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Ecological Communication in Information Society: Reflections on Niklas Luhmann's Thought in Understanding Ecological and Disaster Issues in Indonesia

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Abstract

Ecological issues pose a serious threat to the continued existence of contemporary society. The recent development of humanity as an information society has been unable to overcome ecological issues; indeed, they have become more complex. Rapid advances in information and communication technology have fundamentally transformed various dimensions of human life. At the same time, ecological problems have been complicated by increasingly intense disasters, limited awareness of environmental degradation, as well as the increasingly apparent threat of global warming and climate change. Niklas Luhmann, a German sociologist, offered ecological communication as a conceptual framework for understanding the ecological problems faced by modern society. Through his system theory and concept of resonance, Luhmann sought to explain how modern society, as a complex social system, responds to ecological issues. This article seeks to explore in detail the ecological communication framework developed by Luhmann and use it to understand the ecological issues facing today's information society, especially in Indonesia. The main method used by this research is exploration and explication of the principles of Luhmann's theory, which are implemented to analyze various ecological issues and natural disasters in Indonesia. This research involved the collection of materials on ecological communication from Luhmann's books, as well as the linking of these materials to the ecological problems faced by information society.
Keywords: Ecological communication, Niklas Luhmann, Information society, Resonance, Modern society.

Abstrak

Persoalan ekologi merupakan persoalan serius yang mengancam eksistensi masyarakat kontemporer. Perkembangan masyarakat kontemporer yang berkembang sebagai masyarakat informasi tidak menjadikan persoalan ekologi teratasi, bahkan cenderung semakin kompleks. Perkembangan teknologi informasi dan komunikasi yang sangat pesat telah mengubah secara fundamental berbagai dimensi kehidupan manusia. Pada saat yang sama, persoalan ekologi bertambah kompleks dengan ditandai oleh fakta semakin intensnya bencana terjadi, kesadaran akan kerusakan lingkungan yang masih rendah, sampai ancaman pemanasan global dan perubahan iklim yang semakin nyata. Niklas Luhmann, seorang sosiolog Jerman, menawarkan pembacaan atas problem ekologi

masyarakat modern lewat konsep komunikasi ekologi. Dengan pendekatan teori sistem dan konsep resonansi, Luhmann berupaya menjelaskan bagaimana masyarakat modern sebagai sebuah sistem sosial yang kompleks merespon problem ekologi. Artikel ini bertujuan untuk mengeksplorasi konsep komunikasi ekologi yang dikembangkan oleh Luhmann dan menggunakannya untuk membaca permasalahan ekologi yang terjadi dalam konteks masyarakat informasi saat ini, khususnya di Indonesia. Metode utama penelitian ini adalah eksplorasi dan eksplikasi mengenai prinsip teori Luhmann dan mencoba mengimplementasikannya dalam menganalisis berbagai kasus ekologi termasuk bencana alam di Indonesia. Desain yang diterapkan adalah mengumpulkan materi dari sumber-sumber utama mengenai konsep komunikasi ekologi Luhmann dan mengaitkannya dengan konteks problem ekologi dalam masyarakat informasi.

Keywords: Komunikasi ekologi, Niklas Luhmann, Masyarakati, Resonansi, Masyarakat modern

Introduction

Contemporary society is facing much more complex issues than previously. Today's society, which has been identified as an information society, must deal with such complex ecological issues as intense natural disasters, limited awareness of environmental degradation, the emergence of new environmental issues, and the increasingly real threat of global warming and climate change. Information and communication technology, the main motors of information society, have contributed to this increased complexity. On the one hand, technology has been presented as a solution; however, on the other hand, it has also created its own ecological problems. Such ecological issues can be analyzed and explicated using a range of perspectives and focuses, as offered by various scholars (Diamond, 2011; Curry, 2011; Barnett, 2001; Taylor, 1998; Common & Stagi, 2005). This article seeks to undertake a similar endeavor, exploring the thought of Niklas Luhmann and his use of the ecological communication framework to understand ecological issues within the context of modern society. His framework, which relies on system theory and a unique signification of communication concepts, offers breadth and innovation in its understanding of the ecological issues faced by contemporary society.

Luhmann formulated his system theory, as well as his communication ecology framework, within a social context that differs somewhat from the current context. When Luhmann formulated his framework, communication technology (such as the internet) was not as advanced as it is today. In other words, Luhmann was conceptualizing within the context of conventional mass media. Nonetheless, this change in context has not left Luhmann's thought without relevance, as the logic of system theory and ecological communication is not temporal. His theory involves an understanding of complexity, as well as its effect on technology-based societies. Technological advances, as such, can give Luhmann's concepts—which he viewed as having communication as a core process—even greater relevance.

The concept of ecological communication was developed from the system theory that Luhmann began developing in the 1980s. He explored this concept in his book *Oekologische Kommunikation: Kann die moderne Gesellschaft sich auf Oekologische Gefahrdungen einstellen?*, which was first published in 1986; an English-language translation, titled *Ecological Communication,* followed in 1989: The question posed by the German title—can modern society adapt to ecological threats?—clearly indicates Luhmann's own positioning of communication, ecology, and the future of modern society. Exploring Luhmann's thought, thus, is an important means of providing an alternative explanation of the concept of ecological communication and its contributions to understanding of ecological and disaster issues.

More intense disasters, as well as the increasingly real threat of climate change, are two major ecological issues being faced by contemporary society. In many parts of the world, disasters have caused catastrophic damage as well as significant loss of property and life. In Indonesia, for example, data from the National Disaster Response Agency (BNPB) shows that the country experienced 7,125 floods, 4,441 landslides, 5,564 cyclones, 148 earthquakes, 59 volcanic eruptions, and 5 tsunamis between 2008 and 2018 (http://bnpb.cloud/dibi/grafik1a). There have also been serious environmental issues in Indonesia, including annual hazes that have increasingly far-reaching effects (Kunii, O., Kanagawa, S., Ismail, I. T. S., Kunii, O., Yajima, I., Hisamatsu, Y., Amagai, T. 2002), massive clear-cutting (Margono, et al, 2014), coral reef damage (Roth, et al, 2018), clean water crises (Aziz, 2017), and mangrove forest loss in coastal areas (Ilman, Dargusch, Dart, & Onrizal, 2016). Despite such conditions, Indonesia's social systems (economic, political, media, etc.) have yet to provide a strong and adaptive response. The

frequency with which people live in disaster-prone regions, for a variety of reasons (Wahyuni, et al., 2018), the lack of priority coverage of ecological and disaster issues in mass media (Wahyuni, 2017); and the limited effect of disaster policy are but some examples of this sub-optimal situation.

It is within this context that this article will explore the concept of ecological communication, as developed by Luhmann, and use it to explore the ecological problems that are occurring in today's information society, with a specific focus on the ecological and disaster issues in Indonesia.

Theoretical Framework

Luhmann is a modern sociologist and one of the main thinkers behind system theory. His thought has not been as frequently studied as that of Talcott Parsons and Jurgen Habermas in Indonesia. However, in Germany, Luhmann—despite the difficulty of understanding his work—has become a dominant and influential figure. In many things, Luhmann was opposed to Habermas in his understanding of society, and the two frequently debated (Berghaus, 2011).

Luhmann developed a system theory that he called functional structuralism, which contrasted with the structural functionalism of Parsons—his lecturer at Harvard. Luhmann's strong arguments were able to transform the system perspective, which had long been dominated by a Parsonian approach. Luhmann, aside from Parsons, drew influences from academics of various backgrounds, including the mathematician George Spencer Brown, the biologists Humberto Maturana and Francesco Varela, the phenomenological philosopher Edmund Husserl, the cybernetician Heinz von Foerster, and the philosopher Georg Wilhelm Friedrich Hegel. As such, Luhmann offers a rich, yet complicated, synthesis. His theory, with its complexity and capacity for sharp analysis, has brought widespread debate not only in sociology, but in the social studies in general.

In formulating his system theory, Luhmann put forth several important concepts that later served as his theoretical foundation. The concept of autopoiesis, for instance, was fundamental in his system theory. Etymologically, the word *autopoiesis* is derived from two Greek-language words, namely *auto* ('self') and *poiein* ('creation'). Autopoiesis, as such, may be understood as a system's process of self-creation (Luhmann, 2015). The term *autopoiesis* was originally introduced by Maturana and Varela, and was understood generally as a continuous process of differentiation conducted by a system to distinguish itself from other systems and/or its environment. Through autopoiesis, a system creates its own elements (*self-creation*) through a process of self-reference and self-differentiation (Luhmann, 2015).

Luhmann begins by emphasizing the existence of systems, and highlights that these are self-referential systems (Luhmann, 2015). They have the ability to establish links within themselves, as well as to distinguish themselves from other systems and from their environments. From this initial step into the labyrinth of Luhmannian system theory, the distinction between systems and their environments can be seen as involving more complexity. This requires further understanding. According to Luhmann (2015), a system cannot be more complex than its environment. Systems are always attempting to reproduce the complexity of their environments by creating new complexities; in other words, Luhmann argues that the creation of complexity can help reduce complexity.

Luhmann offers several points that are necessary for understanding communication through a system perspective. First, Luhmann rejects the widely used metaphor of transmission, which he perceives as having several weaknesses; he argues that this metaphor relies too heavily on ontological questions and exaggerates the message (Luhmann, 1992). This point must lead us to an understanding of communication that avoids reference to consciousness and life, as neither are considered to "function" within the logic of autopoiesis (Luhmann, 1992). According to Luhmann, a social system emerges when reciprocal communication—autopoiesis—occurs and distinguishes the system from the environment through appropriate communicative means. As such, social systems are driven not by human beings, not by actions, but by communication (Luhmann, 1992).

Eliminating individuals as the subjects of communication, Luhmann argues that "only communication can communicate". He also underscores that communication does not result from action; rather, it is the opposite. In other words, communication is seen as the cause—rather than result—of action. Action, according to Luhmann, is only made possible by communication networks (Luhmann, 1992). For Luhmann, social systems may be distinguished from individuals at the mental level. Society stems from communication, whereas individuals are rooted in consciousness (Luhmann, 1992). According to Luhmann (1992),

communication is the process of processing options. It is *sui generis*, born from a synthesis of three selection processes: selection of information, selection of utterance, and selective understanding. Communication is only possible when the difference between the information and the message is recognized by the system (Luhmann, 1992). The three components of communication (information, utterance, and understanding) will result in communication when they occur in whole. "Successful" communication within a system will produce the elements of the system, and this will be "recalled" at another place and time through further communication.

Contemporary societies have been defined in various ways by sociologists, in relation to information and communication technology specifically as well as in relation to science and industry in general (Dijk, 2006; Fuchs, 2008). Sociologists have identified categories such as information society, network society, post-industrial society, internet society, digital society, and even post-internet society (Webster, 2006; Dijk, 2005; Fuchs, 2008; Castells, 2000; Mosco, 2017). Peter Otto and Philipp Sonntag (1985) understand information society as a society in which labor is dominated by the information sector and deal with information, signals, symbols, and images (Fuchs, 2008). Daniel Bell (1999), in his book *The Coming of Post-industrial Society* (first published in 1973), has similarly linked information society with the percentage of the workforce involved in the service and information sector. As such, information may be understood as the motor of an information society.

According to Castells (2000), one key feature of information society is the logic of networking within its basic structure. Information society, thus, is a product of the informationalism made possible by new technologies. Castells explains that 'communication power is at the heart of the structure and dynamics of society' (Castells, 2000). Meanwhile, according to Webster, information society may be identified based on five criteria: technology, economy, occupation, space, and culture (Webster, 2006). Webster criticizes the concept of information society using a neo-Marxist approach, arguing that understandings of the concept has failed to recognize that information society is inseparable from capitalistic structure; in other words, it remains oriented towards the accumulation of economic, political, and cultural capital (Fuchs, 2008). Neo-Marxist thinkers have offered several concepts for understanding the conditions of

contemporary society, including digital capitalism, virtual capitalism, high-tech capitalism dan informational capitalism (Fuchs, 2008). However, even with these diverse understandings and definitions of contemporary society, it is clear that the current social system is one that relies heavily on information as the main motor of communication.

Using the logic of system theory, the current development of information society may be seen as the response of the social system to the increased complexity of its environment, in this case technology. Technological systems have enabled the massive production of information, which has led to the social system working harder to reduce complexity through the processes of communication and differentiation.

Material and Methodology

This paper applies a qualitative method aimed at doing a systematic and explicative description of a particular topic. The research was based on two types of research methods. First, it uses desk study method which explores the core theory of communication ecology by Niklas Luhmann. Second, it employs a theoretical study by choosing case studies of previous researches conducted by researchers regarding disasters, especially in Aceh, the case of ecological communication after the 2014 tsunami; the ecological communication of tidal flood in Semarang; haze pollution in Pekanbaru and Pontianak.

The implementation design of the research in details is as follows: first, determining the core books as a source of the study, in this case, Niklas Luhmann's ideas carried in books and journals about ecological communication; second, establishing specific categorizations to explore the key concepts of ecological communication; third, selecting cases based on previous researches on the characters of disaster and ecological communication that highlight each character of disaster; fourth, conducting an analysis and reflection of the theory on the disaster cases.

Result and Discussion
1. The Complexity of Ecological and Disaster Issues in Indonesia

As an archipelagic country located in the Pacific Ring of Fire, Indonesia faces complex ecological and disaster issues. Despite the constant onslaught of natural disasters, disaster management in Indonesia has yet to show optimum development. Indonesia may lack an ideal disaster management

and response system, even though disaster management agencies have been established at national (BNPB) and local (BPBD) levels. According to BNPB, Indonesia—unlike Japan, Australia, and the United States—lacks disaster mitigation standards, and as such, disasters continue to cause a significant loss of property and life (*https://nasional.kompas.com/read/2018/03/05/195 01381/bnpb-indonesia-belum* *punya-standar-mitigasi-bencana-seperti-jepang*). This can be clearly seen, for example, in the tidal flooding and land subsidence that have plagued the northern coast of Java for decades without any sign of effective resolution.

Indonesia's failure to establish an ideal disaster management system can be attributed not only to technical issues, but also to political, social, economic, and cultural dimensions. For instance, disaster management and mitigation depend on the policies and regulations produced by political actors at various levels. Policies that consider disasters in terms of diverse dimensions can ease mitigation and adaptation efforts. At the same time, the success of disaster management and mitigation is influenced by media institutions and individual journalists within them.

Likewise, the responses of the economic system have not been as desired. The potential for disaster is still not viewed as important when making decisions that will broadly affect society. Economic interests are predominant in the decision-making processes of a domain which should be oriented towards the public interest. As such, the economic system continues to heavily influence disasters through such activities as burn-clearing and the granting of construction permits in areas where construction and other economic exploitation should not be allowed. The weak response of various systems increases the danger of disasters.

2. Ecological Communication within Information Society

Luhmann's explorations are unique, and may be identified as a strong synthesis of various intellectual traditions that came before him. Several new concepts are introduced through his framework of ecological communication. First, complexity marks the high potential for differentiation between the components that shape the system. For Parsons (Ritzer, 2004), complexity is an integral part of system theory. Second, contingency—more specifically, dual contingency—shows the complexity of the processes through which humans

interact. Third, systems always and constantly confront new and different environments. Fourth, to overcome such problems, systems utilize the complexities within themselves to relate to or correspond with their environments.

Systems establish systemic structures to reduce the complexities within themselves as well as their environments, thereby negating the correlation between their transformations and their environments. Luhmann (1989) uses the concept of "resonance" to indicate the interplay between systems and their environments. Environmental complexities always pose problems for systems, but at the same time offer solutions. In realizing these solutions, the various components within the system work in conjunction. The social system and the mental system are unique, as the connection between them can be revised through a process of signification. According to Luhmann, meaning is a strategy for choosing between various alternatives. The substance of meaning is not understood as a property of system components, but more functionally as the basis for the integration of the ties between them. The importance of meaning within ecological communication lies in the essential reciprocity and self-referentiality of the communication system. Phenomenology has shown that meaning is the basis for the self; as such, it is self-referential. It also refers exclusively to other meanings. Communication can only communicate because it has meaning; as such, for Luhmann communication is not the transfer of information, but rather the actualization of meaning. The concept of meaning refers to the four or final of Luhmann's complex positions.

The concept of autopoiesis is used by Luhmann to refer to the unique capacity of living social systems to maintain their autonomy and unity through their own operations. Everything that functions as an element of the system is simultaneously part and product of the system. Luhmann shows how this is possible by distinguishing between system elements and systemic relations. Autopoiesis can be expanded into the social domain only if the elements of the social system are considered communicative actions, rather than people, individuals, roles, subjects, etc.

The importance of autopoiesis as a concept lies in its ability to provide a theoretical framework that identifies social systems as being able to self-referentially distinguish between elements, including money in the economic system, power in the political system, love in the family system, and faith in the

religious system. At the same time, autopoiesis requires a non-reductive relationship between the system and the infrastructure it requires (the environment). As such, anything that is not communication is the social environment. Within it, it includes consciousness (as a mental system) and the bodies (biological systems). Communication requires mental and biological systems to happen. Autopoiesis offers the synthetic whole that is needed to produce a system in the social domain. The importance of autopoiesis in ecological communication lies in its recursive organization of the entire social system. When a society is defined as a social system, and therefore as including communication, ecological problems can only be addressed by the society itself through the development of various subsystems.

In ecological communication, communication reacts to the disturbances produced by the environment of the society itself; this process is known as resonance. Ecological communication does not only refer to how a society can manage the existing environmental problems. It also refers to how a society attains a certain awareness of environmental problems and dangers. How can ecological communication be used to recognize the dangers faced by society? Environmental issues can't exist without any awareness of them. Ecological communication, however, is only possible when a society communicates about such problems as water pollution, air pollution, and deforestation. When such environmental issues are communicated, potential dangers may be understood. Ecological communication, thus, concentrates on how danger is constructed. It deals with the contours of the problems faced by society as it adapts to ecological problems, including its communication when disaster occurs. This means that ecological communication is concerned only with how a society *reacts* to environmental issues, and not with how a society *should react* to improve its relations with its environment.

Unlike earlier societies, modern society has been differentiated through various subsystems with specific and primary functions. As such, these subsystems are called "functional social systems". Economics, law, science, politics, religion, and education are all examples of functional social systems. Even if communication within society does not involve specific functional social systems, Luhmann argues that all of them have communicative consequences.

The problems that have emerged within the modern social system are linked to its own self-referentiality. As such, addressing the paradoxical situation of the social system being too strongly oriented towards itself (i.e. too self-referential) is the real problem. Functional social systems communicate within modern society using a binary, distinguishing between two opposites—right/wrong; legal/illegal; owned/unowned; immanent/transcendent; etc. Resonance within society is linked to specific functions and suited to specific functions as well. Complications emerge when dealing with ecological problems, however, as these involve two separate referential systems. First are references to the society as a whole and its environment (that outside society), and second are the references to specific functional social systems within the society. Problems occur when environmental changes produce little resonance, particularly when other issues are causing more resonance at the same time.

The coding and programs within the social system produce a clear reduction in what is termed "information". According to Luhmann (1989), this implies that a society with too little resonance will face environmental danger. Meanwhile, situations within society, in which communication occurs, will differ. The interdependence of communication and functional social systems is strong, and may at times produce too much resonance within a particular society.

Anxiety is an attractive theme in ecological communications. However, little can be achieved through communication that is rooted in a rhetoric of anxiety. This rhetoric can only block a society's attacks on its environment, which will lead to further anxiety. If, thus, a specific function must focus on environmental ethics within the context of ecological communication, Luhmann argues that this must be done carefully.

If these principles of ecological communication are applied to today's information society, the landscape of problems will become more complex. Within an Indonesian context, for example, there are different tendencies in different issues of ecological communication. Communication regarding climate change, for example, has faced serious obstacles within global society's construction of reality. As such, it can be clearly understood that the complexity of this problem could not be addressed readily at the national and local levels. It is difficult to frame disaster issues as part of climate change, and discussion cannot advance when reality

is constructed in a manner that rejects climate change. There have been several cases of developed countries making serious efforts to mitigate climate change (Climate change performance index, 2019). However, in developing countries it has been difficult to recognize climate change as an important issue that can be addressed together (Wahyuni, 2017; Wahyuni, Fitrah, Handayani and Robie, 2018). Within a Luhmannian framework, the ecological communication within such countries has failed to create resonance within society and thereby better communicate ways to adapt to and mitigate climate change.

Maritime disasters, meanwhile, have shown different tendencies. In ten years following the Aceh tsunami, society has shown considerable regression in its ability to adapt and its awareness of tsunami risks. Several tsunami-prone regions have again become occupied for various reasons, including economic ones (Wahyuni, Fitrah, Rum, & Octastefani, 2018). Luhmann (1989) has already underscored the importance of increasing awareness of the risk of disaster through communication. However, time and time again it has been shown that, as differentiation within society becomes increasingly complex, the short-term problems of society blinds them to potential dangers of disaster. The limited capacity for communication between the different functional systems within society results in comprehensive solutions being difficult to find. Indonesian society's sub-optimal response to disasters can be seen in the tsunamis that struck Palu, Central Sulawesi and the Sunda Strait (Banten and Lampung) in 2017.

Another case of maritime disaster, the tidal flooding in Semarang, has exhibited another tendency. Because the disaster has occurred regularly, and local society has considered itself to be capable of resolving the problem, it has been perceived as something that is unavoidable and requires response. Semarang society, thus, has seen disaster as "normal" and lost its sense of crisis. As a result, the disaster area has experienced a failure of infrastructure and a lack of necessary policies. Luhmann's ecological communication framework shows that environmental problems have yet to be used to mobilize the system for a comprehensive solution.

In the haze in Indonesia, blocking has been experienced by different stakeholders. For more than eight years, the issue has been discussed. However, the diverse interests of these various stakeholders have not been united in resolving the disaster.

Political resonance is difficult to avoid in the framing of the haze disaster in Indonesia. Overlapping political and economic resonance has blocked the finding of solutions. It is at this point that communication between functional systems or subsystems exist. In developing countries, this issue is a serious obstacle, one that significantly disturbs the ecological communication process. Society has undertaken an unending process of self-destruction because of the egotism of the system.

In cases of volcanic eruption, the development of infrastructure for adapting to disaster has been the product of continuous communication that has evolved over time. The bunkers that provided shelter in Yogyakarta during the 2006 eruptions of Mount Merapi were incapable of withstanding the 2010 eruptions. Such evolution has challenged Indonesian policymakers to continuously find solutions to potential disasters.

As such, the use of Luhmann's ecological communication framework offers communication analysts and scholars an instrument for analyzing and exploring communication within the context of disaster and ecology. Luhmann's perspective, which understands communication not as a transfer but rather as a process for creating a system that is more sensitive to certain issues, offers a new horizon for exploring environmental issues and problems. Within the context of information society, where information is central in social development, there is the potential for stronger resonance in dealing with environmental issues. However, in order to realize such ideal conditions, there are some conditions that must be met to enable society to better address dynamic and complex issues. These include, for example, greater digital literacy—an understanding of the character of the new media—in information society will enable society to better contribute to addressing environmental issues.

How can Luhmann's framework be applied within information society? Of course, the most appropriate discourse would be one that deals with the environment itself, including the disasters that occur. The context of information society is important, because contemporary society is a development of earlier agricultural and industrial societies. As such, efforts to analyze environmental and disaster issues within the context of information society will offer new nuance to Luhmannian thought as well as the concept of ecological communication.

Highlighting the importance of the context of information society is the fact that changes are occurring much more rapidly than in earlier periods.

These changes are not only positive, but also negative; for example, environmental degradation and disasters are occurring at a much higher rate than previously. Information society is also marked by science and technology taking an increasingly important role in everyday human life, including in humans' interactions with their environments. The new media, an icon of information society, offer a platform to promote discussion that can reinforce the resonance of the system and improve disaster response.

Conclusion

Luhmannian thought has contributed significantly to the understanding of communication as an important process in society. Within the context of disaster, it can clearly be seen that Luhmann's framework—which perceives communication as a social system's response to its environment—gives communication science the opportunity to explore disaster phenomena more critically and in more detail. Through Luhmann's ecological communication framework, one can understand how the social system communicates disaster issues. This includes what is being communicated regarding disaster, whether society succeeds in exploring the potential dangers of its environment, and how the resonance of the social system responds to disasters. Can society successfully realize the most optimum response to disaster, or is it hindered by various factors?

For Luhmann, communication is a circular process, one which functions to continuously reinforce the social system and improve its response to its environment. Luhmann's concept of ecological communication, if explored further, has the potential to promote an understanding of how social systems, such as that in Indonesia, respond to disasters. Ontologically, it can open space for further discussion, as communication is understood not as the transmission of a message from the communicator to the communicant, but rather more substantively as a process for creating a system that is more sensitive to the problems it faces in dealing with its environment.

This early exploration has shown that ecological communication within information society can increase the complexity of the problems being faced. Differentiation is more complex within information society as the constellation of relations within society increases the complexity of the problem. Resonance within the social system is challenged by the complexity of the system, and can

thus fail. Economic, political, religious, and cultural issues will all influence discussions within society and the character of ecological communication. Communication fails when specific values from political, economic, or even religious systems blur the essence of ecological communication.

Examined from a communication perspective, the disasters in Indonesia have their own narratives. However, nearly all of them have resulted from the weak quality of communication, which has limited society's capacity to detect the potential for disaster and to respond to disasters that occur. This results in poor disaster management and limits the ability to respond to future disasters. This study has shown that, in Indonesia, the social system has remained dominated by the political and economic system, as well as a strong mythology that has concealed the meaning of disaster and promoted discussions that have masked the essence and importance of proportional disaster management.

In the future, the essence of disaster must be reinforced in information society through the exchange of information as '...*something that makes difference in any later event…*' (Gregory Bateson in Luhmann, 2000). Conceptually, Gregory Bateson argues that information has a deep meaning, and one must see the essence of distinction as resulting from information being conveyed to others. As such, it is not impossible for further information to result in new social transformations. Ideally, disaster information must create social systems that appropriately respond to disasters and produce differentiated systems that respond to existing conditions through ecological communication.

The next question is how the social system of information society can achieve such a quality of communication. Improving the quality of information requires certain conditions to be met within the social system. For example, current society, marked by mass and new media platforms, implies a condition in which society is prepared to actively produce clear discourses. The resulting social anxiety reflects a problem that is still being faced by Indonesian society, and that will continue to be experienced in the future if media usage ethics are not reinforced. Ecological communication, applied in social studies, will therefore produce studies that are greatly needed to promote alternative approaches to disaster response and management—particularly in Indonesia.

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