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Understanding New Digital Media

Medium Theory or Complexity Theory?

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ABSTRACT

How should we understand the new digital media and the effect of digital networks on global communication? Medium theory would be an obvious candidate, suggesting that we are in the middle of a transition from a society based on analogue media (print and electronic) to a society based on digital media. However, the present article suggests we examine another candidate: complexity theory. According to writers such as John Urry, we are in the middle of a paradigm turn, the so-called complexity turn. The aim of this article is to discuss whether complexity theory can be applied to media studies. What are the gains, and what would we lose? The author takes as his point of departure two case examples. The first is the case of the Mohammed cartoons in the Danish newspaper *Jyllands-Posten*. The second is the case of the Internet. How are we to understand the Internet as a qualitatively new medium? The author goes on to present two fundamental concepts of complexity theory. The first is the concept of complexity. The second is the concept of mediated communication, which appears to change significance in the context of complexity theory.

Key Words complexity theory, hypercomplexity, Internet, medium theory, Mohammed cartoons

The Mohammed cartoons

The flutter of a butterfly's wing over the Pacific can give rise to tornados in Japan. This was how chaos theory was conceptualized some years ago.

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Apparently, chaos theory has now become a reality within the field of media and communication. Cartoons published in a Danish provincial newspaper have given rise to social earthquakes in the Muslim world.[1] Speaking as a Dane, the case has not been particularly honourable. But speaking as a sociologist, it has been extremely interesting.

If chaos theory were to be understood in terms of existing social theory, the obvious candidate would be Manuel Castells' famous theory of the global network society (Castells, 1996–8). Currently, rather banal utterances spread like digital epidemics. Currently, diplomacy does not act with handheld dispatches, but with websites and SMS campaigns. Currently, the whole world is in uproar with little obvious reason, beyond the actions of a local, minority-language newspaper.

But is it, after all, correct to conclude that we live in a globally connected network society? No. It is my assertion that this conclusion is too simple. Even though Castells is on the right track, it is misleading to claim that world society functions as one global network in which everything can happen, and in which everybody is connected to everybody else. Of course, it is tempting and popular to say that the world seems out of control – 'a runaway world' in the words of Anthony Giddens (1999), a 'risk society' according to Ulrich Beck (1986). But this is a simplification.

Why is it not true? First, because the network epidemic that we witnessed in early 2006 is not the rule, but an exception. Second, because there is no direct causal link between the Danish newspaper cartoons and the social drama in the Muslim world. If it were correct to describe modern society as a global, digital network, chaos would be the normal situation. However, even though chaos is a potential risk, it is still an exception.

Thus, in order to understand the current events, I would suggest a more sophisticated network theory: the theory of society as a global communication system elaborated by the German sociologist Niklas Luhmann (1995, 1997). Luhmann emphasizes that our current society can be characterized as a global network. According to one of his successors, Dirk Baecker (2001), Luhmann's (1997) tome on modern society, *Die Gesellschaft der Gesellschaft,* is a book about the computerized society. Like Castells and others, Luhmann is extremely sceptical about the idea that society should be a hierarchy with government and state power at the top. Just ask the Danish prime minister, Anders Fogh Rasmussen, or minister of foreign affairs, Per Stig Møller. They certainly have realized that they are not in control of the situation.

Our modern society is not an anthropocentric society. There is no rational human being pulling the strings from the control room. Our modern society is a polycentric society. Nevertheless, it is not a runaway society, but a surprisingly stable society. This is the important contribution to the understanding of today's society provided by Luhmann. He has demonstrated that stability does not depend on rationality and centralized control. He has shown that in modern societies the alternative to equilibrium is not chaos, but complexity, and that complexity is the result of dynamic, decentralized self-organization. Polycentrism does not lead to chaos, but to dynamic self-stabilization.

First, our modern global society is not one huge network, but consists of an enormous number of loosely coupled networks. All these networks influence and disturb one another, but they are not directly interconnected. This implies that cartoons in the Danish newspaper *Jyllands-Posten* may irritate social and cultural networks in Lebanon or Syria. But these networks operate according to their own inherent mechanisms. Only under very special conditions does a wave of self-perpetuating interference occur.

In relation to the so-called 'cartoon-crisis', the Danish newspaper cartoons had no causal status. They just triggered off already existing dynamic forces. Even though I do not personally find the cartoons in *Jyllands-Posten* particularly tasteful, the situation of demonstrations and setting embassies ablaze was not, in the strict sense, *caused* by the Danish newspaper.

Thus, the so-called network society is rather a *networks* society, and the many networks are mutually closed and only structurally coupled, with lots of blocking mechanisms. Under normal conditions the result is a state of dynamic, self-organizing stability.

Second, according to complexity theory, agitation of normal order causes self-reflection en masse. The reason is that self-reflection is one of the ways in which social networks recreate their internal stability. If one looked at Danish newspapers after the crisis, they were flooded by readers' letters. Every columnist and opinion maker (myself included) discussed whether freedom of expression is unlimited, or whether rights – in this case as elsewhere – are connected with obligations, for instance the obligation to manage one's freedom of expression with thoughtfulness. The general effect of this public debate, this process of collective self-reflection, is that a stable state of normality is re-established.

Thus, even though one should expect that in a globally networked society chaos would be the rule, Luhmann explains why it is still the

exception. But he also explains why it *may* end in disaster. As already mentioned, only under very special conditions are waves of self-perpetuating interference set into motion. For example, demonstrations may spread from one country to the next. These reactions are not directly caused by cartoons in Denmark. Rather, one reaction reinforces the next. Almost prophetically, in view of the cartoon crisis, Luhmann assumed that the transition into a global social system with functionally differentiated networks would lead to an 'increased level of social irritability' (Luhmann, 1997: 789). The advantage of polycentrism is that a polycentric society missing a central steering function can react much faster than a centralized society would be able to. However, the potential cost is that '[to] the lack of coordination of irritations society can only react irritated' (Luhmann, 1997: 789). This is what we see in the current situation. A high level of frustration caused by the fact that nothing can be done. Because the basic social mechanism is structural couplings between social systems that operate according to their own functional mechanism, these global network systems develop in a way that is in principle unpredictable. The result is a state of global neurosis.

Compared with the traditional self-understanding of social actors, in this situation everything seems to be turned upside down.

First of all, direct political control has suddenly appeared to be a sign of risk, not of security. Not only from a democratic, but also from a pragmatic point of view, it is appropriate that the Danish prime minister cannot control the Danish media. It is risky that this is not the case in countries like Iran and Syria. One should not primarily fear their weapons, but the lack of watertight bulkheads between religion, media and politics.

Second, powerful social actors, prime ministers and presidents of corporations alike, during the first weeks of 2006, experienced a massive identity crisis. They thought that they were controllers of the universe, and then it appeared that they are just pawns in a much bigger game.

Third, it has demonstrated that, beyond question, Danes too live in a global society, although conservative and reactionary forces in the country have not wanted to accept this fact.

From this perspective, the initiative of *Jyllands-Posten* could be seen as beneficial. Contrary to its own intention – and quite ironically – this most conservative newspaper has demonstrated that Denmark – this small, self-sufficient country – is a member of the global networks society, and that it has to act accordingly.

The Internet: a new medium or a complexity machine?

The conclusion to the Mohammed cartoons case is that the introduction of new digital media leads to a dramatic increase of social complexity in both space and time. The communicative reach has extended, and cartoons published in Denmark are now being accessed by people in Iran, Syria, Indonesia, etc. At the same time communication has speeded up.

If any single medium can represent this dramatic change, it is the Internet. Consequently, the basic question is whether the Internet can be understood in the same terms, i.e. as a 'complexity machine'. Thus, my second example is the case of the Internet.

Most theories and analyses of the Internet have, implicitly or explicitly, subscribed to the so-called medium theory (Finnemann, 2005: 36–7). For reasons provided later, I would suggest considering another paradigm: the complexity theoretical paradigm.

Medium theory dates back to a number of different researchers, such as Harold Adams Innis (1972), Marshall McLuhan (1962, 1964), Walter Ong (1988) and Joshua Meyrowitz (1985). For an overview, see Meyrowitz (1994). In an unpublished paper, Meyrowitz describes medium theory as a focus on media as environments (contexts or milieus) for society's communications: 'The media-as-environments metaphor focuses attention on those relatively fixed features of a given medium that make it a unique communication setting and distinguish it from other media and from face-to-face interaction' (cited in Dalgaard, 2005: 29).

Although there are different roots to medium theory, in the following I treat it as one paradigm based on the media-as-environments metaphor and assuming that a certain social era can be related to a media complex with identifiable, stable features. I also assume that many media researchers at least implicitly subscribe to these basic medium theory assumptions. Within this broad definition, medium theory works well for earlier societies, i.e. for so-called oral, writing and print eras. In the oral era, social knowledge was archived by networks of storytellers. The size of the communication community was limited by the physical reach of verbal communication, and the basic information challenge was to remember what was told. In the writing era, social knowledge was archived by manuscript collections. The size of the communication community was limited by the access to the relatively limited number of written copies and by the ability to read, and the basic information challenge was to preserve the handwritings. Finally, in the printing era,

social knowledge was archived by the library. The size of the communication community was in principle global, although it was delayed by physical transportation and limited by reading abilities, and the basic information challenge was to organize the ever-growing amount of print material.

Inherently in this theory lies the assumption that a given media complex has a small number of fixed features.

But what about the so-called 'digital era'? On the face of it the same questions can be answered: social knowledge is archived in what can be called a 'meta-archive'; knowledge can be accessed through search engines, according to search criteria determined by technical, political and economic forces. Technically speaking, the size of the communication community is global. In reality, it is determined by electronic access to the digital network. Delays are minimal. The information challenge is to manage information complexity, i.e. to filter irrelevant information.

However, the basic methodological question is whether digital media can be characterized by a limited number of fixed features. The answer is that, on the contrary, the computer and the Internet as a digital network of computers can be characterized as a 'multi-semantic system', its main 'quality' being to integrate all known media into one converged multimedia system. The computer and the digital network is a medium that can copy any other medium. While other media are mono-semantic media, having a limited number of fixed features, digital media have an unlimited number of features. Consequently, it is problematic to characterize the Internet as a communication environment with a fixed set of features such as medium theory demands. Also, while it is highly relevant to study remediation processes (Bolter and Grusin, 1999), it is a problem to identify *specific* 'remediation effects' of the digital network of computers.

Consequently, I would suggest another – or, at least, a supplementary – approach, i.e. the so-called complexity theoretical approach.

According to this approach, the basic function of media is to manage social complexity, the basic mechanism being that complexity is managed by complexity. For instance, oral media are characterized by a low level of communication management potential. It cannot manage geographically complex social systems, because the geographical reach is limited. Similarly, it cannot manage historically complex social systems, because the ability to remember is limited. Thus, only societies with a relatively low level of social complexity – i.e. physically and historically limited interaction groups – can manage themselves through such media.

In comparison, a modern, functionally differentiated, globalized society could not be managed through oral or print media, but only through the Internet as a digital network of computers.

The introduction of this paradigm has a number of theoretical consequences. Instead of characterizing the Internet through its fixed medium qualities, it should be characterized in terms of its complexity management capacity. Here, the basic point is its ability to reproduce itself through its fixed protocols and its hypertextuality, i.e. its ability to create links between nodes in the digital network. Thus, it represents a dynamic, self-developing media system with an ability to develop internal complexity.

One of the main effects is the paradoxical impact of the complexity of the Internet. By increasing its internal complexity, thus being able to manage external complexity, the Internet in itself produces complexity management problems. This is an everyday life experience: we could not live without the capacity of the Internet. At the same time, however, we are overwhelmed by the unlimited input capacity. At the societal level, with the characterization of 'network morphologies' and the concept of 'spaces of flow' as a concept for the dynamic identity of the network society, Manuel Castells has suggested sociological concepts for a complex, but not chaotic (and certainly not stable) society. Another elaborated proposal has been developed by Niklas Luhmann (1997).

Compared with the media determinism of medium theory, complexity theory represents what could be called a social determinism. It addresses media and media development in media evolution terms, implying that new media emerge in order to address emerging social complexity management problems, creating an endless spiral of social-media complexity development dynamics.

Finally, this paradigm has a number of more basic theoretical consequences. For instance, it does not consider communication as a transfer process, but as a phenomenon with low probability. Successful communication is not a 'natural', but a highly improbable phenomenon. Thus, the effect of communication media is to limit the improbability of communication success, and the qualities of media can be measured by their impact on communication success. By using new media, does it become more or less probable that the sender reaches the intended receivers? Does it become more or less probable that understanding is achieved? Does it become more or less probable that the intended effect is achieved? These three dimensions (dissemination, understanding and effect) are the three basic communication dimensions of any medium.

Complexity

The basic concept of complexity theory is of course: complexity. Even a quick examination of these concepts reveals that not only does the word stand for complexity. It is in itself a conceptually complex word.

At first glance, one might think that complexity could be defined as a fixed figure. One would think that complexity is 'more' than order and 'less' than chaos. However, complexity is a relative concept. Whether something is complex depends on the capacity of the observer. In the natural sciences, Per Bak has suggested a division between order, chaos and complexity. At least since Prigogine's theories of dissipative processes in natural systems it has been obvious that order – systems in balance – cannot exhibit any of the interesting current natural science issues. But the same goes for the concept of chaos. Like systems in balance, chaotic systems exclude the dimension of time. Orderly systems do so because they do not change, or only change according to mechanical principles. Chaotic systems have no memory of the past, and thus they cannot evolve and they cannot reflect on their past (Bak, 1996: 30).

In comparison, complex behaviour is always created by a long process of evolution. It implies that the system with complex behaviour is operationally closed and that it is able to observe both itself and its environment. Therefore, in order to define complexity, Luhmann has to include the existence of an observer. For an observer, 'a system is complex when it is not fully ordered or fully unordered, but realizes a mixture of redundancy and variation' (Luhmann, 1997: 136; my translation).

This implies that complex systems will always be characterized by a combination between the increase in complexity and its reduction (see Nowotny, 2005: 15). This is why the Internet can be characterized as a complex medium – compared with other media that do not have the inherent quality of self-regulation and self-development. This also provides an explanation for the Mohammed cartoons example discussed earlier. A complex system is complex in the sense that it cannot combine every element with every other element, but is forced to make selections. The result is contingency.

However, in a modern society complexity is unavoidable. One cannot address external complexity by absolute closure. Only complexity can reduce complexity (Luhmann, 1995: 26).

Mediated communication in a complexity theory context

This leads to the second consideration in this brief introduction to complexity theory to media studies: mediated communication.

According to systems theory, communication is characterized by double contingency. One communication actor cannot observe the other without a loss of information. Or, in the terms of complexity: all elements of one actor cannot be connected to all the elements of the other. The immediate consequence is that communication cannot be understood in terms of transfer with the medium as an environment for the transportation of information. On the contrary, communication is highly improbable. An analysis of communication, both in general terms and in relation to the special type of educational communication, implies that three types of improbability for successful communication can be identified.

One may take the normal classroom experience as an example. First of all, it is not probable that the pupils will hear what is being said. Second, it is not probable that they understand what is being said. Third, it is not very likely that the children – if, against all odds, they have heard and understood what was said – react to what has been uttered in accordance with the intention of the communication. This can be illustrated by Luhmann's own example from an evening meal with his family. When he told his children that they should wash their hands, they didn't hear him. They were too busy doing their own activities. When they, eventually, heard what he said, they didn't understand it. They looked at their hands and simply couldn't understand what was meant. 'Dirty? What do you mean?' And when they finally understood it, they didn't react accordingly, but continued doing what they thought was more important, silently backed up by their gentle mother, who gave the impression that it wasn't after all *that* important.

A similar example has been provided by Søren Kierkegaard. He presented a copy of one of his ethical essays to a person he knew – but obviously didn't admire. In the book he wrote the following dedication: 'It is not likely that you will take the time to read the book. If you do so, you probably will not understand it. And even if you do understand it, you certainly will not change your lifestyle accordingly.' However, he sarcastically added, 'I believe that you will be pleased to note that it is bound in chamois with gold printing.' Once again, there are three improbabilities: the improbabilities of being heard, understood, or accepted and followed.

Based on these three types of communicative improbability, three types of media can be identified (see Luhmann, 1995: 157–63). Referring once more to the classroom example, the result is as follows:

- It is improbable that the child will hear what the teacher says, i.e. that the message reaches the addressee. Consequently,

dissemination media (writing, printing, loudspeakers, broadcasting) must be used.
- It is improbable that the child will understand what the teacher says. Consequently, media of understanding must be used. The basic medium of understanding is language, but in the educational context this must refer to concepts that relate to the children's world of experience.
- It is improbable that the child will react according to what the teacher says. Consequently, effect media must be used. These are techniques of persuasion, rhetoric, etc. At a societal level, it is the development of symbolically generalized communication media, i.e. media that are functionally adequate to a particular set of problems.

From here, the basic mechanisms of media in relation to communication can be identified. Dissemination media will increase the probability of communication between actors without physical contact, e.g. global communication. However, the effect is increased social complexity, which then leads to considerations of using or developing new media of understanding and new effect media. However, the risk of using effect media is that the focus becomes too narrow, thus excluding relevant addressees.

I hope that this brief and simple example illustrates the basic point of complexity theory applied to media studies. That media always have a double effect of increasing and reducing complexity. And that the Internet is a particular media system that has internalized this double mechanism into its dynamic functionality.

Conclusion

The aim of this article has been to present the application of complexity theory in studies of new digital media, and to compare this with the medium theory approach.

First, I have illustrated the doubleness of modern media, that they increase social complexity, and that they are also used for managing complexity. This results in 'communication events' like the Mohammed cartoons case.

Second, I have tried to demonstrate that according to complexity theory the role of media is:

- To make communication possible;

- To increase social complexity by giving access to social acts worldwide;
- To manage social complexity by building systems of internal complexity in order to balance external complexity.

Of course, the final result is a paradoxical situation. That one has to increase the level of personal and organizational complexity in order to cope with an increasingly complex world. I believe that this paradox mirrors the personal experience shared by most of us, living in modern, hypercomplex societies.

Note

1. The cartoons were published by the Danish national newspaper *Jyllands-Posten* on 30 September 2005. After an initial wave of protests from Muslim countries, in October 2005 Prime Minister Anders Fogh Rasmussen received a letter from the ambassadors of 11 Muslim countries asking for a meeting, but he refused to accept the invitation. This, then, led into the massive wave of protests mentioned in the article.

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