

# **Semiotic Perspective on Sensemaking Software and Consequences for Journalism**

**By**

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## **Abstract**

This paper aims to demonstrate how the workings of the argument-mapping software Compendium are compatible with both Peirce’s notion of semiotics and with the Actor-Network Theory framework developed chiefly by Bruno Latour. With these concepts established, this paper explores the implications of Compendium for McLuhan’s conception of media. Following that, the implications for sensemaking and argument mapping for journalism are explored, and an avenue for development for media is suggested, using Cohere as a conceptual starting point for a hypothetical system.

## **Introduction**

This paper introduces the concepts of Bruno Latour’s Actor-Network Theory, supplemented by the framework of semiotics proposed by American philosopher Charles Sanders Peirce, and applying them to Compendium. With these frameworks, the paper suggests that Compendium can be thought of as an equal to human participants when used in the context of a community discussion. In addition, with concepts of media by communication theorist Marshall McLuhan, the paper would suggest that tools such as, but not limited to Compendium, are essentially creating a community of extended minds.

Software projects such as Compendium, Cohere, and many others indicates that there is a need for tools to help in the process of ‘sensemaking’. ‘Sensemaking’ here refers to “how individuals and groups construct meaning when confronted by complex, and sometimes contradictory information” (Uren et al., 2005). This ‘sensemaking’ can be further elaborated as “giving form to our evolving understanding of the meaning of data and ideas, as we seek to relate them to our existing conceptual structures, through talking, sketching and other forms of external representation”(Ibid). Sensemaking is examined here especially in the context of “wicked problems” since it is in that specific usage that the power of sensemaking comes into its own. Wicked problems, as defined by Jeff Conklin are often difficult, complex intractable issues with no definite solution that would require a different set of cognitive frameworks in order to even begin understanding the problem (2001). Of external importance is the fact that many global issues of pressing concern can be termed as wicked problems since these problems are often complex issues with multiple stakeholders contesting for their own perspectives of the problems to predominate.

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Interpretations of Compendium can help draw out the implications of its usage and the overall process of sensemaking, especially in context of its usage in community discussions. This paper is then, a proof-of-concept to demonstrate how sociologically-driven theories can demonstrate the agency of software. Moreover, such software can be thought of an additional media that extends another aspect of man in the McLuhanian sense.

Marshall McLuhan writes in *Understanding Media* about how various inventions have extended the abilities of man. Clothing becomes an extension of the human skin in helping to trap heat (1964); housing then becomes for the home and the family what the clothing has become for the individual (Ibid). The wheel, bicycle and airplane have become extensions of human feet in the area for transportation, and so on (Ibid).

In the last chapter of *Understanding Media*, the argument could be made that McLuhan glimpsed into the information age by demonstrating how various inventions of humanity have enhanced and altered the way people relate to information.

First published in 1964, these conceptual framework of analyzing the extension of human characteristics, along with his analysis of information and communication, provided the basis for subsequent interpretations of the information-dependent age of the late 20th and 21st century.

## **Semiotics**

Semiotics refers to the study of signs and their meanings. The applications of semiotics have been varied, although they are used mainly in literature. One could even argue that the study of linguistics constitute a branch of the study of semiotics.

Here, the semiotics as developed by Charles Sanders Peirce and by Bruno Latour will be of interest. The two approaches share a common denominator in being rooted to the logic of semiotics, in presuming that signs can be interpreted, and that there are processes that allow for the interpretation. The two approaches are also markedly different, in having different typologies and approaches in the way signs are interpreted. The differences of these approaches are noteworthy, in providing different perspectives in the interpretation of Compendium.

## **Peircean Semiotics**

The semiotics of Charles Sanders Peirce, is based on three elements: sign-vehicle, interpretant, and the object (Atkin, 2006).

While a comparative study of the two systems is beyond the scope of this essay, suffice to say, the system that Peirce proposes will be the theoretical framework used in the paper since the inclusion of a interpretant, as we will see, is an important factor in the overall semiotic functioning of Compendium, and in Compendium-mediated discussions.

The sign-vehicle, which is also known by the term ‘signifying element’ refers to the “causal connection” that exists between the phenomena or qualities that are identified to be the traits that are signified. The Stanford Encyclopedia of Philosophy provides the examples of molehills as a sign of moles: that it is not the color of the mound, nor the size of the molehill that identifies, or is a sign, for the existence of the moles, but the one could argue, the quality of the molehill itself that stands for, or is a sign for, the existence of the moles.

The next important component in Peirce’s theory of sign relations is the concept of the object. The concept of the object can be thought as the constraints of the signification of the sign. One aspect of this would be in the physical manifestation of the sign-vehicle itself.

The interpretant refers to “the sign in the mind that is the result of an encounter with a sign”, and can be thought of that which intervenes between the sign in the world and in the comprehension of the sign being standing for something else, or in terms of its actual signification.

In this various ways, the process of semiosis that Compendium engenders can be clearly brought out.

### **Bruno Latour’s Actor-Network Theory (ANT)**

ANT has been described as “a ruthless application of semiotics” (Law, 2004) or as an sociology of associations (Latour, 2007). To be clear, ANT does not refer to any specific theory or framework, but rather, refers to various approaches to doing things that have in common, some principles in the analysis of socio-technical systems.

What is unique about ANT is an emphasis of non-humans or even the ascription of agency to objects in their studies. This is what ANT writers have labeled as the ‘principle of symmetry’, although this symmetry refers to a methodological symmetry, rather than treating alike humans and non-humans. The motivations for ascribing such methodological symmetry to objects, as written by Law is that “since both nature and culture are produced together and in the same process, it is unsatisfactorily asymmetrical to assume that nature has a particular and distinctive form, and therefore needs to be explained in terms that are different to those of the social. Rather, says Callon, we should follow a principle of ‘free association”, and continues with, “Instead of imposing a pre-established grid of analysis upon... [the entities and their relationships mobilised by actors in discussion], the observer follows the actors in order to identify the manner in which these define and associate the different elements by which they build and explain their world, whether it be social or natural” (Law, 2004).

For Latour, ANT redefines the term ‘social’ is a ‘type of momentary association’, wherein entities are associated or ‘translated’ into new combinations (2007). Non-human objects are thus granted agency in the way they become associated with human actions. This perspective is noteworthy in this re-examination of the usage of Compendium.

### **Compendium and Cohere**

Compendium is an example of an issue-based information system (IBIS), that is used for dialogue mapping for topics. As such, Compendium can be thought of as a software tool that aims to facilitate the process of sensemaking.

The interface of Compendium comprises of several kinds of nodes, representing the different responses that are most often used in the format of a structured conversation. Here, the term structured conversation refers to dialogue that is directed towards the aim of understanding a specific topic.

In an IBIS, there are a few defining questions, and following that, more questions, which prompts further answers and responses.

For the scope of this paper, the most important type of nodes will be considered: question, idea, pro, and con. These nodes can be thought of as fundamental to the whole project of Compendium.

While Compendium might be deployed in many possible methods, the usage here that will be dealt with in greater detail is when Compendium is used in the context of a discussions

session, where the participants are physically present. While the number of participants need not be specified, there would possibly be an optimum number of participants for effective discussion and facilitation.

More importantly, Compendium could be thought of as playing a key role as a tool for the mediating or facilitation in learning environments, a classroom being a key example of where the learning takes place. An examination of the usage process of Compendium would be necessary in order to understand and evaluate its efficacy in mediating discussions for the benefit for every participants.

One would wonder however, if the language represented through the usage of Compendium could find wider applications beyond the classroom. As a form of dialogue-mapping, Compendium could easily be used to explicate complex issues and key arguments for civic awareness. One could even go so far as to imagine reasonable political debate and where the assumptions of different factions are laid out neatly in the visual language of Compendium – as an example.

Cohere is another example of a sensemaking software related in function to Compendium. Whereas Compendium is a desktop-based programme, Cohere is instead, an online-based application that allows users to construct their maps.

Cohere shares several similarities with Compendium, offering the same structure of ideas, links, and the terms used to describe the different kinds of nodes. What is unique about Cohere is that the links are labeled and describe the quality of the link between nodes. This differs from Compendium in that, while Compendium allows for the labeling of links between nodes, Compendium does not allow for the quality of the link to be expressed. However, this and other differences between Compendium and Cohere do not necessarily complicate the analysis, rather the different software program should be seen as different variations of the same theme of sensemaking using the visual technique of argument mapping.

### **Actor-Network Theory and Compendium**

Following the semiotic arguments made of Compendium, one could then argue about the place of Compendium in an entire organisation or group. Based on the principle of symmetry for both human and non-human actants in an actor-network, the case can be made for Compendium as being an actor in its own right in the context of a sensemaking group. Without Compendium, or the facilitator using Compendium, the whole process of sensemaking is at least compromised; while there are other analogue tools that can help achieve comprehension of a complex issue, analogue tools are constrained in not being as easily wielded as software tools such as Compendium.

Compendium then, can be thought of as a participant in the entire process of collective sensemaking in a group. One could even argue that the icons used in the user-interface of Compendium, can by themselves, individually, and collectively, be thought of as participants in the entire process of sensemaking. While the individual icons themselves would only make limited sense in the context of a discussion, it is the relationships between the ideas, questions, pros and cons that collectively create a complete actant that interacts, in dynamic fashion with the participants and the user of Compendium.

The term ‘dynamic’ is used to denote the constant interchange, the back-fro of ideas within the different participants. There are a few relationships that can be conceived of, and they are:

1. Amongst the participants;
2. Between the participants and the Compendium representation;
3. Between the Compendium-user and the participants;
4. Between the Compendium-user and the Compendium software.

All of these relations would have to be considered in their own right, since the dynamics between these modes of interactions are completely different. On this note, one could even argue for a fifth mode of interaction, and that is;

5. Between the icons in Compendium.

The principle of symmetry of ANT approaches require that both non-human and human actors have to be examined on similar methodological terms. In this context, human participants in a Compendium-mediated discussion should not take pride of place in the analysis of the entire discussion, rather, the role of the software and the representations afforded by it would have to be considered on their own terms as well. The motive for taking such a stand is that the entire set of interactions are not reliant on the human participants *alone*, nor the software *alone*, nor even the Compendium-facilitator *alone*, but is very much intertwined by at least these three sets of entities. The usage of ANT perspectives thus allows for the examination of the entire process of Compendium-mediated discussions.

One could imagine that the participants of a Compendium-mediated discussion to leave the session with a distinctly different set of ideas from when they first came in. The resulting difference made due to the representations of Compendium then go on to further influence interactions thereafter. As explicated above, Compendium does not merely provide the representation of ideas and arguments, but also the language that is accompanies the representation. One can imagine someone who has gone through the mediated discussion session to begin speaking in verbal what was represented as visual. In so doing, the very visual structure of Compendium has become translated to the verbal.

The semiotic framework demonstrated using Compendium can be applied largely to Cohere as well, with some modifications. For one, Cohere is imagined to be used in an entirely personal setting, and so the processes that involve other human participants would be absent, which results in only points 4 and 5 remaining.

### **Semiotics as applied to Compendium**

The semiotic process in Compendium is fairly obvious: the icons representing the nodes clearly demarcate their roles in the entire dialogue map. Question marks illustrate an enquiry that is being expressed, while light bulbs represent an idea that is being offered in response to a question or as a response to another idea.

However, there is another point that is less obvious, in that the entire structure of nodes and links only make sense in relation to one another. Without a question node, the presence of the idea node would be moot, and the reverse is true. An idea isolated by itself in the entire argument map would not make sense, and would defeat the purpose of sensemaking as the objective for the argument map.

In the Peircean system as applied to Compendium, the object could refer to the graphical representation via the icons of the light bulbs, question marks, plus (+), minus (-) and arrows, that are in themselves, indexical signs that refer to 'ideas', a 'question', 'pro' 'con' positions, and relations, respectively in the context of Compendium usage.

One can then conceive the icons and with the relations signified by the arrows, as forming

a language, one that requires participants in a Compendium-mediated discussion and the user of the Compendium itself to understand, in order to arrive at the end, of sensemaking.

The three concepts of Peirce's semiotics will become important in the subsequent examination of Compendium and Compendium-mediated discussions. What is important for this examination is that the Peircean perspective contains the intervening 'interpretant' - the 'sign in the mind'.

A participant viewing an argument map in Compendium would be viewing the entire map as a sign in itself, and the overall environment of the Compendium software can be thought of as the object which limits the kinds of signification that can occur.

The process of sensemaking can be thought of as generating the interpretants - the signs in the mind necessary to understand the complex issue at hand. Thus, the role of software such as Compendium can be re-framed in an entirely different light, that the software is responsible in assisting with the formation of the interpretants in the first place, by explicitly 'embodying' the interpretants in a visual format.

The process of semiosis interpreted through the workings of Compendium provides then an avenues through which Compendium and related software can be said to gain agency within the local construct of the Compendium-facilitated discussion. In the language of ANT, Compendium becomes an *actor* where it is heavily involved in the social activity

The triadic relationship formulated thus can be found when considering the application of McLuhan's ideas in the context of Compendium.

McLuhan is considered a revolutionary in some quarters in considering how different technological inventions were extending the reach of humanity. Having viewed the semiotics and the role of Compendium in heterogeneous networks, the point can now be made about the role of Compendium in a larger context, in acting as a tool to enable the effective sharing of arguments in a collective setting.

Compendium and other related IBIS can then be thought of as an extension of the collective's minds. Whereas computers and previous forms of digital information were thought of as extensions of the human mind, and whereas the internet could be thought of as a neural extension of numerous human minds, Compendium can be thought of as being a directed form of conversations that is formally different from the interactions on the rest of the world wide web.

The directedness of the Compendium is due to the nodes and in the way the nodes function together to form a 'conversation structure' so to speak. This form of conversation structure differs significantly from the discussion or comment threads typically seen on various websites as the features on Compendium provide structured responses to previous ideas or topics.

The medium is the message for Compendium, in that the format of the argument structure constitutes a framing message for the contents lying within it. There are numerous layers of meanings embedded through such a format, and in Compendium there are at least three forms of meanings.

The first layer of meanings lie in the usage of Compendium itself. The design of the software and the visual of the icons and functions constitute a language for the user to navigate through.

The second layer of meanings lies in the presentation of the map itself. The design of the icons as nodes, and the relations between nodes as depicted using arrows constitute the second layer of meanings that would have to be deciphered for participants and users alike.

The third layer though, is the intervening layer between the software usage layer and the map layer of meaning. This third layer is in the usage of the Compendium *tools*, that is markedly

different from the literacy of the software itself. Another way to describe this third language process would be *fluency* (Shum, 2007). Knowing the tools, functions and the associated significations icons in Compendium is one thing, but being able to use these various tools, and manipulate the signification of the tools themselves constitute another skill altogether. This third process incorporates both the first process in the know how of the icons and functions, but includes knowledge of other factors, such as an understanding of the visual nature of the map, in knowing where and how to place those relations with each other. What would constitute examples of fluency includes the overall distribution of nodes, and the extent to which the entire map can be easily interpreted by both the user and the other participants. What also exists at this levels are the 'rules' which are used to construct the maps. For example, one of the points that has been raised with the usage of Compendium has to do that each node should represent one and only one statement, question or stand. This is crucial since objections, and replies can then be brought to bear only on that issue, reducing ambiguity. Another rule that has been thought about is that one daughter node can have one and only one parent node. In this sense, one can imagine that the usage of Compendium and the thought that goes into the representation of the argument map can be thought of as a kind of language even.

The first layer of meanings correspond to the objects in being the physical limitations that restrict the possibility of the signification process. The second layer of meanings correspond to the sign-vehicle, in being in the form of the map that transmits to the participants. The third layer of meanings correspond to the interpretant, in intervening between the signs and the mind that understands the sign and the associated meanings attach to those signs. The entire nature of the argument map only makes sense when these three components are integrated together. The argument map *signifies itself* within the boundaries of the Compendium-mediated discussion. *Minds* are already embedded within it, hence the usual interpretant that resides in the mind is now embodied within the argument map.

Since the map is the message, knowing *how* to draw the map becomes an almost hidden tool in the usage of Compendium, and is arguably as important as what the contents of the nodes actually consist of.

## **Synthesis**

Having explicated the premises of the main frameworks, one can now put together that attempts to synthesize the various frameworks together, constituting an attempt to interpret the role of Compendium and related software in the relationship with human actors.

ANT and related approaches demonstrate that Compendium is deeply embedded in sociological accounts, and that there is an melding of the human and the non-human together in a single discourse. Peircean semiotics undergird the functioning of Compendium, by explicating the process of semiosis that occurs as participants and users together create an argument map. One observation made in this instance is that the visualisation of the argument map could very well be congruent with the interpretant - the sign in the mind that aids in the comprehension of the argument map.

McLuhan's concept of media as the extension of the media then finds an additional example in the illustration of how Compendium is used as an extension of the collective, in a way that is more directed and structure than the comment structure used on the Web.

The three concepts together could cause a review of the way Compendium can be interpreted, with further implications for how the usage and design of Compendium and related

software might need to be examined in greater detail.

The consequence of these perspectives re-interprets the relationship between software and the human actors. The discussion above has import on the issue of media. While the analysis above was based on a small-group discussion setting, one could easily imagine extending the small-group to an even larger group, perhaps extending to an entire nation or the entire world. McLuhan's notion of the electric media forming the brain of the world is not then, too far from the truth.

Having demonstrated the agency of Compendium, and having also shown how something like Compendium itself can be thought as the medium/message, then an another important point can be made about the relevance of discourse systems such as Compendium on the media and journalism landscape.

### **Applications for Journalism**

Newspapers are in the midst of a transition period as new business models are being sought. One move has been that of engaging the reader by incorporating elements of the social into news stories. These developments have been in place for a while, in fact, with the "comments" section now commonplace. Most news websites today also allow for sharing of the news story by introducing Facebook, Digg, and other social networking websites links at the end of their news stories. All of these represent additional attempts by news websites to engage the reader on several levels. Despite these attempts, newspapers continue to struggle to find a viable news model.

There is then, the case for exploring alternative ways to maintain the necessary service of providing news content to the information consumer. While there already exists an established network for information dispersal of current news via the established services of Reuters and the Associated Press, journalism has always depended on the human writer to make sense of the news by introducing aspects that would be of interest to the reader. Hence the lament that news stories are sometimes sensationalized in order to attract the interest of the reader at the expense of accuracy or objectivity. Yet, the model worked, in a way, since readership increases attracted advertisers to place ads on the newspapers.

The advent of software such as Compendium working towards the project of sensemaking adds an additional dimension to the issue of the future of media and journalism. Newspaper companies could now instead offer secondary or even tertiary analysis of news events in the form resembling that of the argument mapping process mentioned elsewhere. Drawing on elements from social media and the requirement of interactivity to engage readers, these argument maps could then be made editable by readers.

One could imagine perhaps, a different kind of "Comments" section, where instead of looking through the comments in prose, a viewer on the website could instead be viewing the various argument maps that others have created for themselves, based on the original argument map created for the news story.

The role of the journalist/editor would then now, have to incorporate the role of the librarian, or as Park would call it, a "knowledge gardener".

The creation of alternative maps would not be the only mode of interaction between the map and the user. Semiosis of the hypothetical argument map already provides avenues for the fictional reader to engage with the map in highly abstracted ways, as Peirce would have it. Since



the map itself would already contain a huge trove of meanings, fictional readers could edit on the map itself, and news companies should, provide that capability to be present.

As argument maps develop and new insights gained, the need to develop entirely new arguments maps might be diminished, although numerous more specific sections or sub-sections of large, extant argument maps would be required for focus. In these instances, scalability in both visually in the drilling down of more specific issues, and in the context of scope would have to be considered for ease of the reader. Even if the reader does not contribute to the maps, the reader would have to pay in order to access the potentially huge catalogue of maps made by other readers. While the details of the payment system under such a scheme would have to be worked out in greater detail, one can imagine the justification of paying for access to the maps of others and to the librarian-services of the reformed news companies.

The implications of acknowledging the active role of software programs in the process of semiosis presents additional opportunities for working in the area of interactions between information systems in the person and with a larger community. While Cohere represents exactly a working model of what is being argued here for, what is missing is largely the attachment of argument maps with moving news and research notifications. An additional entailment that can be drawn out from this example could be the automation of the argument mapping process, and the search for possible responses from questions using various search engines.

### **Further thoughts and conclusion**

This paper was written with hypothetical constructs, and as such, will require validation from work in the real world. Ideally, ethnomethodological work with real participants on real issues using sensemaking software will be preferred to serve as resources to validate the process of sensemaking. The methodology is likely to require video recording for the session itself, complemented by the interviews post-discussion to find out from participants about the entire process of sensemaking. On another front, developments can be made on how to incorporate newsfeeds into systems such as Cohere to generate dynamic argument maps that are scalable and interactive. While recognizing that work has already been done with regards to recording the sensemaking process “in the wild”, additional such work along ethnomethodological lines would certainly be useful.

Overall, the future of argument mapping remains promising as research continues into the mechanisms to promote and improve the entire process of sensemaking, both from a software technological perspective, and from the direction of human-interaction facilitation, which is often as important in many instances.

This paper has also provided an attempt to construct ways in which sensemaking, specifically argument mapping could become a form of popular media that truly empowers viewer-citizens in the deliberation of issues deemed important for our time.

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