

A SEMIOTIC TECHNOLOGY STUDY IN WEB- BASED APPLICATION

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Written and submitted by

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THESIS

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I hereby declare that this thesis is entirely my own work and does not contain the work of other individuals, except where explicitly cited within quotations and references, as is customary in scientific papers.

Makassar, 23 February 2024



Muhammad Taufik Al Hakim Yaumi

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ABSTRACT

MUHAMMAD TAUFIK AL HAKIM YAUMI. **A Semiotic Study in Web-based Application** (supervised by Fathu Rahman and Harlinah Sahib).

This research explores the field of semiotic technology within web-based applications, with a specific focus on the analysis of how technology constructs meaning and influences society. The study employs a comprehensive review of related literature to examine the role of semiotic technology and recent analyses of technology, drawing upon relevant and up-to-date theories from diverse scholarly resources. The research data obtained through *E-RES* provided by *Perpustakaan Nasional*, Education Resources Information Center (ERIC) database, Google-based web search, Google Scholar, and a database for the national library of Indonesia. The research results indicates that the types of semiotic technology applications primarily addressed in the literature include those used for educational contexts, business purposes, personal publications, and social interactions. The researcher found that the functions of the application construct meaning in semiotic technology studies by investigating the principles to start understanding how the meaning is created in digital technology. The researcher classified the resources about semiotic functions by identifying these principles. The functions are Semiotic Resources, Semiotic Regimes, Multimodality, and Discourse. The findings of this research are expected to contribute to the broader understanding of semiotic technology and its impact on society, shedding light on the potential for meaning-making and the ways in which technology shapes and is utilized by society.

Keywords: Semiotic Technology, Web-based Applications, Semiotic Resources, Semiotic Regimes, Multimodality, Discourse



ABSTRAK

MUHAMMAD TAUFIK AL HAKIM YAUMI. **Studi Semiotik dalam Aplikasi Berbasis Web** (dibimbing oleh Fathu Rahman dan Harlinah Sahib).

Penelitian ini mengupas bidang teknologi semiotik dalam aplikasi berbasis web, dengan fokus khusus pada analisis bagaimana teknologi membentuk makna dan memengaruhi masyarakat. Studi ini menggunakan tinjauan komprehensif terhadap literatur terkait untuk mengkaji peran teknologi semiotik dan analisis terkini tentang teknologi, dengan mengacu pada teori-teori yang relevan dan terkini dari berbagai sumber akademis. Data penelitian diperoleh melalui E-RES yang disediakan oleh Perpustakaan Nasional, Education Resources Information Center (ERIC) database, penelusuran berbasis Google, dan Google Cendekia. Hasil penelitian menunjukkan bahwa jenis aplikasi teknologi semiotik yang utama dibahas dalam literatur meliputi aplikasi yang digunakan untuk konteks pendidikan, tujuan bisnis, publikasi pribadi, dan interaksi sosial. Peneliti menemukan bahwa fungsi aplikasi membentuk makna dalam studi teknologi semiotik dengan menyelidiki prinsip-prinsip untuk memulai pemahaman bagaimana makna diciptakan dalam teknologi digital. Peneliti mengklasifikasikan sumber daya tentang fungsi semiotik dengan mengidentifikasi prinsip-prinsip ini. Fungsi-fungsi tersebut adalah Sumber Daya Semiotik, Rezim Semiotik, Multimodalitas, dan Wacana. Temuan dari penelitian ini diharapkan dapat berkontribusi pada pemahaman yang lebih luas tentang teknologi semiotik dan dampaknya pada masyarakat, memberikan pencerahan tentang potensi pembentukan makna dan cara teknologi membentuk serta digunakan oleh masyarakat.

Kata kunci: Teknologi Semiotik, Aplikasi Berbasis Web, Semiotic Resources, Semiotic Regimes, Multimodality, Discourse



TABLE OF CONTENTS

COVER.....	i
SUBMISSION PAGE	ii
APPROVAL SHEET	iii
STATEMENT OF THESIS AUTHENTICITY.....	iv
ACKNOWLEDGEMENTS	v
ABSTRACT	vii
TABLE OF CONTENTS.....	ix
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF ABBREVIATIONS	xiii
CHAPTER I	
INTRODUCTION	1
A. Background of The Study	1
B. Research Questions	10
C. The objective of the Study	10
D. Significance of the Research	10
E. Scope of the Research	12
CHAPTER II	
LITERATURE REVIEW	13
A. Review of Related Studies	13
1. Previous Studies Related to Semiotic Technology	14
2. New Paradigm of Semiotic Technology	21
3. Dimensions of semiotic technology	25
B. Conceptual Framework.....	27
CHAPTER III	
RESEARCH METHODOLOGY	31
A. Research Design	31
B. The Technique of Collecting Data	32
C. Technique of Analyzing Data	33
CHAPTER IV	
FINDINGS AND DISCUSSION	36
A. Findings	36
1. Types of Semiotic Application	36

2. The Functions of Semiotic Technology Software: <i>Semiotic Resources, Regimes, Multimodality, and Discourse</i>	56
B. Discussion	73
1. Conceptual Definition Semiotic Technology	73
2. Linguistic & Non-Linguistic Aspects in Semiotic Technology	78
3. The Scope of Semiotic Technology	80
CHAPTER V	81
CONCLUSION AND DISCUSSION	81
A. Conclusion	81
B. Suggestions	86
REFERENCES	88
APPENDICES	96

LIST OF TABLES

Table 4.1. Semiotic Technology applications	37
Table 4.2. Linguistic & non-linguistic features of Social Media applications	43
Table 4.3. Linguistic & non-linguistic features within social media app.....	51
Table 4.4. Linguistic & non-linguistic features within web blog app	55
Table 4.5. Functions of Semiotic Technology Software.....	57

LIST OF FIGURES

Figure 2.1. Picture of road signs.....	24
Figure 2.2. Conceptual Framework	29
Figure 3.1. Steps in Conducting Research Literature Reviews. Adapted from Fink (2019).	34
Figure 4.1. The concept of semiotic technology	74
Figure 4.2. Functions of Semiotic Technology app	77

LIST OF ABBREVIATIONS

GIF	Graphics Interchange Format
ERIC	Education Resources Information Center
E-RES	Electronic Resources
AI	Artificial Intelligence
IT	Information Technology
HCI	Human-Computer Interaction

CHAPTER I

INTRODUCTION

A. Background of The Study

Linguistics, the study of language, has seen a big increase in academic attention lately. What's interesting is that researchers are teaming up from different areas to find new ways of looking at language. For example, they have combined psychology and linguistics to create psycholinguistics (Levelt, 2013). This field explores how our brains handle language – how people learn it, use it, and understand it. It is not just about language; it is about how our minds work with it. In a similar way, linguistics and anthropology have come together to make anthropolinguistics (Danesi, 2012). This field looks at how language and culture are connected. It shows us how different languages relate to different cultural practices.

Then there is social semiotics (Leeuwen, 2005), where language is seen as more than just words. It is a part of how people communicate in social world, reflecting society's norms and practices. Finally, there is semiotic technology (Innis, 2009; Zhao & Leeuwen, 2014), which looks at how technology and signs work together. It is about understanding things like the symbols on your phone or how people communicate online. These developments in linguistic studies are not just more research; they are helping us understand how language, the way people think, our culture, and technology all fit together in our complex world of communication.

The study of semiotic technology represents a relatively recent discipline within linguistic studies. Its emergence, largely recognized within the past decade, can be traced back to the late 2000s, initiated by Emilia Djonov, Kay O'Halloran, and Theo van Leeuwen (Paulsen et al., 2018). However, it remains absent as a standalone course in literature or linguistics departments at universities. The primary reason for its absence is the ongoing debate and discussion surrounding its subject matter among scholars. Figures like Leeuwen, Paulsen, Kvale, and others explore elements such as semiotic resources (Leeuwen, 2010), multimodality (Paulsen 2018), and discourse within PowerPoint (Zhao, 2014) to introduce and define semiotic technology. Within the broader realm of linguistic studies, disagreements persist regarding the placement of semiotic technology. While some argue for its inclusion within linguistic inquiry (Paulsen, 2020), others position it outside the scope of linguistics. This debate partly arises from its nomenclature — termed "semiotic technology" rather than "technological semiotics." Innis (2009) attempts to address these differences by defining semiotic technology as the study of technology serving as a potent analytical instrument, offering fresh perspectives on technology as a fundamentally human phenomenon.

This analytical approach does not limit itself to offering rigid models but rather encourages exploration into the intricate interplay between humans and technology. Beyond the mere allocation and accessibility of semiotic perceptual predispositions, it encompasses the mediation of content. Consequently, this approach facilitates an examination not only of

media and technology but also of the diverse elements encompassing them. Innis' definition of semiotic technology thus provides a framework encouraging a comprehensive scrutiny of the multifaceted relationship between humans and technology, shedding light on their symbiotic interaction.

Delving deeper, this approach goes beyond theoretical exploration, providing a practical lens through which to understand the intricate dynamics between humans and their technological interfaces. It invites a nuanced understanding of how humans interact, perceive, and negotiate with technology in various contexts. This comprehensive perspective allows researchers to explore the nuanced facets of technology beyond its functional aspects, revealing the intricate ways in which humans engage with, interpret, and navigate through technological environments. Ultimately, this in-depth analysis offered by semiotic technology offers valuable insights into the intertwined relationship between humans and the technologies they interact with on a daily basis.

In fact, to reconcile the debate mentioned above, it is essential to delve into a detailed examination of what semiotics and technology entail. Afterward, this research explored how these two fields of study converge to form a unified discipline known as semiotic technology. Firstly, in studying semiotics, it is all about studying signs and symbols, meaning-making potentials, and culture and Context of society. This study is one of the most popular studies across linguistics. The term "semiotics" was first introduced in its modern sense in the early 17th century by John Locke, a British

philosopher. However, the formalization and development of semiotics as a field of study occurred in the 19th and 20th centuries by the American philosopher and logician Charles Sanders Peirce. Peirce's work focused on signs, symbols, and the process of signification, which are central concepts in semiotics.

In the 20th century, scholars like Ferdinand de Saussure, a Swiss linguist, and Roland Barthes, a French literary theorist, further advanced the field of semiotics. Saussure's work on structural linguistics and the study of language as a system of signs influenced semiotic theory profoundly. Barthes applied semiotic principles to the analysis of culture and communication, emphasizing the role of signs and symbols in interpreting texts and cultural phenomena.

The term "semiotics" has its origins in the Greek language. It is derived from the Greek word "sēmeiōtikos," which means "concerned with signs." This Greek word, in turn, is derived from "sēmeion," which means "sign" or "mark." The root of "sēmeion" can be traced back to "sēma," which means "sign" or "signal." The concept of semiotics as the study of signs and symbols and their role in communication was developed in the late 19th and early 20th centuries by scholars such as Ferdinand de Saussure and Charles Sanders Peirce. They formalized the field and gave it the name "semiology" (*sémiologie* in French), which later evolved into "semiotics" in English. While exploring semiotics, which involves the study of signs and symbols and their meanings, various viewpoints and theories have emerged over the years, making it a subject of growing interest.

Secondly, technology in the context of linguistics refers to the use of digital tools and software in the analysis and study of language. With the increasing availability of digital tools and software, linguists are able to analyze language in new and innovative ways, such as through corpus linguistics, computational linguistics, and natural language processing. For example, corpus linguistics involves the use of large collections of texts, or corpora, to study language patterns and usage. Computational linguistics involves the use of computer algorithms to analyze and process language data. Natural language processing involves the use of computer algorithms to understand and generate human language.

How can social semioticians effectively analyze social media, specifically digital platforms that facilitate virtual communities and interactions? Traditional social semiotics involves the examination of semiotic resources used in social practices and the social regulation of these resources (van Leeuwen, 2005). The primary focus of this study encompasses the multimodal texts found on social media, such as Instagram posts, and the social practices intertwined with these texts. However, in the realm of social media, the distinction between texts and the technological features responsible for design, production, distribution, and consumption becomes blurred. For instance, crafting an Instagram post not only entails capturing and uploading an image but also involves the utilization of resources like image filters and hashtags. Users partake in a dynamic process in which meaning continuously evolves through the selection and negotiation of various resources offered by the social platform.

Consequently, a comprehensive social semiotic analysis of social media must incorporate a third element of study: the technology utilized to create multimodal texts, which both influences and is influenced by social practices – essentially, viewing social media as a semiotic technology.

As technology has become an integral part of people's daily lives, it has also led to an increase in research endeavors. Numerous studies have explored the utilization of applications across various fields of research. For instance, in the realm of education, researchers have investigated the effectiveness of online learning platforms like Quipper (Mulyono & Herri, 2016) and assessed the usability of various learning applications such as Google Classroom, Schoology, and WhatsApp. In addition, tools like Zoom have been employed for video conferences, and applications like Autodesk SketchBook, TEDEd, and FastStone Capture have been adopted as alternatives to traditional whiteboards. Furthermore, platforms like Google Forms, Quizizz, and Kahoot have been utilized for quiz assessments and final projects (Atmojo, 2020; Febrianto et al., 2020).

In the area of social media applications, researchers have delved into various social media platforms to examine aspects like the efficacy of Facebook's Group features in enhancing English writing skills (Rahman et al., 2019) and the usage patterns of emojis in social media (Arafah & Hasyim, 2019). However, recent studies have increasingly focused on analyzing how the use of emojis, emoticons, stickers, GIFs, and other semiotic resources within applications impacts social activities and communication practices. Surprisingly, not many of these studies have

centered on how the application or other technological elements reshape social interactions and communication dynamics (Poulsen et al., 2018).

Studying the technical components of an application is crucial because it helps us understand how technology shapes our social interactions and communication. As emphasized by Poulsen & Kvåle (2018), the design of social media technology has a significant influence on social interaction through its structure and the different ways it works. Analyzing this technology provides valuable insights into how it affects our communication processes and how people engage with it. This understanding plays a pivotal role in developing effective communication strategies and designing technologies that better suit our communication needs.

Thirdly, semiotic technology is perceived as social semiotics. Leeuwen (2004) points out that social semiotics is not just a standalone theory; it becomes most valuable when applied to specific real-life situations and problems. To do this effectively, one needs to not only understand semiotic concepts and methods but also delve into other related fields. This same idea applies to the 'social' aspect of 'social semiotics.' It truly shines when it is combined with social theory. This interdisciplinary approach, where different areas of study come together, is a crucial aspect of social semiotics. This interdisciplinary nature of semiotics suggests the potential for the emergence of new subfields within the study of semiotics in the future. For example, the exploration of Semiotics with Technology could pave the way for a novel subfield known as "Semiotic Technology."

The term Semiotic Technology itself is a rising term in the field of semiotics. Semiotic technology research explores how all different types of technologies for meaning-making enable both the production and distribution of multimodal texts and artifacts as well as the performance of semiotic practices. (Paulsen, 2021) The performance of semiotic practices refers to the ways in which people use semiotic resources to create meaning in various contexts. Semiotic practices involve the use of signs, symbols, and other semiotic resources to communicate and create meaning. The emergence of technology and the use of the technology has been ubiquitous in today's society and has become a pivotal role contributing in the Semiotic Technology field. (Paulsen & Kvåle, 2018)

Several studies concerning the use of semiotic technology have been conducted by social semiotic scholars. One of which is that this thesis is mostly centered on its premises. Zhao & Leeuwen (2014) propose using a social semiotic approach to study the use of PowerPoint in the University Classroom. They argue that PowerPoint is not just a neutral tool for presenting information, but is also an integral part of the discourse of the classroom. They suggest that the use of PowerPoint in lectures is related to the design of the software and the composition of the slides, and that these factors can have an impact on the way that knowledge is constructed and conveyed in the classroom. The authors also suggest that the use of PowerPoint in university classrooms involves a second type of recontextualisation: the recontextualisation of a corporate practice/genre in higher education settings. They argue that instead of adapting to the needs

of education, PowerPoint forces education to adapt to its corporate modes of presentation and the values embedded therein.

While many research studies have extensively explained various methods and frameworks for examining applications as semiotic technology, these studies can be complex and challenging to understand. In other words, when using an interdisciplinary approach that draws insights from fields like linguistics, sociology, anthropology, and media studies to analyze various applications in semiotic technology, it can be difficult to determine which methodology to use. Despite being comprehensively defined as explained by the scholars above, this field of study still lacks clarity regarding its scope, including the types of technology and their roles in meaning production. More specifically, semiotic technology studies tend to focus extensively on critiquing social media applications and their connection to societal behaviors but often neglect applications that contribute to meaning expression and the role of these applications in constructing meaning. Furthermore, these studies tend to be excessively focused on the objectivity of individual research.

Hence, there is a need for a comprehensive examination of the various technological applications most commonly addressed and their functions in meaning-making. In this research context, technological applications refer to a range of tools such as presentation software, social media, blogging platforms, and everyday life applications. The function of shaping meaning pertains to semiotic resources, regimes, multimodality, and discourse.

B. Research Questions

Based on the problem statements above, the present research addresses two major research questions: 1) What types of applications are mostly addressed in semiotic technology studies? 2) How do the functions of the application construct the meaning in semiotic technology studies?

C. The objective of the Study

This study is aimed at investigating 1) the flexibility of the critical analysis of Semiotic Technology towards the types of application that is analyzed by semioticians, and 2) how the functions of these applications contribute to the construction of meaning within the context of semiotic technology studies. Through rigorous analysis and synthesis of existing literature, this study seeks to provide valuable insights into the key applications and their functional roles in shaping semiotic technology research.

D. Significance of the Research

This research aims to achieve significance in the context of the following aspects:

Theoretical significance

This research contributed to the Semiotic Technology field by systematically reviewing and categorizing the types of applications explored in semiotic technology studies, thereby contributing to the theoretical foundation of semiotic technology as an interdisciplinary field. Investigating how the functions of applications constructed meaning in semiotic

technology studies added depth to our theoretical knowledge, shedding light on the intricate relationships between technology, semiotics, and communication. The findings of this study informed the development of theoretical frameworks specific to semiotic technology, assisting researchers in this field to better conceptualize and analyze their studies.

Practical significance

This research aimed to provide contributions to Applied Linguistics, Language practitioners, and future language researchers. For Applied Linguistics, the study offered guidance to researchers and scholars interested in semiotic technology, providing insights into frequently studied applications and their usage patterns. This assistance helped researchers in selecting relevant case studies and methodologies. Moreover, understanding how applications constructed meaning informed educators and instructional designers, potentially leading to improved instructional strategies and the development of more effective educational technologies. Language practitioners as well as future language researchers benefited from insights into how users interpreted and interacted with applications. This knowledge could inform user-centered design approaches. Lastly, the results of this study served as a reference for similar research endeavors.

E. Scope of the Research

This research solely focused on reviewing previous research on semiotic technology and applications in Indonesia identified by another researcher. In essence, this research relied on the quality of preceding research conducted in the field. The researcher aimed to categorize applications, with a specific focus on semiotic technology aspects. This categorization was based on three interconnected objectives: 1) Identifying and analyzing applications present in semiotic technology research, encompassing applications, semiotic artifacts, resources, and other communication modes; 2) Examining the utilization of these applications and identify their use scenario with semiotic technology approach; and 3) Providing insights into the design principles of these software tools. It is important to note that while this research covered a range of applications, it did not offer detailed, individual explanations of each application. Instead, the focus was on analyzing overarching semiotic technology aspects and their potential for meaning-making.

CHAPTER II

LITERATURE REVIEW

This chapter introduced three focal areas that served as the research variables within the study. The topics under consideration encompassed the notion of semiotic technology, semiotic technology itself, and recent analysis on technology. Each topic was meticulously presented, drawing upon relevant and up-to-date theories from diverse scholarly resources.

The initial discussion delved into a comprehensive review of related literature, setting the stage for subsequent analysis. Within this exploration, the notion of semiotic technology was thoroughly examined, highlighting the influential role of social semioticians in shaping the study. Towards the conclusion of this chapter, the formulated hypotheses were articulated, encapsulating the anticipated outcomes and directions of the study.

A. Review of Related Studies

The purpose of this subchapter is to discuss previous studies related to the present study. It highlighted the most important researches that shaped semiotic technology and web-based application in relevance to the present study. At the end of this sub-chapter, the research gaps and researchers' standing points were laid out.

1. Previous Studies Related to Semiotic Technology

Several research findings were relevant to the current research. Zhao and Leeuwen (2014) studied how PowerPoint was used by seven cultural studies lectures in Australian university classrooms using a social semiotic approach. Their research indicated how multimodal resources (text, sounds, pictures, etc.) in PowerPoint slides were used by seven cultural studies lectures for pedagogic recontextualization. The findings of this research revealed that the use of PowerPoint in education related closely to the knowledge structure of particular fields. The researchers also introduced recontextualization in their research. Recontextualization referred to the process of adapting a particular discourse or genre to a new context. In the case of PowerPoint in university classrooms, they argued that two types of recontextualization took place. The first type of recontextualization was the multimodal recontextualization of a specific field of knowledge. This meant that when a lecturer created a set of PowerPoint slides, they made choices about how to represent their knowledge in a way that was appropriate for the context of the classroom. This involved adapting the discourse of their field to the multimodal affordances of PowerPoint, such as the use of images, bullet points, and animations.

The second type of recontextualization was the recontextualization of a corporate genre in the higher education context. This meant that when a lecturer used PowerPoint in the classroom, they also engaged with the design choices made by the software designers and the authors of PowerPoint slides in other social contexts, such as the corporate world. The

researchers argued that the use of PowerPoint in university classrooms involved adapting the design choices made by designers with an eye to the needs of the corporate context, and that this could have an impact on the way that knowledge was constructed and conveyed in the classroom.

While their study on the use of PowerPoint in Australian university classrooms, specifically in cultural studies lectures, provides valuable insights into how instructors use visual elements like text, sounds, and pictures for teaching. The idea of "pedagogic recontextualization" they introduce helps us understand how teachers adapt and present their knowledge using PowerPoint slides. The researchers identify two types of recontextualization: one involving the way knowledge is represented visually (multimodal recontextualization), and the other involving how the content of a field is adjusted to fit PowerPoint's features, like images and bullet points. While their findings are insightful, it would be beneficial for the study to delve deeper into how these choices made in creating PowerPoint presentations impact students' learning experiences. Additionally, discussing any limitations in the study's sample size or specific cultural contexts within Australian universities could provide a more well-rounded understanding of the research outcomes. In essence, while the study offers valuable insights, a clearer discussion of its practical implications and potential limitations would enhance its contributions to the field of educational technology.

Jovanovic and Leeuwen (2018) conducted research that investigated how multimodal dialog was used in social media. Jovanovic and Leeuwen

focused on examining digitally mediated multimodal dialogue on social media in relation to intersections between semiotic technology and social communication. Their aim was to explore the unique features of multimodal dialogue on social media and how they were used to create meaning and convey social actions. They argued that this type of communication changed the way people communicated and interacted with each other, emphasizing the importance of understanding these changes to fully comprehend the impact of social media on society. Their research aimed to explore the interdependence between the design and the use of social media, demonstrating how social media provided pre-designed templates for exchanging information and how users responded to these technological affordances through dialogic forms. They used discourse analysis to examine examples of multimodal dialogue on Facebook and Twitter, exploring the unique features of this type of communication and how it was used to create meaning and convey social actions.

While they discuss how this kind of communication impacts us, the details about exactly how and to what extent are a bit unclear. It would be helpful if they could dive deeper into real-life examples or situations where talking on social media really changed the way people interact. Also, the idea of "pre-designed templates" on social media needs more explanation. How exactly do these templates affect how information is shared? Providing concrete examples could make this clearer. Additionally, it would be good if the researchers talked more about the limitations of their study. For instance, choosing examples from Facebook and Twitter might not

represent all social media platforms, and this could affect how we understand their findings. Even though their method of analyzing conversations is good, discussing these potential issues would make their study more balanced. In essence, this critique suggests looking more closely at certain concepts to make the study even better.

Djonov and Leeuwen (2018) studied ResearchGate, an online social platform for scientists or researchers to collaborate, comment, share, answer questions, and find collaborators. By using ResearchGate and combining the research with a critical approach to social media, they constructed a model to study social media as semiotic technology. In their study, they explained that social media as semiotic technology was a study of analyzing 1) the design of the software, which included semiotic resources within the software (edit images, posting videos, comments, etc.), the history of the software 2) their use in specific institutional and cultural contexts, and associated discourses, and 3) the dynamic relationship between the design and use to the broader semiotic landscape and socio-cultural context.

While Djonov & Leeuwen's study on how people communicate on social media is informative, but there are some areas that could be improved. While they discuss how this kind of communication impacts us, the details about exactly how and to what extent are a bit unclear. It would be helpful if they could dive deeper into real-life examples or situations where talking on social media really changed the way people interact. Also, the idea of "pre-designed templates" on social media needs more

explanation. How exactly do these templates affect how information is shared? Providing concrete examples could make this clearer. Additionally, it would be good if the researchers talked more about the limitations of their study. For instance, choosing examples from Facebook and Twitter might not represent all social media platforms, and this could affect how we understand their findings. Even though their method of analyzing conversations is good, discussing these potential issues would make their study more balanced. In essence, this critique suggests looking more closely at certain concepts to make the study even better.

Poulsen & Kvåle (2018) presented a social semiotic framework for studying social media as semiotic technology. The framework treated semiotic technology as an artifact that structured how people communicated and interacted. It consisted of two main dimensions: the multimodal dimension and the social dimension. The multimodal dimension concerned the systematic and detailed analysis of the semiotic resources and semiotic regimes that people used and attended to in social practices. Semiotic resources could include a wide range of elements, such as language, images, sounds, gestures, and objects, that were used to create meaning in social practices. Semiotic regimes, on the other hand, were the social mechanisms that regulated the use of semiotic resources and structured the production and interpretation of meaning. The social dimension concerned the ways in which social media technology structured communication and interaction. This involved examining the design and organization of

resources in the layout of a social medium, as well as the ways in which social media technology structured communication and interaction.

The researchers also discussed the breadth of this framework and the need for further research to address several dimensions. The research highlighted the importance of understanding social media practices as embedded in normative discourses and the concept of segregation in relation to framing in textual semiotics. The authors' research interests revolved around multimodality, digital technology, critical discourse analysis, and literacy. They had also edited books on multimodality and on literacy in higher education. Overall, the paper provided a valuable framework for analyzing social media as semiotic technology and highlighted the need for further research in this area.

Poulsen & Kvåle's framework for studying social media is helpful, but there are areas that could be clearer. They talk about social media as a tool that influences how people communicate, which is good. However, the concept of "semiotic regimes" and how they guide the use of elements like language and images might be a bit tricky to grasp. Providing more examples or explanations of how these regimes work in everyday social media interactions would make it easier for readers to understand. Also, the part about the "social dimension" and how social media design affects communication could use more practical illustrations. How exactly does the layout of social media platforms influence the way people talk to each other? Giving specific examples would make this aspect more tangible. In addition, Poulsen & Kvåle could discuss potential limitations in their framework, like

whether it applies equally well to all types of social media. Acknowledging these potential issues would add depth to their study. Overall, the framework is a good start, but a bit more clarity and practical examples could enhance its accessibility and applicability.

Zhao and Zappavigna (2018) explored the interplay of semiotic technologies and genre in the context of the selfie. They argued that recognizing an image as a selfie required viewers to interpret the image in relation to the technological and sociocultural context in which the photo was taken and shared. In their research, they identified four types or subgenres of selfies: represented, mirrored, implied, and inferred. They also considered the technological conditions that had shaped the evolution of the selfie as a visual genre, including the hardware, software, and platform involved in selfie practices. The research aimed to show the unique theoretical and methodological challenges selfies posed as a "genre-in-making" for multimodality and social semiotic research in social media environments.

Poulsen's (2021) research highlighted the need for a semiotic approach to understand the potential disturbances caused by the manipulation of faces in deepfake technology. It emphasized the importance of considering the rich cultural history and meaning potential of faces in evaluating the effects of synthetic media. The research also utilized the semiotic technology approach to analyze the functional features of deepfake software as signifiers with meaning potential. By studying how technology is designed as a semiotic device and how users interpret the meaning

created through deepfakes, the study provides insights into the cultural and technical dimensions of deepfake technology. However, while the study delves into the semiotic aspects of deepfake software design and usage, further research could explore the broader impact of deepfakes on society, including issues related to misinformation, privacy, and trust in digital media.

2. New Paradigm of Semiotic Technology

The purpose of this subchapter is to discuss the new paradigm of semiotic technology. It highlighted the most important theories that both semiotic technology and web-based applications are relevant to the present study.

a. Semiotic Technology

Semiotic technology refers to a technology that is designed for meaning-making and has meaning-making potentials built into the technology through various semiotic modes (e.g., layout, texture, color, sound, etc.). (Zhao & van Leeuwen, 2014b) When studying social semiotics, there is no pure theory since it is not a field of study that can stand up by itself (Leeuwen, 2004). More specifically, it is a field that requires applications of other specific instances or problems. For instance, if social semiotics and technology are combined, it is not sufficient to only use social semiotics concepts and methods but also needs to engage in technical aspects.

The concept of Semiotic Technology as mentioned in previous studies tend to incorporate interdisciplinary research. In other words,

researchers incorporate other field of studies to conduct their research. Therefore, there are some ambiguity results of variety of field that is combined to this study. As Van Leeuwen (2004) stated, semiotic research is not a purely theoretical endeavor. It can only be specifically developed if combined with other theories to analyze a phenomenon. In this case, Semiotic Technology incorporates Technology to analyze new phenomena. Therefore, technology become the object of social semiotic research. This area of research stems from the work of social semiotics which has three foci of research, that is (1) To outline semiotic resources in the technology of meaning-making; (2) To learn how semiotic technology is used in semiotic practices or social practices; (3) to examine the histories, narratives, and discourses of technologically mediated resources. (Halliday, 1978; Hodge & Kress, 1988; Poulsen, 2021,)

As previously mentioned, when analyzing semiotics of technology, it is always centered on the multimodal text people make using the technology, that is the several features that people use to express themselves using multimodal media such as Instagram posts like text, images, videos, and voices. However, a recent study suggests that the study of multimodality in social media cannot be separated from the technology for design, production, consumption, and distribution (Poulsen & Kvåle, 2018). For instance, when posting social media content, the user gets to choose various resources from social media such as filters, soundtracks, or stickers.

b. Semiotic resource

While semiotic studies have been examined by many prominent semioticians, the question arises: What precisely is the role of semioticians? Is their focus solely on studying signs or signals in specific situations? According to Leeuwen (2005), he asserts that semioticians primarily engage in the analysis and examination of semiotic resources. Semioticians concentrate on the semiotic resource elements within a given activity, involving the collection, investigation, and contribution to the understanding of these resources (Leeuwen, 2008). Hence, it becomes evident that semiotic resources are a fundamental aspect in semiotic analysis.

Semiotic resources include the actions and artefacts people utilize for communication. These artefacts can be created through physiological means, such as using our vocal apparatus or facial muscles for expressions and gestures, or they can be generated through the utilization of various technologies, such as pen and paper, computer hardware and software, fabrics, scissors, sewing machines, and more. (Leeuwen, 2005)

One of the fundamental parts of the process of meaning-making is to identify the semiotic resources. Leeuwen (2005) stated that semiotic resource is one of the most fundamental parts of analyzing social semiotics. He defines a semiotic resource as actions and “artefacts” people use to communicate, whether it is used with facial expressions and gestures, or by using technologies.

Before it is called ‘resource’, it is called ‘signs’. It originated from the work of Saussure’s (1983) signifier and signified. Saussure claimed that the sign consisted of two parts. He defined the physical form of a sign as a

signifier and signified is the meaning conveyed by the sign, whether it was written or spoken. These shapes and sounds meant a particular spiritual concept to the audience. All signs have a signifier signified. The signifier is the material shape of the sign. (De Saussure, 2011; Van Leeuwen, 2005) More specifically, it is a material that people will see, touch, hear taste, or smell. In different words, that is the physical shape of the sign. For instance, in some parts of Indonesia, when there is a person who passed away, people raise a white flag near the funeral home of the person who passed away. The white flag can be considered a signifier.



Figure 2.1. Picture of road signs

Signs can sometimes be associated with road signs or warning signs, on the contrary, the sign is not restricted to road signs, speech, writing, or picture making. It could also be in form of social behavior. Leeuwen (2005) gives an example of how people walk. At a glance, how people walk seems to be a non-semiotic behavior, meaning that it is something that all people have in common with other people. However, there are various ways people

walk. For instance, gender difference can make a difference in how people walk, people from other countries or ethnicity walk differently, furthermore, when comes to social institutions such as the army or fashion industry, they have a specific way of walking. People walk differently based on how they expressed and define themselves in society. Therefore, the way people walk is an *artefact* of meaning-making and has meaning-making potential.

3. Dimensions of semiotic technology

In discussing semiotic technology, some references show that the dimension of semiotic analysis is an essential part of studying semiotics. Leeuwen (2005) suggested using semiotic analysis to find out the potential of meaning-making in technology usage. Semiotic analysis is not only limited to identifying the artifacts that could produce meaning or have meaning-making potential, for instance in the previous example how people walk can be categorized as artefacts that can produce a semiotic analysis. However, to analyze the artefacts in more detail, Leeuwen (2005) introduced the dimensions of semiotic analysis.

a. Discourse

The notion of discourse holds significant weight within semiotic analysis, constituting an examination of how communication functions within society. Discourses serve as representational resources, encapsulating knowledge concerning specific facets of reality employed when representing said features. Despite not imposing constraints on what

people express about a particular aspect of reality, discourses act as frameworks enabling us to comprehend and interpret the world around us.

There are two functions used when analyzing discourses material. It can function as psychological or technical. (Leeuwen, 2005) The psychological function is what people generally used when communicating. It is the use of facial expressions such as happiness, confusion, sadness, etc., gestures and body language such as the act of lowering the head, or any other specific body language that reinforces verbal messages, and other physical actions. The psychological function is considered social-regulated, meaning that it is completely based on society's culture that people observed and imitated from their family or their community.

The second function of a resource is a technical resource, which expands the psychological function of the resource. People use other means of communication rather than facial expressions or body language, but some people use instruments, and sometimes traditional clothing can convey meaning. For instance, in Indonesia, there is an instrument that is still used until this day, that is Kentongan. In ancient times, Indonesians used Kentongan as a medium of mass communication, as a warning of harmful occurrences such as robbers, earthquakes, or individuals who passed away. When people hear a slow tempo rhythm, it means it is safe. Meanwhile, the sound of a gong with a quick pace is a warning that danger is approaching.

An additional illustration showcasing the technical function of resources involves employing technology for communication purposes. For

instance, the capability to transmit direct messages through applications using various formats such as text, voice recording, or video recording, enables communication across vast distances.

With the development of technology, communication, and artefacts of semiotic resources become more diverse. For instance, the use of Zoom or Google Meet in distance learning can make the teaching and learning environment more flexible.

b. Multimodal

Multimodality describes the interaction of several representational modalities, such as visuals and the written or spoken word. The socio-cultural ways in which these modes are mixed in the communication process are mediated by multimodal representations. The word multimodality was coined to emphasize the significance of considering semiotics other than the language in usage, such as pictures, music, gesture, and so on. The escalating prevalence of sound, images, and video accessible through television, computers, and the internet significantly underlies the heightened focus and intrigue surrounding the multi-semiotic intricacy inherent in the representations generated and encountered in contemporary environments. (Ledema, 2003)

B. Conceptual Framework

The conceptual framework shows the concept which describes the Semiotic Technology in web-based application. Figure 3 shows INPUT,

PROCESS, and OUTPUT these three points contributed to Semiotic Technology in web-based application.

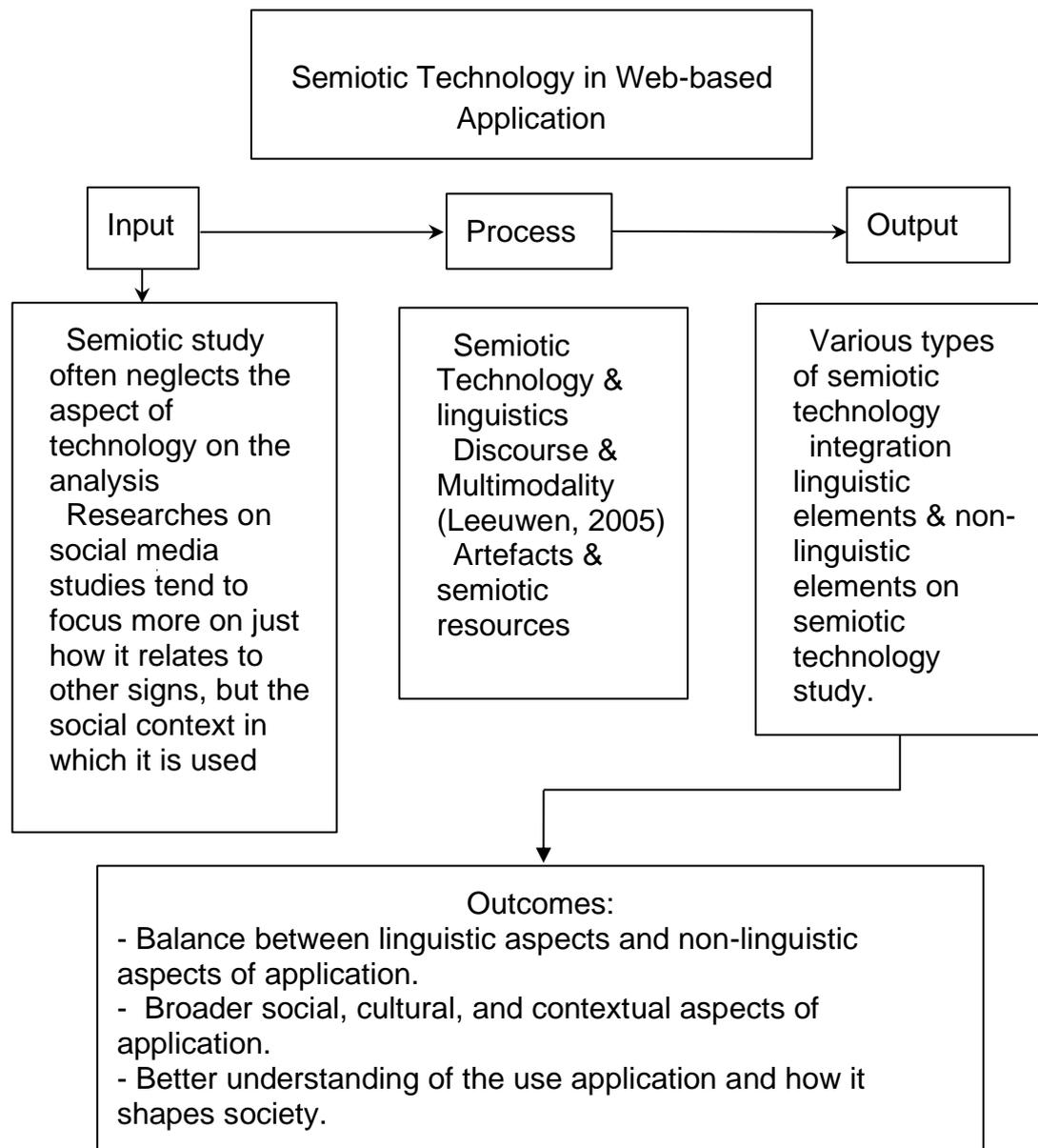


Figure 2.2. Conceptual Framework

Based on the explanation of the review of related literature, the researcher constructed the conceptual framework to provide a clear illustration of what the study entailed. The variables were divided into three subcategories: INPUT, PROCESS, and OUTPUT.

In the INPUT subcategories, the researcher mentioned the problems of the research. These were: 1) The lack of portrayal of Technology in Semiotic research. 2) It was a new theory; therefore, the semiotic technology theory covered only a small number of applications (such as social media, presentations, and other deepfake software).

In the PROCESS subcategories, the researcher mentioned how to deal with the problems of the research. The Semiotic Features were the distinctive attributes contained in the semiotic artefacts. The artefacts themselves were semiotic tools that produced meaning or had meaning-making potentials embedded in the tool. Semiotic resources were tools employed to organize perception and produce meaning in communication with others or for oneself.

In the OUTPUT subcategories, the researcher mentioned various types of semiotic features constructed in applications. Second was the integration of semiotic artefacts into web applications. Lastly was the common use of semiotic resources.

In the last subcategory, which was OUTCOMES, the researcher pointed out the expected results of the research. First was a better understanding of what the ideal application for Applications was. Second was a new framework for exploring Semiotic Technology for analyzing applications.