vol 7 no. 2, Desember 2022

Available at:
https://ejournal.unida.gontor.ac.id/index.php/ettisal
http://dx.doi.org/10.21111/ejoc.v7i2.9405

ETTISAL
JOURNAL OF COMMUNICATION
P-ISSN 2503-1880
E-ISSN 2599-3240

Analysis of Digital Behavior and Visual Culture in A Networked Society

Jokhanan Kristiyono[1*], Maulia Jayantina Islami[2], Ratna Puspita Sari[3], Suprihatin[4]

[1,3,4] Stikosa-AWS, Surabaya
[2]Balai Pengembangan Sumber Daya Manusia dan Penelitian (BPSDMP) Kominfo Surabaya
[1,3,4] Nginden Intan Timur 1/18, Surabaya 60118, Indonesia
[2] Ketajen No.36 Sidoarjo, 61254, Indonesia
[1]jokhanan.k@stikosa-aws.ac.id, [2]maul005@kominfo.go.id, [3]ratnapuspita.s@stikosa-aws.ac.id, [4]meetitien@stikosa-aws.ac.id

Abstract

This article describes scientific discoveries that drive the phenomenon of visual cultural communication media in networked societies. Many types of research on visual culture have focused more on visual arts and mass media. However, few have yet addressed the problem of people's digital activities in searching for visual information on the Internet. Visual search engine as a resource for visual data mining. The amount of digital information, including visual information, is increasing exponentially. This research uses a literature study method with a qualitative approach. The primary data used in this study are studies on visual culture and visual search engines published in international peer-reviewed journals. Analysis of digital behavior and visual culture in a networked society is described as a research topic in previous research results. The conclusions drawn indicate that there is still a relatively deep and broad analysis of the study of visual culture when using digital communication media. The benefits obtained from this research are theoretically obtaining the results of the analysis of digital behavior and visual culture of networked communities, which have been described in the results of previous studies as research objects.

Keywords: *visual culture, data mining, network society, digital activity*

Submitted : 14-02-2023 Accepted : 06-04-2023 Published : 07-04-2023

Analisis Perilaku Digital dan Budaya Visual dalam Masyarakat Jaringan

Abstrak

Artikel ini menjelaskan tentang fenomena media komunikasi budaya visual dalam masyarakat berjejaring. Terdapat banyak jenis penelitian tentang budaya visual yang lebih berfokus pada seni visual dan media massa. Namun, masih sedikit yang membahas masalah aktivitas digital masyarakat dalam mencari informasi visual di Internet Mesin pencari visual sebagai sumber daya untuk penggalian data visual. Jumlah informasi digital, termasuk informasi visual, meningkat secara eksponensial. Penelitian ini menggunakan metode studi literatur dengan pendekatan kualitatif. Data primer yang digunakan dalam penelitian ini adalah penelitian-penelitian mengenai budaya visual dan mesin pencari visual yang dipublikasikan di jurnal-jurnal internasional. Analisis perilaku digital dan budaya visual dalam masyarakat berjejaring dijelaskan sebagai topik penelitian dalam hasil penelitian sebelumnya. Kesimpulan yang diambil menunjukkan bahwa masih terdapat analisis yang relatif dalam dan luas mengenai studi budaya visual ketika menggunakan media komunikasi digital. Manfaat yang diperoleh dari penelitian ini adalah secara teoritis mendapatkan hasil analisis perilaku digital dan budaya visual masyarakat berjejaring yang telah dijelaskan pada hasil penelitian terdahulu sebagai objek penelitian.

Kata kunci: *budaya visual, data visual, masyarakat berjejaring, aktivitas digital*

Introduction

Visual culture in science and technology provides a sound synthesis of studies of the history and historiography of visual representations in the Western tradition in the early modern period and from the modern to late 20th century. Research on visual culture has focused more on fine arts and mass media, so these other images constitute a large part of all images produced by academics and are still relatively unexplored. Outside of academia, science pictures appear in magazines, the Internet, popular science books, and the famous "Art Meets Science" exhibition. In this case, the images are often greatly simplified and lose much of their meaning for their creator (Elkins, 2010).

Visual data mining uses data and knowledge visualization techniques to discover implicit and valuable Knowledge from large datasets. The eyes and brain control the human visual system. The brain can be viewed as a powerful, highly parallel processing and reasoning engine with an extensive knowledge base. Visual data mining combines the power of these components, making it a highly engaging and effective tool for understanding data distributions, patterns, clusters, and outliers (Han et al., 2012).

Data visualization and data mining are two of the disciplines that make up visual data mining. It is also strongly associated with powerful computing, multimedia applications, reinforcement learning, human-computer interaction, and computer graphics. Visual data mining is interacting with and thinking analytically about one or more visual representations of abstract data. This process can visually discover robust patterns in this data and guide for applying other data mining and analysis techniques. This makes it easier for analysts to understand the data set's underlying structure better. This process relies on the close linking of tasks, the choice of visual representation, the right set of interactions, and the proper analytical techniques. The patterns are discovered from the information and Knowledge used to make decisions (Simoff et al., 2008).

It is widely acknowledged that our society is increasingly visual. However, fields that wish to provide a theory of visuality, such as visual studies, art history, philosophy, and sociology, continue to draw examples from and object to analysis from the small minority of visuals described as art. In the twenty-first century, data visualization has been used in computer systems such as desktop publishing, website/blog publishing, and Geographic Information Systems (GIS). Infographics have only recently been introduced, and study in these areas is still in its infancy. Infographics aid readers in understanding and processing information more rapidly in the age of information overload. Similar to how compelling headlines and eye-catching images draw readers in, a successful infographic will not only share the tale of the reader but will also pique interest and inspire viewers to read related articles. Graphics, however, might easily convince readers to disregard the article (Siricharoen, 2013).

As individuals and social societies, we live in a world where culture plays an important role. Over the years, culture has arisen and formed among people. Even if we are unaware of it, we cannot see it

around us because we are surrounded by culture everywhere. There is a particular interaction between the tools created by humans to make life easier and the culture itself. The more tools individuals use, the more they can change and/or develop their human life and culture accordingly. Because it is an essential fact of life, the meaning of culture has changed dramatically over the years. Williams (1960) shows that culture as a word acquired a particular meaning after the 19th century: First, the relationship between human perfection is represented as a general mental state of ideas. Second, it means the intellectual development of the whole society. Third, it generally refers to art collections. Finally, fourthly, it means a universal, intellectual, and material way of life.

The emergence of a culture incorporates two main reactions: Respect for the actual difference between certain moral activities and dominant intellectual forces and a new type of society. Second, the importance of these activities as a means of regulating human desires in the social and practical evaluation stage is a diminishing and activating choice (Erdal, 2012). In the historical developments above, two main reactions have met. They have been integrated and transformed by the increasing claims of a universal way of life to unify and transform all of our shared experiences.

The study and interpretation of visual pictures and symbols in society are referred to as visual culture. Art, advertising, television, cinema, photography, and digital media on the internet are all examples of visual media. In this sense, culture can be said to be a response to the Internet environment (Kristiyono, 2015).

The emergence of culture is also related to new forms of social and personal relations and is also a response to new socio-political developments, namely democracy. As it is seen as a socio-political or democratic environment, perhaps the most democratic environment created in history in terms of representation and diversity: minorities and those who do not have many opportunities in society to express their opinions. In addition, it also provides a more participatory environment for the community (Kristiyono & Ida, 2019).

Most people know that the world's digital information is increasing exponentially. In the last two years, the world has created 90 miles of digital data-2.5 trillion bytes daily. People consume much digital content by reading website articles, browsing digital magazines, watching videos on YouTube or other platforms, and even interacting with others on social media. Many of the advertisements we see every day are digital advertisements. Nevertheless, how did digital content become such an essential part of modern life? We have delved into the mysterious (or less mysterious) past of digital content and put together this infographic to illustrate the history of digital content from its birth to modern times - and even give a peek into the future of digital content (merlinone. com. March 11, 2018 . History of Digital Content Infographic. last access: September 16, 2021, from https://merlinone.com/history-of-digital-content-infographic/).

The behavior of networked people in sharing visual information is growing and developing. As technological advancements in digital photography and online

publication proliferate, the increasing demand for aesthetics in the last two decades has driven an unprecedented movement in multimedia visual communication (Kristiyono, 2020). In today's social media era, visual communication is essential to business and public communication. Social media has drawn millions of users to social networking sites (SNS) because of its interactive features, which allow users to engage with others.

Users of social media communicate mostly through visual content. This can be done by expressing feelings with others, entertaining friends, or sharing stories. One of the most important strategies for boosting social media engagement, reading, and even sales is visual communication (Kristiyono, 2022). Key phrases in expert blogs, articles, and white papers include "visual content is king" and "visual network." Instead of being an option, visual material is perceived as a need.

While information sent via visual communication on social media has high priority, the well-known adage that a picture is worth a thousand words is true. Because visual components enable marketers to forge closer connections with customers, visual impacts are quite powerful, especially for businesses on social media. As more information becomes available on social media, users are more willing to skip a bunch of content until they find it more exciting and believe it is functional. High-quality visual effects can ensure visibility on SNS because they can quickly attract and convey ideas (Kujur & Singh, 2020).

Due to the widespread use of the Internet, we can find many visual images. One of the visual services that combine many virtual images in cyberspace is a visual search engine (VSE) for the resource of visual data mining. Since visuals are the main element of network communication, their various applications in this communication environment guide our visual abilities. These are concepts that play an intermediate role in the formation of visual culture. Visual literacy is the ability to understand and use images, including two primary skills: Awareness of attitudes and feelings conveyed in visual information. The second is the ability to generate meaningful images when communicating with others. All of these elements make up the visual culture. Mirzoeff believes that visual culture is of interest because many art scholars and critics believe that the existing visual disciplines must fully explain the prevalence of visuals (Mirzoeff, 2002).

Therefore, it is necessary to understand and consider the evolution of visual culture so that the information we want to convey can be conveyed effectively in network communication. In the new computer-aided communication environment, digitization is the central concept of visualization. Visualization takes a new look through the creation of digital content, which has led to the emergence of new media products such as digital films, video games, and simulations based on digital content visual culture concepts. The problem is that there needs to be more studies and analyses of the research results on visual culture and digital activities in networked societies, especially people's behavior searching for visual information.

The research question that arises from the background of the problems above is how visual culture is developing in today's

networked society, especially in digital visual search engine activities. The purpose of this study is to analyze research studies on visual culture and digital visual information search activities on visual search engines as a source of visual data mining.

Table 1. Table of examples of previous research on visual culture and digital activity

Previous Research	Relevance
Flavian-Blanco et al (2011). Analyzing the emotional outcomes of online search behaviors with search engines. Computers in Human Behavior 27 (2011) 540–551	*Reviews*: Users will feel satisfied with the search results if they do not encounter problems in searching and get results that match expectations
Liaw et al. (2003). An investigation of user attitudes toward search engines as an information retrieval tool. Computers in Human Behavior 19 (2003) 751–765	*Reviews*: The quality of information obtained by users from search engines will affect user motivation in carrying out search activities through search engines
Dan et al. (2016). Measuring and Predicting Search Engine Users› Satisfaction. ACM Computing Surveys, Vol. 49, No. 1, Article 18.	*Reviews*: The process of switching search engines to one another indicates that there is dissatisfaction by users due toneffectiveness in carrying out the search process
O›Brien, H.L., Arguello, J., Capra, R. (2020) An empirical study of interest, task complexity, and search behavior on user engagement. Information Processing and Management 57 102226	*Reviews*: The existence of excessive effort or effort given by users in carrying out the search process will harm engagement with users

Source : Author, 2022

The Gap in Knowledge

From the four previous studies as examples of relevant research sampling, the fundamental difference from this research is that there are no reviews related to searches conducted using the visual method.

Material and Methodology

This research uses a literature study method with a qualitative approach. Literature study research can also be called a literature review, which is structured in the same way as other research. However, the sources and methods of data collection include collecting data in the library, reading data, and taking notes and research materials. The data obtained by the author has been analyzed in detail (Davies & Hughes, 2014).

The primary data used in this study are the results of research on visual culture and visual search engines that have been published in reputable indexed international journals such as Scimago and

IEEE. Primary data collection as an object of research is taken from publications on visual culture and visual search engines. As a research limitation, the research object was taken from research published in 2020.

This limitation is determined as a research focus that places the growth and development of visual culture and digital visual search engine activities in a networked society in the Internet world. The secondary data used in this study is theoretical literature as material for analytical studies because this research aims to find theoretical clues related to the cases or problems found (Snyder, 2019)

Result and Discussion

There has been a surge in interest in researching the intersection of digital behavior and visual culture in networked societies in recent years. Here's a quick rundown of some current research in this field: Martin Irvine's (2013) "Visual Culture in the Digital Age": This paper investigates how the transition from print to digital media is changing the way we create and experience the visual culture (Elkins et al., 2013). Irvine contends that digital media is enabling new forms of visual communication and creativity, but it also raises ethical concerns about picture manipulation and the role of visual media in shaping our perceptions of reality.

Alice E. Marwick and Danah Boyd's "Social Media and Visual Culture" (2014): This paper investigates how social media platforms such as Facebook, Twitter, and Instagram are influencing our perceptions of visual culture (Marwick & Boyd, 2014). The writers contend that these platforms enable new forms of visual expression and social interaction, but they also raise concerns about privacy and the commodification of visual data.

Tarleton Gillespie et al. (2018), "Visualizing Digital Culture: A Critical Inquiry into the YouTube Algorithm": This research looks at how the YouTube algorithm influences the creation and consumption of visual content on the site. The authors contend that the algorithmic recommendation system has a significant impact on what content users see and can have a profound effect on cultural values and norms (Gillespie, 2018).

Lev Manovich and Jay Chow (2018), "Visualizing the Past: Big Data Approaches to Photography": This paper investigates the application of big data approaches to the analysis and interpretation of historical photos (Manovich, 2018). According to the authors, digital tools and methods can help us better understand the social and cultural context in which these images were created, as well as cast light on how visual culture has changed over time.

Overall, these works highlight the significance of studying digital behavior and visual culture in networked societies. As digital media continues to change the way we create and consume visual content, it is critical to comprehend the cultural and social consequences of these changes.

Visual Data Mining

Mirzoeff (2002) points out that the central essence of visual culture practices is visual events, which represent the realization of networks operated by subjects with mutual respect for freedom

of movement. Because it is a large-scale communication network system, the e-government system consists of many visual events. These multi-visual events are a well-organized visual culture for users who use digital and government visual services to serve their citizens through face-to-face visual communication. Communication while performing traditional services.

In an image search system or what can be called a Visual Search Engine (VISE), citizens interact through search engines (Google, Yahoo, Pinterest, and others). It is created by interface intermediaries, such as visual content and images, to get specific information from the images they are looking for. These events require and develop visual abilities, which include specific skills in understanding and using images (Elkins et al., 2013 ; Hentschel, 2014). All these stages are implemented by Human-Computer Interaction (HCI), and the user's visual perception takes place in HCI. It must always be remembered that visual perception plays an essential role in the process of creating meaning for visual events in the construction of visual culture.

"A picture is worth a thousand words" is a well-known saying. "When data is encoded in a visual form, the human brain can better recognize and understand relationships and patterns". The definition of an infographic is: "using interactive vision supported by computer data representation to enhance cognition" (Bederson & Shneiderman, 2003). Infographics are graphic visual representations of information, data or Knowledge designed to clarify and integrate complex information quickly and clearly (Smiciklas, 2012). Construct (define) infographics: a group of graphic organizers that blend text, images, symbols, and schematics with other material to create straightforward charts. By utilizing images to boost the capacity of the human visual system to perceive patterns and trends, infographics can promote user cognition in human-computer interaction (HCI) (Jacko, 2012). Infographics are a new way to visualize data. Another word for infographics is Information Visualization (InfoVis, Visual Information) or data visualization (Cashman et al., 2019).

Visualization is "the mechanisms by which people perceive, interpret, use, and communicate visual information". The primary purpose of visualization is to use graphics to convey information more clearly and effectively. For journalism, it is essential to visualize information that complements the background of a report. This is a reliable and trustworthy method. As the title of the book "-White Space is not Your Enemy" by R Hagen and K Golombisky in 2013 explains that Infographics: Maximum Information in Minimum Space means that infographics are the maximum and optimal medium of information in a minimal space medium, this stage illustrates the main goal making an infographic as detailed and economical as possible.

In visual perception, visual information comes from our senses, and our brain perceives and stores this information. Perception involves interaction with information sent by the senses, and our prior Knowledge is stored in memory. When visualizing this information, our brain tries to match known patterns necessary for perceiving objects. Once our brain

recognizes an object, it will be easier to recognize the same object anywhere in the field of view the next time we encounter that visual object (Hoober & Berkman, 2018). This visual culture study forms the basis for analysis in research that raises the theme and problems of visual culture in networked societies in the current digital era.

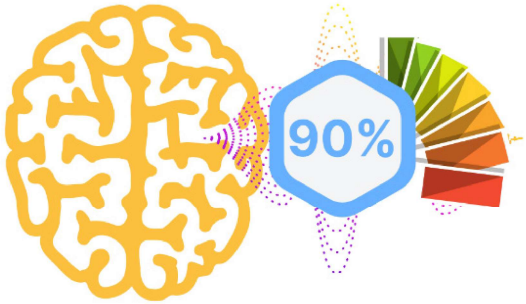
Digital Visual Activities in Network Society

Online searches using visual search are stimulated by actual visuals (screenshots, images from the Internet, or photos). AI (artificial intelligence) is used by contemporary visual search technology to comprehend the content and context of these photos and presents a list of pertinent results. In the world of e-commerce, it is very useful. Visual search allows sellers in e-commerce to recommend fashion-related topics or products to shoppers, which would otherwise be difficult for plain text queries. Pinterest, Google, and Amazon are today's most important visual search engines. For the Bing search engine, Microsoft has also created outstanding computer vision skills.

Visual search can potentially change how we interact with the world around us. Visuals already dominate our culture, so it's natural for us to use images to start our search. After all, we rarely begin our offline shopping experiences with an SMS. A visual search gives the internet world a sense of visual discovery. In addition, we frequently prefer to locate a brand-new theme, outfit, or look rather than a specific item. In a way that text could never capture, visual search technology helps group these items together based on aesthetic connections. Google, Amazon, Pinterest, Bing, and several others have developed their visual search engines and are sure to make an impact on this technology quickly. This technology is still in its infancy and is developed by the respective developers, but the latest trends show that the speed of development is very significant. In particular, the highly developed visual search technologies are Pinterest and Google Lens visual search).

In terms of statistical data about visual culture can be described as follows:

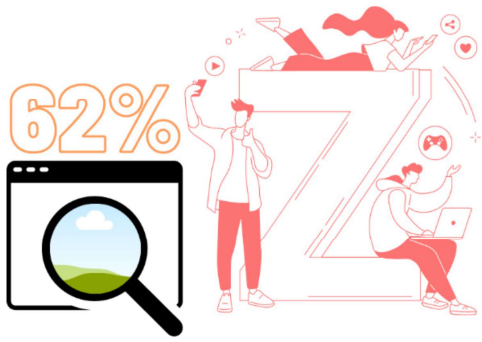
Picture 1. The information sent to the human brain is visual



Source: author, 2022

90% of the information sent to the human brain is visual. MIT neuroscientists found that the brain can identify visible images in as little as 13 milliseconds, or it can be called the twinkling of an eye (source: https://news.mit.edu/2014/in-the-blink-of-an-eye-0116, last access: 22 September 2021)

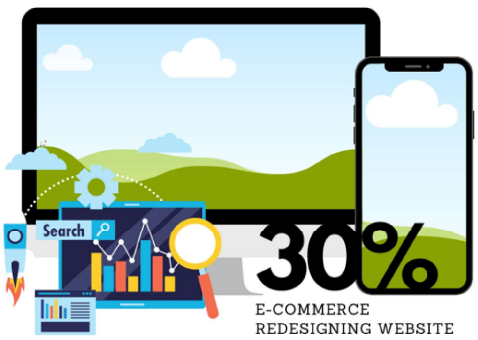
Picture 2. Networked society wants visual search over other new technologies



Source: author, 2022

62% of millennials in a networked society want visual search over other new technologies. New Research from ViSenze Finds 62 Percent of Generation Z and Millennial Consumers Want Visual Search Capabilities, More Than Other New Technologies (source: https://www.businesswire.com/news/home/20180829005092/en/New-Research-ViSenze-Finds -62-Percent-Generation#.W4eYrWp5Mrc.LinkedIn, last accessed: September 22, 2021)

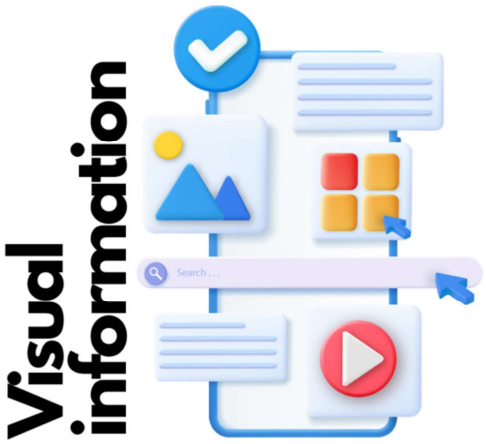
Picture 3. e-commerce redesigning their websites to support visual and voice search



Source: author, 2022

By 2021, e-commerce redesigning their websites to support visual and voice search will increase their digital commerce revenue by 30% (source: https://www.gartner.com/smarterwithgartner/gartner-top-strategic -predictions-for-2018-and-beyond, last accessed: September 23, 2021).

Picture 4. Visual Search over Text Search



Source: author, 2022

At least 50% of respondents in every category except electronics, home products, wine, and spirits prefer visual information to text. Consumers tend to believe what they see, not what they read but what they see visually. According to research from The Intent Lab, a research partnership between Performics and Northwestern University (source: https://www.businesswire.com/news/home/20190204005613/en/Visual-Search-Wins-Text-Consumers%E2%80%99-Trusted-Information, last accessed: September 23, 2021).

Picture 5. the networked society considers visual information more critical than textual

Source: author, 2022

59% of the networked society considers visual information more critical than textual information (source: https://www.businesswire.com/news/home/20190204005613/en/Visual-Search-Wins-Text-Consumers%E2%80%99-Trusted-Information, last accessed: 23 September 2021).

Picture 6. Visual Search App features

Source: author, 2022

Visual search is used by 20% of app users when VSE functionalities are enabled (source: https://www.shopsafe.co.uk/news/notifications-sent-by-retail-apps-shape-consumer-buying-habits/12310, last accessed September 23, 2021)

Visual capabilities play an essential role in network communications. VSE is a virtual communication environment that provides visual search services to people networked and operating in the digital world (Internet). This is a new type of communication between the visual community and society. Due to the establishment of many visual applications and digital visual services for virtual communication, the VSE subculture visual governance system is a virtual environment for creating the visual culture itself.

Digital visual activities are becoming more common in network society as more people interact with digital media and online platforms. The process of analyzing visual data to extract significant insights and patterns is known as visual data mining. It entails analyzing large amounts of visual data and identifying trends and patterns using machine learning algorithms and other algorithmic techniques.

Social media platforms, online gaming, virtual reality, and augmented reality are examples of digital visual behaviors in the network society. Instagram and Snapchat have grown in popularity for sharing visual content, such as pictures and videos, and interacting with others through visual communication. Online gaming platforms such as Fortnite and Minecraft have opened up new avenues for social engagement and creative expression via digital visuals.

Visual data mining can be used to examine the patterns and trends in these digital visual activities, revealing user behavior, interests, and trends. It can, for example, be used to identify the most popular visual content on social media

platforms or to analyze user interaction patterns with visual content in online gaming environments.

Conclusion

Overall, digital visual activities in the network society and visual data mining are critical fields of research for understanding how digital media and visual communication shape our social and cultural norms.

Since the digital world and the Internet have become the new communication environment in a networked social society, visual images have evolved more than any other way of constructing meaning in this society. There are certain reasons for the widespread use of virtual environments. For example, it has become the most democratic communication environment and has the opportunity to express our feelings and thoughts. Despite all the advantages, it must be considered that the communication environment is different from other environments. Therefore, to successfully transmit messages, specific rules must be followed. Several rules or principles must be followed to effectively convey messages, including Clarity, Simplicity, Relevance, Credibility, Consistency, and Context.

The sender can increase the likelihood that their communication will be successfully transmitted and understood by the recipient by following these rules. The new communication environment is where computer and human interaction (HCI) takes place, which requires the effective use of visual effects for effective communication.

An information search system that uses a lot of visual effects by creating digital content in a new communication environment is a visual culture that occurs in the digital activities of networked communities. The results of the analysis and discussion above show that there is still a depth and breadth of analytical studies regarding visual culture in digital communication media.

The benefits obtained from this research are theoretically obtaining the results of the analysis of digital behavior and visual culture of networked communities, which have been described in the results of previous studies as research objects.

Acknowledgment

Thanks to Prof. Rachmah Ida, academic and research supervisor. This paper and its research would not have been possible without her exceptional support. The author thanks Maulia, Pipit, and Suprihatin for their kindness and full support in finishing this paper. The generosity and expertise of one and all have improved this study in innumerable ways; those that inevitably remain are entirely our responsibility.

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