

# The Argument of Technologic Determinism and the Learning of Medium

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## Abstract

McLuhan (1964) noted “medium is message” and medium is extension of human boy in his book < Understanding Media: The Extensions of Man>. This book supported an outstanding understanding of medium at that age, although the view exit one-sidedness leading to technologic determinism. Bimber (1990) distinguished three interpretations of technological determinism: The Normative, Nomological and Unintended Consequences accounts to define the technologic determinism through relative literatures. In this essay, the introduction of technologic determinism force on McLuhan and Bimber’s idea. The second part will argue their idea and the example the supported in their literatures. In third section, Vygotsky’s double-stimulation and high-order-thinking (including culture-historical activity theory), and also, the actor-network theory (ANT) will supply to understand what’s medium. Finally, the essay will consider the question: what’s education.

## Keywords

Technological determinism, Double-stimulation, Culture-historical activity, Actor-network theory.

## 1. What’s Technology Determinism?

McLuhan (1964) once pointed a view of Global Village. The primary medium of primitive society was spoken language. Due to the physical limitation of hearing, people could only live in close tribal groups. The emergence of written media makes human communication and communication no longer based on the proximity of physical space. As a result, tribal society disintegrates and interpersonal relationship becomes estranged. The popularization and development of modern electronic media, especially television, have brought the distant external world closer and greatly shortened the distance between people. As a result, human beings have re-tribalized in a larger scope and the whole world has become a global village. This concept illustrates McLuhan’s idea that medium play a significant role in development of human society. appearance of electronic period and subsequent development of western world seems prove McLuhan’s view of medium and technology determinism. “Medium is message” was raised by McLuhan (1964) which emphasized the effect of medium in human society: as a basic motivation in progress of human history, medium create a possibility to evaluate a new type of human society. That is, the direction of society’ development was decided by medium or technology. Furthermore, the other point supported by him was “All technology is communication, an extension of ourselves that allows us to reach further through time and/or space. In addition, these extensions mirror the human body.” In this view, McLuhan (1964) combined development of medium and development of human society, and considered human society history as the same as progress of medium.

Bimber (1990) distinguished three interpretations of technological determinism: The Normative, Nomological and Unintended Consequences accounts, although Bimber utilized Coben’ criteria to argue that the Normative and Unintended Consequences accounts are not

technological determinism. Firstly, it is deterministic that the history is determined by laws or by physical and biological conditions rather than by human's volition. Secondly, according to distinguishing from other determinisms, it is necessary that technology should exist in the preceding events or states of the world determine the future which was considered as a standard to meet the definition. In Nomological account, Miller explained that social structures evolve by adapting to technological change. That is, it is no matter what people want or desire, it didn't influence future development of society. Development happens through some natural logic. On the other side, Heilbroner stated that Nomological accounts are culture-independent. Generally, the gist of the Nomological account is that the technology-driven society emerges regardless of human desires and values and there is no relationship between Nomological accounts and culture.

## 2. Argument to Technological Determinism

McLuhan (1964) stated that medium is message which consider medium as the only element to enhance development of human society. McLuhan supported an example that the influence of money medium in in seventeenth-century Japan. It "caused a slow but irresistible revolution, culminating in the breakdown of feudal government and the resumption of intercourse with foreign countries after more than two hundred years of seclusion." Money has reorganized the sense life of peoples just because it is an extension of our sense lives. McLuhan noted that this change isn't concerned with those living in the society. However, the main incentive is those living in the seclusion society and the economic reason. The increasingly dissatisfaction of human who live in seclusion society cause conflict, and also the western countries want open the market in Japan because of economic reason. The currency medium is only the one of variety methods to stimulate human to finish the seclusion situation, although it can be regarded as an element to influence this result. In this case, the volition of western countries is the main factor to push them to breakdown Japanese government's seclusion. The money medium actually is a message illustrate the tendency of breaking seclusion, but didn't decide the development of Japan in 17th century.

Additionally, McLuhan suggested that medium is the extension of human body. For instance, vehicles extend our feet. In this case, McLuhan explained that human create vehicles which influenced human' behavior like that when human come out to a far-way district, he come there by foot in the past. However, for saving time and physical power, he can choose vehicles to replace their foot. That means, the progress of society has been decided by progress of medium. As the example showing, human society transform from feet to vehicles, the region of human activity has been extended. It seems like medium or technology really determine the way human-being living, the direction for development of society and the possibility of revolution of society. Nevertheless, McLuhan neglected the effect of volition in those whole process. Using the example between feet and vehicles, it's time for a student to get up and go to school. The student faced two way to arrival the destination: by foot or by bike. Did he certainly choose the bike to school? The answer is no, although the society have developed to the status that vehicles extend feet. The will controls student to decided which kind of way he want to live or choose. The vehicles, in this time, are considered as an intervention to stimulate student to make other choice. As McLuhan & Leonard (1967) noted that the only limitation is human imagination. The imagination was controlled by human volition. Although, the progress of medium is closely related with development of human society, as the word "society" was created by human-beings, history-cultural development is the sign of society progress which deeply influence medium development. Medium certainly make senses in society development. It seems like that human volition has an expectation target which has a distance between current society, the appearance of medium can be utilized to get reach at the expectation target.

Bimber (1990) pointed out the definition of technological determinism by referring to literature. Although, Bimber firstly support three accounts for technological determinism: The Normative, Nomological and Unintended Consequences accounts, normative and unintended consequences accounts which can be seen as an argument to technological determinism. Habermas suggests that technology can be considered autonomous and deterministic when the norms by which it is advanced are removed from political and ethical discourse and when goals of efficiency or productivity become surrogates for value-based debate over methods, alternatives, means, and ends. This is what Bimber calls a Normative account. Normative accounts are culture-specific. Compared with Nomological accounts, Nomological accounts are culture independent, which means that history is predetermined by scientific laws. Society development can be seen as the history of human-being development. Human-being differs from animals because they have high-order thinking which causes from the interaction with human and the environment they lived which is limited by history-culture. Bimber argued that normative accounts are not technologic determinism accounting for its culture-specific, however, the culture-independence of nomological account appears technological determinism is thoughtless. The progress of society cannot separate from history-culture, it's culture-dependence. As mentioned, the gist of the Nomological account is that the technology-driven society emerges regardless of human desires and values (Miller). The social structures evolve by adapting to technological change. Bimber states that given the past, and the laws of nature, there is only one possible future, and also, technology itself exercises causal influence on social practice. As an example, the railroad necessitates the telegraph, steel production, large industry, etc. Those examples neglected effect of human requirement and volition despite it looks like the technology determine the subsequent evolution of society on the surface. Deeply thinking of this question, technology really accelerate evolution of society to some kind of direction and future but no determination. Firstly, human-being create railroad which offer a method or stimulate human-being to enter or acceleratingly enter into next society phase. As a medium, volition control human to decide whether utilize railroad or not, although railroad seems like a better choice. The technology didn't force human to determine but offer other choice. The same, the telegraph, steel production, large industry etc. are also restricted by human volition according for their requirement. Those development comes from human decision whether accelerate the development of railroad. It seems like human make decision depends upon their volition, the volition also grow up within history-culture. The volition has authority to determine but finally influenced by history-culture development to determine which seems like right. It still is culture-dependent. For unintended consequences accounts, it means outcomes of actions are uncertain and uncontrollable. It was be argued that technologic determinism is deterministic but unintended consequences accounts are indeterministic which are properties of social action. Compared with unintended consequences accounts, nomologic accounts meet the criteria by holding that society evolves along a fixed and predetermined path, regardless of human intervention. This is why nomologic accounts has been regarded as the standard to define technological determinist. At the same time, it's also the reason a larger amount of literatures has been recognized as determinists despite their views make much senses and are irrefutable. Thus, Marx's historical materialism constitute has been cited. In normative accounts, eventually society adopts the efficiency judgements of the scientist. In this logic and efficiency reign supreme and become all-encompassing norms. Actually, Marx's historical materialism fulfill the requirements of normative accounts. It seems like Marx is a technologic determinist but his theory didn't meet the nomologic accounts, thus, he or his theory isn't.

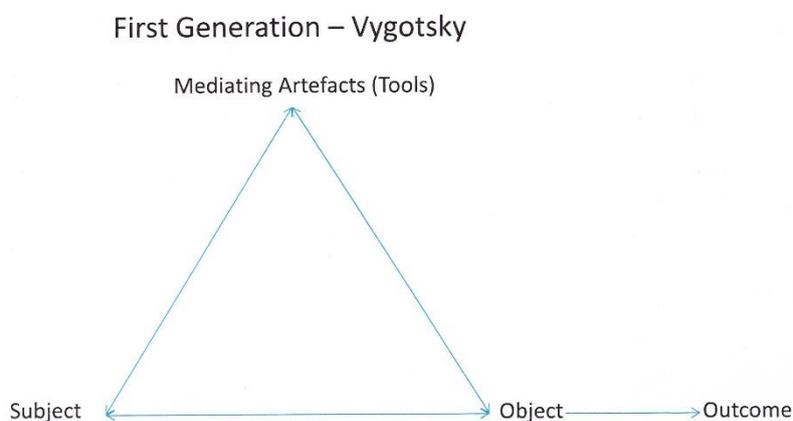
### 3. Thinking about Medium

Considering of this question, we can see the effect of medium in Vygotsky's double-stimulation and high-order-thinking (including culture-historical activity theory), and also, the actor-

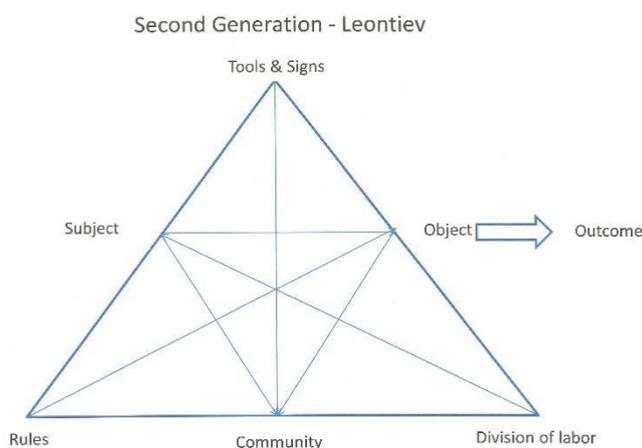
network theory (ANT). Veer (2001,2008) explained double-stimulation is a way to “trace internal and unobservable psychological process”. Furthermore, after participant was triggered by an initial problematic situation or first stimulus, a second stimulus was mobilized in the double stimulation experiment. This mobilization becomes a sign to connect the outside world and inner psychological function (Sannino, 2015). It can be easily to understand by Vygotsky’s brief description of waiting experiment: “The subject is asked to wait for a long time and to no purpose in an empty room. She vacillates – to leave or to continue waiting, a conflict of motives occurs. She looks at her watch; this only reinforces one of the motives, specifically, it is time to go, it is already late. Until now the subject was exclusively at the mercy of the motives, but now she begins to control her own behavior. The watch instantly constituted a stimulus that acquires the significance of an auxiliary motive. The subject decides ‘When the hands of the watch reach a certain position, I will get up and leave.’ Consequently, she closes a conditioned connection between the position of the hands and her leaving; she decides to leave through the hands of the watch and she acts in response to external stimuli, in other words, she introduces an auxiliary motive similar to the dice or the count ‘one, two, three’ for getting up (Vygotsky 1997, p. 212).” In this example, one of the participate illustrate the process of his psychology process that the watch stimulated her to undertake volitional actions when she is facing conflict of motives whether wait or leave. In this experiment, medium is the watch which serve the function of auxiliary motives, the participate react on this medium-the external stimulation. Returning to the seclusion of Japan in 17th century, in this case, McLuhan considered currency as the medium to led the breakdown of seclusion. Whereas, when we come back to see double-stimulation, it can be clearly seen that, in 17th century, the western states were facing a conflict whether break this satiation. The currency can be regarded as a second stimuli to led the final decision. It seems likes double-stimulation is discussing the external world and internal psychology not the country layer. However, carefully thinking, countries’ action was decided by their leaders and people, those individuals was limited by their volition which is still an expression of traceable interaction of outside world and inside psychology process.

High-order-thinking is another view provided by Vygotsky which differs western high-order-thinking. Differing with low-order-thinking, the use of psychology tools such as language, sign, words etc. makes psychological function upgrading to a higher-level layer. Similarly, when human-being begin to utilize tools in their development history, human-being begin to separate from animals and the concept of society start to form. For example, as mentioned, “in situations of uncertainty and cognitive incongruity human beings facing conflicts of motives can rely on artifacts which serve the function of auxiliary motives and which help them undertake volitional actions.” That is, the psychology process of undertaking volitional actions is a way illustrate high-order-thinking. Oppositely, it can be clearly seen why Thorndike’s Puzzle box experiment was been argued by Vygotsky. In Thorndike’s Puzzle box experiment, He placed a cat in the puzzle box, which was encourage to escape to reach a scrap of fish placed outside. Thorndike would put a cat into the box and time how long it took to escape. The cats experimented with different ways to escape the puzzle box and reach the fish. Eventually they would stumble upon the lever which opened the cage. When it had escaped it was put in again, and once more the time it took to escape was noted. In successive trials the cats would learn that pressing the lever would have favorable consequences and they would adopt this behavior, becoming increasingly quick at pressing the lever. This is Thorndike’s S(stimulation)-R(Reaction) theory that the result of connection between stimulation and reaction is learning. This theory is deficient when research in human-being learning because it didn’t consider a large number of other elements like culture-historical factors and human will. The learning process is not just the process of S-R within individuals. The psychological process happening in human-being didn’t be took into account but it works in animals. This theory didn’t consider that the animals just master low-order-thinking, it may work in some educational method but

it works and practices the low-order-thinking not high-order-thinking which didn't utilize the psychological mediums. In addition, the first generation of activity theory model by Vygotsky explain the argument. In graph 1, the triangle-model consist of three factors including subject, object and mediating artefacts(tools): The Subject, Object, and Mediating Artifact stand in a dialectical relationship whereby each affects the other and the activity as a whole.



Graph 1 the triangle activity theory model of first generation



Graph 2 the second triangle activity theory model

Vygotsky (1987) argued that the relationship between a human subject and an object is never direct but must be sought in society and culture as they evolve historically. In his idea, consciousness emerges from human activity mediated by artifacts (tools) and signs. The use of signs leads to a specific structure of human behavior, which breaks away from mere biological development allowing the creation of new forms of culturally-based psychological processes – hence the importance of (cultural-historical) context: individuals must accompany with cultural environment to understand, and without the agency of the individuals with artifacts, society cannot understand the individuals. With the increasingly development of theory, the second generation (graph 2) has been supported which differs from the first in individuals and collective motivated activity adding Rules, community and division of labor.

Taking about actor-network theory (ANT), Latour (1990) noted that “there is no need to go searching for mysterious or global causes outside networks. if something is missing, it is

because the description is not complete.” The dualism is challenged by ANT, there is no different between object and subject. That means, every element, no matter human or non-human and material or abstract thing, get the same level in this network system (Latour,1990). No actor which cause change in this system did the decisive action or subsidiarity, they are the same. In this theory, medium is not only a medium which cannot be seen as individual. The actor does action, and the action will promote to connect another actor. This process is ceaselessly going until actor stop to do action, which generate network including a variety of actors. The whole network is regarded as the one. It can be considered in an example of waiting experiment. In this waiting experiment mentioned, did the watch (medium) stimulate participate to leave or her volition decide to leave? In ANT, the whole process should be considered as one network. The volition, the participate, the watch and etc., every element acted constitute this network, and the whole network cause to leave.

#### 4. What's Education?

For this question, different individuals express their own viewpoint. For educators, education can be regarded as an activity to spread knowledge, cultivate people's social ability, improve learner from low-order-thinking to high-order-thinking and the extension of their own experience. Considering of learners, education is a method to acquire ability to be accepted and adapt the society and the nature, is a way to prepare to realize self-worth and aseity and to satisfy their curiosity. To researchers, education is to find the essence of thing and to understand the world the lived. To society, education is a medium to achieve evolution. Education stimulate not decided the society and make evaluation possibly. If education didn't exit in society, historical culture cannot be inherited, the process of progress would stop without motivation. Although there is a huge number of argument and theory in sociology, science, psychology, behavioristics and etc., the necessity of education never be neglected because education make the theory can be spread to others and make human to critically argue. In technological determinism, education can be regarded as a method to accelerate technology progress. In Vygotsky's theory, the purpose of education is to development human's psychological thought from low-order-thinking to high-order-thinking and is an activity to short the Zone of proximal development (ZPD) for individuals. To ANT, the education is an actor which need agency to express and act in the whole network.

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