called personal current affairs social media (hereafter, personal current affairs). The other types of personal social media are named personal general social media (hereafter, personal general social media).

This study provided discusses the impact of communication technology on news production and consumption in various platforms, particularly within the context of social media. It also addresses the influence of factors at different levels on the content of news produced. The first of the key points is the influence of news content. The development of communication technology has led to the production and consumption of news across diverse platforms, which play a role in formation of the content of news messages. The factors that influence news content can be understood using a layered model that includes personal (reporter characteristics), organizational (news practices and organizations), social (cultural influences), and extra-organizational (governments, advertisers, and audiences) dimensions. The second is the focus on the level of news organizations. The study focuses on this aspect as a factor that influences news content, which involves considering differences in news produced by organizations with professionally trained journalists, strict gatekeeping, and editorial control compared with those with less control. Lastly, the study considers traditional versus online media. Traditional media, such as newspapers and broadcasting, practice strong editorial control and adherence to journalistic values such as objectivity and accuracy. The emergence of online media has led to changes in the news production environment.

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This study focused on the value judgment and interaction of users in terms of news to examine the diffusion process of produced news. First, determining whether or not a news is true is easy. Thus, the rumor of the death of North Korean leader Kim Jong-un, which was one of the news materials actively consumed in Korean society, is suitable for analysis on fake news or misinformation.

This study reviewed previous research related to the spread of fake news on social media and discussed data collection methods and research results using NodeXL.

## 2. Diffusion of fake news on Social Media

The rapid spread of fake news through social media platforms in recent years deserves attention due to its significant impact on society. Different news producers on social media play different roles in the spread of fake news, and each contributes to the spread and perpetuation of misinformation.

First, mainstream media, which has traditionally been considered an authoritative source of information, may unintentionally become a medium that transmits fake news. Competitive pressures to publish breaking news quickly can result in insufficient fact-checking and the spread of unverified information. For example, the case of Kim Jong-un's health abnormalities shows how mainstream media such as CNN can contribute to the spread of false information by reporting speculative information without thorough verification. When mainstream media publish such news, they gain legitimacy and wider reach due to their established credibility, thereby accelerating the spread of misinformation across various platforms [15].

Personal current affairs channels on social media frequently produce content that blurs the line between factual reporting and opinion, contributing to the spread of fake news by prioritizing sensationalism and engagement over accuracy. Research has shown that these channels can have a significant impact on public perception by amplifying unconfirmed stories, often using emotional language and visuals to drive views and shares [16].

As seen in the rumors surrounding Kim Jong-un's death, continued references to debunked stories highlight the role of private channels in keeping fake news alive in public discourse long after they have been discredited [17].

Our findings on the spread of fake news highlight the importance of strong fact-checking mechanisms for all types of news producers. Mainstream media must strengthen their editorial standards and verification processes, while social media platforms and private channels require more stringent monitoring and fact-checking interventions [18].

## 3. Materials and Methods

Materials and Methods should be described with sufficient details to allow others to replicate and build on published results. Please note that publication of your manuscript implicates that you must make all materials, data, computer code, and protocols associated with the publication available to readers. Please disclose at the submission stage any restrictions on the availability of materials or information. New methods and protocols should be described in detail while well-established methods can be briefly described and appropriately cited.

Research manuscripts reporting large datasets that are deposited in a publicly available database should specify where the data have been deposited and provide the relevant accession numbers. If the accession numbers have not yet been obtained at the time of submission, please state that they will be provided during review. They must be provided prior to publication.

Interventionary studies involving animals or humans, and other studies require ethical approval must list the authority that provided approval and the corresponding ethical approval code.

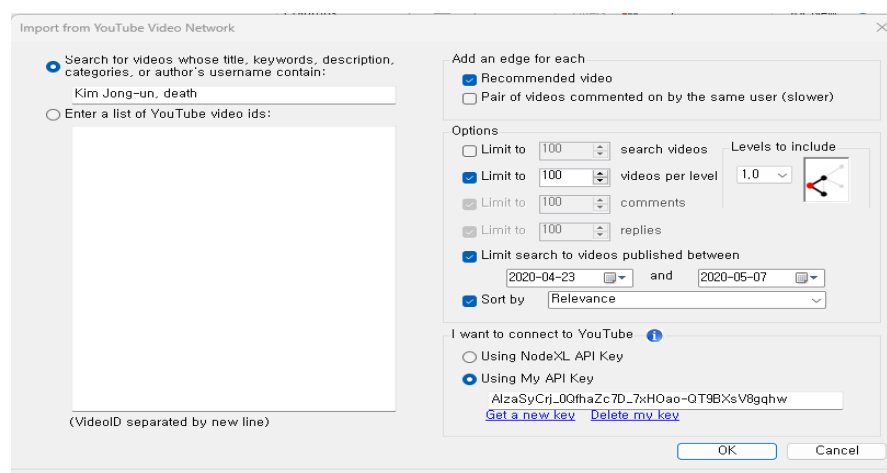
### 3.1 Data collection

To quantitatively view the process of the formation of public opinion within social media, in this study, a YouTube-based network analysis was conducted using NodeXL. NodeXL (Node Excel) is a robust network analysis and visualization tool designed as an Excel add-in, offering a familiar interface for users to input and analyze data. It includes powerful tools for network visualization, featuring a range of layout algorithms (e.g., force-directed layouts) to facilitate understanding of the structure and relationships within intricate networks.

Scholars view the ripple power of YouTube channels as a relative influence in the network; thus, the study intends to identify which videos exert an impact on the same issue. Prior to the discussion of the results for each issue, network analysis using NodeXL is explained as follows.

First, when a search word is entered, a video becomes a collection target if content related to the search word is evident in the title and description of the video. Importing a video from NodeXL can be conducted using two methods. The first is collecting two videos linked by the same commenter. For example, if A posts a comment on videos 1 and 2, then both videos are collected. The second is collecting recommended videos for the searched videos. Depending on its objective, a study can select one or two conditions and load the video.

Video search conditions in NodeXL consist of (1) collecting recommended videos or videos by the same commenter, (2) setting the level of video connection (levels 1, 1.5, and 2), and (3) setting the search period. Level of connection indicates a step from one node to another node in the network. Level 1 pertains to collecting data in the first step, and level 2 denotes gathering data by executing up to two steps. Collecting data in the first step indicates loading only one node and directly connected nodes. Executing up to two steps pertains to bringing up the connection between a node and a directly connected node. Figure 1, this step can be set to level 1.5, which shows the relationship between friends connected to the first level if a connection exists (pp. 231–232) [12].



**Figure 1.** Example of level of data collection of YouTube videos using NodeXL

### 3.2 Rumor of Kim Jung-un's death

In the case of videos related to the health anomaly of Kim Jung-un, the first period of videos covered the time when Kim Jung-un's health anomaly was reported on the Central News Network (CNN) and when the news appeared on North Korea's Chosun Centru\ TV on May 1 in 2020. The second period covered the time after the rumor of Kim Jung-un's death was proved to be fake news, which is set as the 1st to the 9 on May in 2020. The study collected 509 videos for the first period, which Kim Jung-un, health problems, and death rumors as search terms. For the second period, the search terms were Kim Jung-un, fakes, and doubles. Researchers can collect data by setting various conditions according to the purpose of the study, and search results may vary according to relevance, date, number of views, and title. The collected data on YouTube videos contain author, publication date, title, description, number of views, number of comments, likes, and video URL information

Materials and Methods should be described with sufficient details to allow others to replicate and build on published results. Please note that publication of your manuscript implicates that you must make all materials, data, computer code, and protocols associated with the publication available to readers. Please disclose at the submission stage any restrictions on the availability of materials or information. New methods and protocols should be described in detail while well-established methods can be briefly described and appropriately cited.

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The reason why the theory of Kim Jong-un's death was chosen is that it did not receive much attention when it was first raised but was later confirmed as true through CNN's report, making the media a driver in the spread of fake news. This case was used to empirically identify the role of the media in the process of spreading fake news, and I decided it was appropriate. The rumor surrounding Kim Jong-un's death exemplifies a significant deviation in the usual supply of news. Given that the veracity of the theory hinges on official confirmation from a specific date onward, it becomes straightforward to discern the stance of news producers based on their reports before and after fact-checking. Moreover, in this case, there is minimal room for consumer divergence beyond accepting or rejecting the provided news, highlighting how differences among providers can strongly influence perceptions. Essentially, the Kim Jong-un death theory can be categorized as either true or false, with positions largely limited to acceptance or rejection, making it an ideal issue for examining variations based on news producers.

### 3.3 Network analysis with NodeXL

The study used the following method for interpreting the YouTube video network generated as a result of analysis using NodeXL. A dot in the network picture, that is, a node, represents a single YouTube video. If the number of views exceeds a certain level, then the author of the node (video) is displayed in the graph to reveal who produced each video. For example, if a specific author (A) has produced five videos, which is considered high, then the node in the graph is marked as A. An edge is a line that connects between nodes (videos), and connectivity indicates the number of lines connecting the nodes. If a node has six lines, then degree of connection is 6. If nodes 1 and 2 are connected, then the person who watched video 1 also watched video 2. The connection of the YouTube video network presents a direction, which is determined by the order of watching the videos. In other words, arrows in the network appear in order of which video was recommended first.

For example, a line from videos 2 to 1 indicates that the person who watched video 2 also watched video 1. Based on directionality, in-degree centrality denotes the number of edges entering a node, whereas out-degree centrality is the number of edges exiting a node. Betweenness, closeness, and eigenvector centrality are also used to explain the central role of a node together with connection centrality (pp. 40-42) [19]. Specifically, betweenness centrality is the average of the sum of the distances between one node and the most directly connected nodes. If the betweenness centrality, which is a measure of the distance between directly connected nodes in the network, is high, it can be said that there are many direct connections with other nodes in the network.

In addition to direct connections, information flows indirectly through the network. Neighbor centrality is a value that reflects the flow of such information, and a few people collect a lot of information using only a few steps. In addition to people who directly know each other, it is through people who know it across the street.

A value that reflects this phenomenon is adjacency centrality, which denotes the average of the values of all connection distances, including connections between one node and directly connected nodes. Depending on the properties of the network, difference in the value of adjacency centrality may be greater than that of betweenness centrality, and the value of adjacency centrality may be important depending on the purpose of the study.

If a specific node is connected to an influential node in the network, then the value of prestige centrality is seemingly large. This study examines the characteristics of the videos and focuses on the values of inward and outward connectivity and betweenness centrality, which exhibited differences as a result of network analysis.

In a network, a video may be located at the core or at the periphery. As a video node actively interacts with other video nodes in the network, it is located at the center. The distance between nodes in a network is expressed based on the number of interactions between two nodes, and researchers can display the relationship between nodes in a network centered on a specific value. The stronger the relationship with a particular node than other nodes, the shorter the distance between nodes in the network.

Based on the discussion so far, this study set the following research questions.

RQ 1 What are the patterns shown in the diffusion of political news on YouTube, before and after the discovery of fake news?

RQ 2 In the diffusion of political news on YouTube, who produce the news before and after the discovery of fake news?

#### 4. Results

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation as well as the experimental conclusions that can be drawn.

##### 4.1 Number of videos by news producers

This study classified news producers who uploaded videos related to Kim Jung-un's death. Table 1 shows that out of 509 video authors, 239 were personal general videos, which were identified as channels addressing various topics such as stocks, North Korean news, history, and entertainment. Alternatively, 196 and 74 of these video authors were media outlets and individual preview companies, respectively. For the second period, the proportion of media companies was 32.2%, which is slightly less than that for the first period (38.5%). In the case of the general public, compared with 47.0% in the first period, the study found that it has slightly decreased to 42.9%. In the case of individual suggestion, it increased from 14.5% in the first period to 24.9% in the second period. The study proposes that the reason behind the increase is that the number of private preview operators who actively expressed their opinions about the death of Kim Jung-un was found to be false.

**Table 1.** Comparison of the number of videos by channel type before and after Kim Jung-un's death was considered fake news (%)

Type of channel	Period		Total
	First	Second	
Press channel	196 (38.5)	57 (32.2)	253 (36.9)
Personal current Affairs channel	74 (14.5)	44 (24.9)	118 (17.2)
Personal general channel	239 (47.0)	76 (42.9)	315 (45.9)
Total	509 (100.0)	177 (100.0)	686 (100.0)

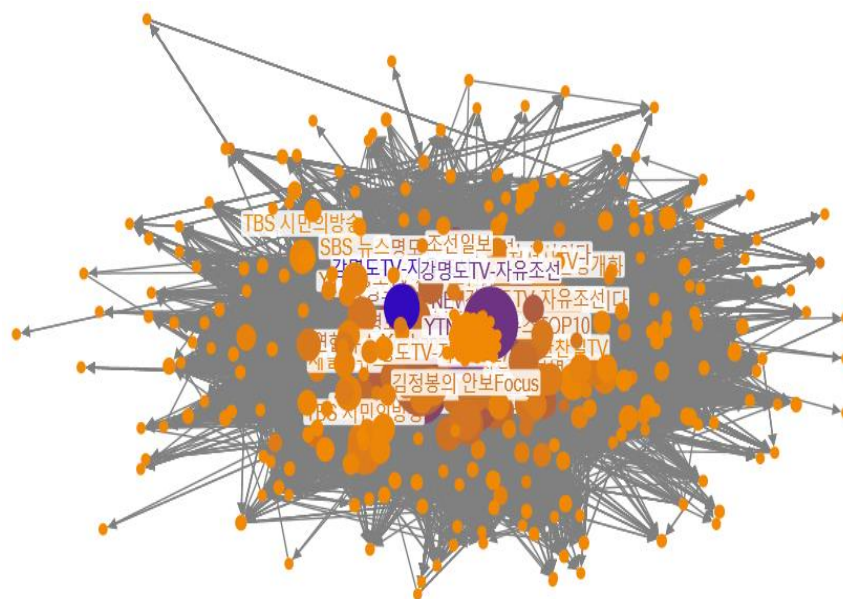
##### 4.2 Results of YouTube video network analysis before and after the fake news

Figure 2 depicts the results of network analysis regarding the death rumor of Kim Jung-un. Node size represents the number of views, and purple indicates a higher betweenness centrality value. In the first graph, only video authors with more than 300,000 views (approximately the top 40) were displayed. Considering the distribution of views among the collected videos, Gangmyeongdo TV obtained the highest number of views (1,698,688) and a large betweenness centrality value, which indicates its central position in the network. Notably, Gangmyeongdo TV uploaded a video on April 21 entitled "Kim Jung-un, sudden death?" and mentioned reports from CNN regarding Kim Jung-un's critical condition. The video also claimed to hold information from Korean intelligence authorities that suggest Kim Jung-un's sudden demise. Media companies, such as TBS(Transportation Broadcasting System), CBS(Christian Broadcasting System), JTBC (JoongAng Tongyang Broadcasting Company) News, and TV Chosun also produced centrally located YouTube videos.

In the second period, only video authors with more than 50,000 views (top 48) were displayed given the distribution of views among the collected videos. Even after being identified as fake news, the study observed that a video from Gangmyeongdo TV-Free Joseon remained central in the network with a relatively large median centrality value. Gangmyeongdo TV continued to promote the theory of Kim Jung-un's doppelgänger and raised doubts about his existence, while Seong Chang-gyeong TV, who garnered many views, questioned the authenticity of Kim Jung-un's pictures. Alternatively, YTN, a media company, faced criticism for spreading fake news related to the rumor of Kim Jung-un's death, as reports confirmed that Kim Jung-un was alive.

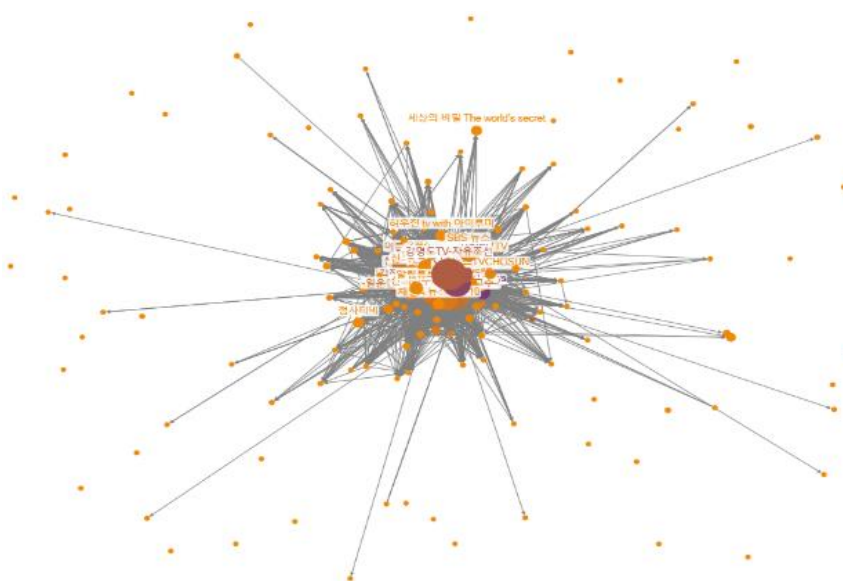
To summarize the network results of the first and second periods, during the initial phase when Kim Jung-un's death was undisclosed, various media outlets, current affairs social media, and the general public reported speculative information about Kim Jung-un. However, after the rumor was debunked as fake news in the second period, news media focused on criticizing and debunking the false information, while the general public denied Kim Jung-un's existence by suggesting the presence of a double, which questions the authenticity of the released videos and references ongoing investigation conducted by intelligence authorities in the United States.

In this study, top influential channels uploaded several videos claiming Kim Jong-un's death, resulting in a high number of views. Initially, personal channels run by North Korean defectors and those with conservative leanings ranked highest in influence. In the second stage, after it was determined to be fake news, channels asserting 'Kim Jong-un is alive' gained the top influence.



Created with NodeXL (<http://nodexl.codeplex.com>)

(a)



Created with NodeXL Pro (<http://nodexl.codeplex.com>) from the Social Media Research Foundation (<http://www.smrfoundation.org>)

(b)

**Figure 2.** Results of YouTube video network analysis before and after fake news((a)first phase, (b) the second phase)\*

\*The author is displayed only when the number of views is more than 300,000 in the first graph and displayed only when the number of views is more than 50,000 in the second graph.

### 4.3 Results of group network analysis of news producers

#### 4.3.1 group network analysis by news producer

Figure 3 displays the analysis of channel operators, which were categorized into media companies, individual current events, and general individuals. Blue nodes represent general individual groups, sky blue represents the media, and green represents individual current affairs groups.

Media videos exhibited several nodes of similar sizes, which indicate user interest in news related to Kim Jung-un's death. However, interactions between videos were inactive for personal and general videos, except for a few videos with more than 100,000 views. This result suggests that personal and general channels, which do not specialize in current affairs, do not attract much viewership for related videos, because they cover various topics.

In the second period, the study noted an increase in the number of personal preview video channels along with an increase in views. Consequently, the size (number of views) of personal preview video nodes increased compared with that of the first period. Notably, This study found a few influential videos among personal preview videos, while this study located videos without interaction at the periphery.

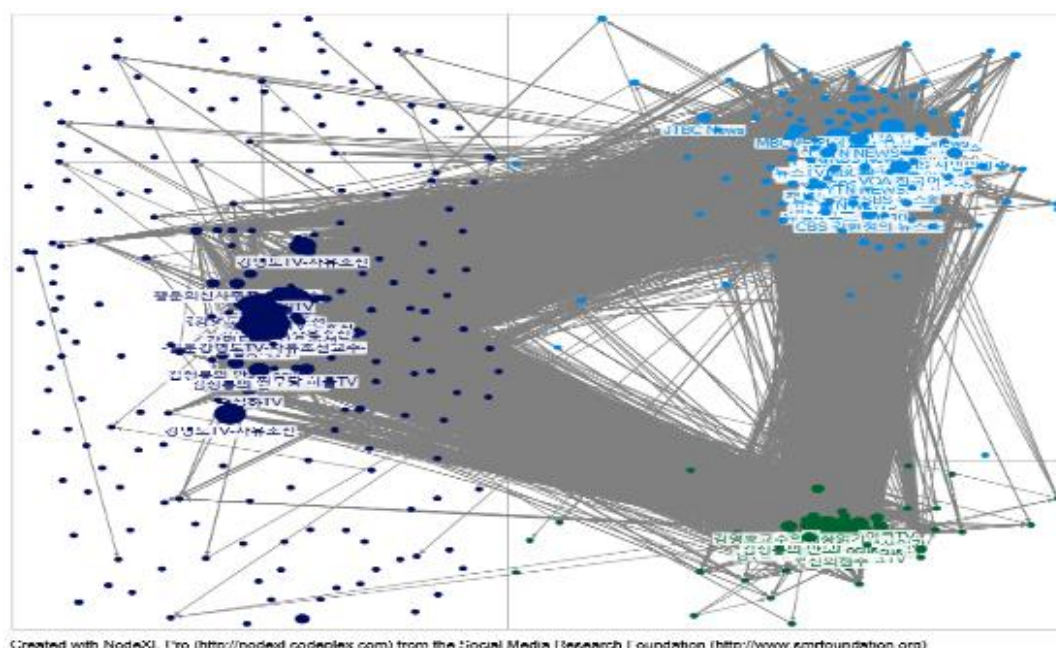
Notably, videos with higher views in the second period were evenly distributed among individual current affairs, individual general, and media outlets. The reason is that media outlets reported on the debunking of the rumor of Kim Jung-un's death, while personal general and individual preview videos gained attention by spreading conspiracy theories regarding the fake news of Kim Jung-un's death.

Node size indicates the number of views, and the study observed that personal preview videos were relatively fewer in number (74), but many of them displayed high view counts. Examining node sizes, this study noted that the highest-viewed videos in the first period were primarily from the general public (8) followed by the media. Media channels produced numerous videos with more than 100,000 views, which indicate the preference of users for obtaining accurate information from media sources. Personal current affairs channels produced fewer videos with high views compared with those of the general public.

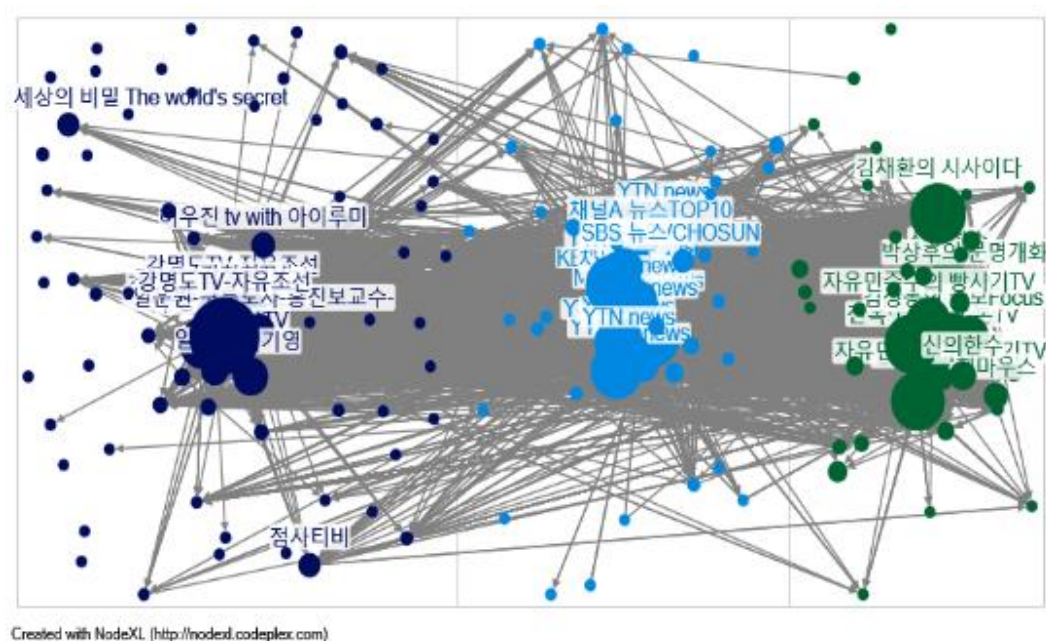
In the second period, the number of views for media channels increased compared with that of the first period. Although a personal preview channel produced higher views than the first season, it did not surpass the view counts of general individuals. The number of videos from media channels decreased compared with that of the first period, while the general public continued to produce several videos with high view counts, which is similar to that of the first period.

Videos from reputable media sources that receive substantial views, particularly those exceeding 100,000, indicate that users trust established and authoritative media outlets when addressing sensitive topics like rumors. Additionally, despite their limited quantity, personal current affairs videos also garnered significant views. These channels, although not specialized in news, are seen to have captured attention by exploring conspiracy theories or presenting alternative narratives related to the rumors surrounding Kim Jong-un.





(a)



(b)

**Figure 3.** Results of video group network analysis related to rumors of Kim Jung-un's death ((a) first phase, (b) the second phase)\*

\*The larger the number of views, the larger the node size, the first stage only when the number of views is 100,000 or more, the second stage only when the number of views is 50,000, Author is displayed

#### 4.3.2 Properties of videos of top influencers with more than 500,000 views

Based on the results of network analysis, this study examined the characteristics of video channels presented in graphs. This study investigated the attributes of influential YouTube authors by according to media, personal current affairs, and personal general channel types based on video headlines, number of views, and mediation centrality. Table 2 shows that the average number of views of all videos in the first period was

86,690.37, and the average betweenness centrality was 200.3892. For example, The media reported on the video uploaded by Channel A, “[Emergency diagnosis of Taegu-min] Kim Jung-un, if it is true that ‘living away in Wonsan’....” The number of views was high at 1,126,590, and betweenness centrality was also relatively high at 1216.922. Table 2 shows that the video entitled “North Korean defector” depicts the elected president Ji Seong-ho as claiming “Kim Jung-un’s death” obtained more than 500,000 views, but its mediation centrality was highest at 3004.125, which makes it an influential video that plays a mediating role. In addition, Channel A reported that “the person who spread rumors related to Kim Jung-un’s death in Pyongyang was searched out” and “he died last week.” Although the number of views of the two videos uploaded by Shinuihansu was relatively high at 370,000 and 230,000, respectively, its mediation centrality was lower than average, such that it did not play a mediating role. In contrast, another video was entitled “Kim Jung-un is a vegetable human?” The number of views of “Kim Il-sung’s death rumor” and “Kim Jung-un’s death rumor” in common was only approximately 20,000, but their mediation centrality reached 110.466, which was higher than the number of views. Thus, the study infers that the personal suggestion conveyed the rumor of Kim Jung-un’s death with a provocative headline. For the general public, the number of views of videos on North Korean channels specializing in North Korean news was high.

The videos uploaded by Gangmyeongdo TV-Free Joseon obtained a high number of views and high betweenness centrality. A video entitled “(Emergency) Urgent News Received from North Korea Regarding the Rumor of Kim Jung-Un’s Death” by Gangmyeongdo TV-Free Joseon obtained the highest number of views at 1.6 million with mediation centrality of 427.944, which indicates that the video was highly influential. In the case of a video from Jung Sungsan TV, the number of views was large at 420,000, but betweenness centrality was low at 46.682.

**Table 2.** Influential YouTube authors and attributes by type of first-generation channel related to the rumor of Kim Jung-un’s death

Channel type	Author	Headline	Views	Betweenness centrality
Press channel*	Channel A NEWS	[Tae Gu-min's emergency diagnosis] If Kim Jung-un is “living away in Wonsan ...”	1,127,690	1126,590
		Ji Seong-ho, a former North Korean defector, claimed that Kim Jung-un was dead.	597,619	3,004.125
		Searching for the person who spread rumors of Kim Jung-un’s death	429,028	133.658
		“Kim Jung-un passed away last week”... I tasted it... Disaster without evacuation,	134,234	185.856
		“Find out those who spread rumors of Kim Jung-un’s death”	42,017	2.567
Personal current affairs channel	A stroke of genius	Rumors of Kim Jung-un’s death spread! Pyongyang went crazy	375,217	21.564
		Rumors of Kim jung-un’s death sparked an uproar in Pyongyang! Extreme hoarding!	237,180	25.783
	Alert Hwang Hee-doo	Kim Jung-un plant human? Common points between “Kim Il-sung’s death rumor” and “Kim Jung-un’s death rumor”	20,907	110.446

Personal general channel	Gangmyeongdo TV-Free Joseon	(Urgent) Urgent news from North Korea about rumors of Kim Jung-un's death!	1,577,952	2,024.409
		Slander? Death rumor? The reason for Kim Jung-un's disappearance has been revealed!	1,439,196	1,094.089
		[Exclusive Report] Kim Jung-un collapsed from a stroke at the missile launch site on April 14!	1,126,590	1,631.037
	Jeongseongsan TV	[Exclusive Report] Has Kim Jung-un finally collapsed?	895,958	652.542
		(Exclusive) Kim Jung-un death theory, Kim Yeo-jeong, Choi Seon-hee special show!	353,284	46.682

In the second period, the study examined influential videos across media, personal current affairs, and personal general categories. The average number of views for all videos in this period was 70,778.93, and the average betweenness centrality was 91.062. Table 3 shows that videos uploaded by YTN NEWS received the highest number of views among media outlets. YTN NEWS criticized individuals who produced fake news and debunked the rumors about Kim Jung-un's health and death. A video titled "Tae Young-ho and Ji Seong-ho proved to be producing 'fake news'. Criticism of irresponsible propaganda" obtained approximately 210,000 views but exhibited high mediation centrality at 385.858. This video played an influential role in mediating information regarding the issue. YTN NEWS, as a 24-hour news channel, quickly reported several related news, which contributed to its high viewership.

Individual news reports and the general public: After the rumors of Kim Jung-un's death were revealed as fake news, individual news reports and the general public conveyed contents that denied the existence of Kim Jung-un. Examples include personal news that suggests that "Kim Jung-un's picture is suspicious" and private news mentioning "Kim Jung-un has a double." Although the general public directly expressed that Kim Jung-un is fake, personal previews took an indirect approach by using terms such as "suspicious" or quoting foreign media. Gangmyeongdo TV: Among videos uploaded by channels specializing in North Korea, the video from Gangmyeongdo TV's obtained the highest number of views among the general public. This channel exerted a significant influence on the issue due to its high betweenness centrality, which indicates its mediating role in the network.

These findings highlight the influential videos across categories during the second period. YTN NEWS stood out among media outlets, while individual news reports, personal previews, and Gangmyeongdo TV played significant roles in shaping public discourse on the issue of Kim Jung-un's death.

**Table 3.** Influential YouTube authors and attributes by channel type after the fake news

Channel type	Author	Headline	Views	Betweenness centrality
Press channel*	YTN NEWS	Kim Jung-un in a video released by North Korea ... dispelling the theory of personal anomaly	685,936	450.989
		North Korean TV, Chairman Kim Jung-un attended the completion ceremony of the fertilizer plant	536,577	456.823
		Tae Young-ho and Ji Seong-ho proved to be producing "fake news" ... Criticism of "irresponsible agitation"	216,266	885.858
		Kim Jung-un in a video released by North Korea ... dispelling the theory of personal anomaly	127,562	572.758
		North Korean TV broadcasts a video of Chairman Kim Jung-un's activities	114,110	81.321

	Kim Chae-hwan's SISAYIDA Sung Chang-kyung TV	Summary of reasons why Kim Jung-un is fake-Yong-gu The Sun, 8 overseas media outlets report similar reports The picture of Kim Jung-un is suspicious!	487,523 451,262	5567021 674769
Personal current affairs channel	Lee Chun-geun TV	“The present situation of Kim Jung-un & the truth of North Korea–China relations” seen through 20 days of happenings	448,556	166423
	Liberal Democracy Bread Season TV	trot! Kim Jung-un trend! Video Suspicious Points US Satellite Wiretapping Full Operation!	293,921	135831
	A stroke of genius	North Korean followers jumping for joy at the return of Kim Jung-un!	198,919	251,436
		Kim Jung-un admitted that he was fake?	786,707	918.787
Personal general channel	Gangmyeongdo TV	North Korea's Kim Jung-un substitute, fake	776,917	307.901
		Kim Jung-un, issue really fine?	429,883	897.238
	Gang Cheol Hwan TV	Who won the deception of the international community, Kim Jung-un's high-cost fraud, and the information war with North Korea?	54,484	245.62

## 5. Discussion

The study extracted YouTube videos related to the two issues and performed network analysis by collecting videos linked to the same commenter as per the recommendation algorithm of YouTube along with analysis of the characteristics of all YouTube videos. Through this method, this study investigated the role of media, personal general channels, and personal current affairs channels in spreading issues according to the nature of the issue.

After the report of CNN on Kim Jung-un's death, the Korean press scrambled to report on the topic. In the early days of the report, issues, such as health problems and death rumors, were unconfirmed. Nevertheless, the issue has spread, which was confirmed fake by Chosun Central TV of North Korea. At the time of the spread of the death rumor, media channels cited CNN reports and provided information on Kim Joug-un's health problems. In general, these rumors spread around YouTube channels specializing in North Korean news. After the death of Kim Jung-un was revealed as fake news, media outlets corrected the facts by reporting that “Kim Jung-un is alive” and criticizing the former member and North Korean defector of the National Assembly who produced fake news. Alternatively, personal general and personal previews contributed to the production of conspiracy theories, such as “Kim Jung-un is a double, his gait is strange in photos of Kim Jung-un, and the US intelligence authorities have also confirmed it.” Personal general social media categorically stated that “Kim Jung-un is a double,” while personal current affairs channels indirectly conveyed this message by citing overseas reports.

Nevertheless, after the rumor of Kim Jung-un's death was revealed as fake, the reason that individuals in general and personal affairs continue to produce such conspiracy theories is believed to be to attract attention from users and increase the number of views from a commercial aspect.

## 6. Conclusions

News consumption in Korea today mostly centers on large-scale portals and YouTube. News consumers exhibit a strong propensity to consume individual news through portal platforms and social media instead of through the websites of individual media companies or reader apps. Examining the agents of the spread of fake news in portal sites and YouTube is meaningful in which news of different tones and levels are provided. This study believes that investigating reactions to news posted on YouTube, which has established itself as a medium for obtaining news and current affairs information in Korea, is necessary for elucidating the reactions of news consumers to major social issues.

The originality of this study stands out in the following ways: First, it introduces methodological innovation by offering a detailed exploration of user behavior through YouTube comment network analysis and uncovering the information diffusion pathways shaped by the recommendation algorithm. Second, it contributes theoretically by providing a comprehensive understanding of the mechanisms behind the spread of fake news, specifically by categorizing and contrasting the roles played by different types of news producers in this process. These findings carry significant implications for the development of policy responses aimed at mitigating the dissemination of fake news.

Despite its significance, this study acknowledges the need to consider the validity of this study by outlining its limitations. First, the selection of YouTube as the platform may have been influenced by YouTube's recommendation algorithm during the data collection phase. These constraints should be considered when interpreting the findings. Second, the analysis period spanned from the initial mention of the rumor regarding Kim Jong-un's death until his appearance on North Korean broadcasts. It should be noted that results may vary if they encompass significant political events occurring during this timeframe.

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