



Analog and Digital Technologies

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ABSTRACT

Throughout history, humans have constantly been evolving economically, socially and politically, among others. The rise of civilizations since the dawn of history has been due to different levels of human activities giving rise to products and services which were critical for advancement. In the midst of society's developmental process, the use of technologies, both analog and digital, has become home vocabulary for people born within the period such technology emerged. For instance, the use of analog tools has defined a society of technological users with televisions, radios, microphones, and such, helping daily activities of human beings. Analog tools defined a culture of people.

With the advent of digital technology, human processes have become fast and complex allowing for inventions and innovations to flood in the society. In the same manner that analog technology brought along a culture of technological users – that of a viewing public, and listeners to information from various analog tools utilized, digital culture was born with people hooked to digital gadgets, with information chunked into binary units that could be preserved for a long time – all these things are continually emerging, affecting lives of people in many ways. Inter-connectivity is greatly observed with digital consumers using abundant communication-enhancing tools within their midst. Lives have improved and cultures have boomed.

This paper looks into the intricacies of analog and digital technologies in terms of disparities, similarities and the multiple applications and connections they have built in numerous processes. Human processes have become indulgent with technological affordance in their midst. Both analog and digital tools are symbols of human progress that this paper elucidates.

Fundamental Technological Difference and Similarities

A signal is a physical quantity that varies with time, space, or any other independent variable (Eren, 2018). In terms of signal, wave functions of analog and digital technology may seem the same if viewed from a distance but a closer look will reveal that analog signals follow a continuous, uninterrupted wave while digital technology is not continuous or wave-like but in square and discrete. In addition, both analog and digital signals are ways of sending messages, they differ in manner of sending. Analog can take many values while digital can only take two values, either one or zero. A common example to illustrate the difference is that a wall clock with continuous second hand that moves around uninterruptedly belongs to analog technology while a digital clock is one that illustrates time expressed in numbers with flashing colon sign (:) indicating seconds of an hour. The movement looks like square waves as opposed to continuous waves in analog technology.

The analysis of the clock also provides other information on the difference between the two technologies. Another example to illustrate the difference would be that between numbers zero and one, there are numerous steps and points like 0.1, 0.111, 0.112, etc. in analog system while a digital system would be discrete, finite and defined in terms of the number of steps, distinctly marked in squares such as 02, 04, 06., up to 1.0. The difference between the two can be united in terms of the idea that discrete steps between zero and one can be minimized so that continuity is achieved. In effect, analog provides infinite perspective while digital tool allows for a number of finite steps to consider.

Another example to illustrate analog application is thermometer where temperature reading is indicated by continuous rising or falling of liquid mercury as a consequence of which, continuous data of temperature reading is simultaneously observed as opposed to a digital

tal tool that stores data in square waves that are discontinuous in nature.

Another example to illustrate the difference is a light dimmer. By rotating the knob, the light dims depending on the degree of rotation. This movement is continuous as opposed to a light switch that does 'on' and 'off' only with the property of continuous movement. This is digital system that works on binary units like a digital computer.

In addition to all the differences, Analog to Digital Converter (ADC) allows the transfer of analog data to digital forms so information is preserved while Digital to Analog Converter (DAC) does the reverse process. In effect, this tells a unity of usage where one technology is not necessarily displaced because another one is superior in quality. The confluence of the two is likened to the concept of transistor that converts electronic voltage into something from analog to digital and vice versa. It is like having digital quality in analog system, a case of in-between frequency.

Historical Development

Due to the broadness of analog and digital technologies in their uptake, this section will divide the history of the technologies in terms of specific areas of application: analog and digital recording, analog and digital computer.

Analog and Digital Recording

Analog recording is recording with the use of analog signals allowing analog audio and analog video for later playback (Wikipedia). It began with the use of mechanical systems like phonoautograph and phonograph. The former is the earliest known recording device which was later replaced by phonograph. Invented by Thomas Edison in 1877, it made use of essential elements that became staples found in today's recording devices. Recording using phonograph makes use of a microphone connected to a needle which causes both to vibrate that causes sharp tip to etch a distinctive groove into a cylinder made out of tinfoil (Wikipedia).

During Edison's time, phonograph had some pitfalls in recording and playback mechanisms. First, physical contact between the needle and the tinfoil diaphragm had to be continuous which resulted to wear and tear. This implied sound losing its vitality and susceptibility to be gone forever. Another difficulty of analog recording was its permanency where anything recorded was final. Editing was not possible which essentially irked musicians who had to edit their recording. Next problem was fidelity of sound, nearness of original sound to recorded sound on phonograph which was crude in Edison's time so that its use was mostly on speeches, meetings, etc. rather than music recordings. Today, phonograph records have lost their vitality and vinyl records are collector's items now.

Digital Recording

The use of analog recording became popular up to the 1970s but the process became more and more expensive through time which prompted technologists to develop digital recording that would be economically sound yet qualitatively enhancing. In the digitization process, there was sampling of the waves thousands of times in a second, measuring the amplitude of each sample, and then assigning one of a limited number of binary values to each. This resulted to tape recording with on-off signals, or bits (collectionscanada.org). This process led to reduction of noise that was prevalent in analogic recording of the past done through multiple alterations of bits of coded message.

The first digital tape recorder took place in Japan in 1967 and its appearance as a digital label appeared on the Denon label in 1972 while commercially available digital recorders was the SONY PCM-1 which essentially transferred analog signal into its digital counterpart later recorded on video cassettes and VCRs. In its incipient stage, digitally remastered recordings were utilizing vinyl disks in analog form and in 1982, compact disc players were first released by Sony and Phillips companies.

Soon enough compact discs flooded the market which repressed cassette tapes due to the high quality of sound the former produced. In their continued evolution, CDs evolved into MP3s and MP4s with much higher quality of sound produced and now digital recording is available on the internet. Its widespread use has made possible the invention of digital platforms such as Youtube, Spotify, GarageBands that improved digital sound recording. What is remarkable in digital recording is its low-cost element that makes recorders of music utilize the technology optimally.

The use of digital recording is immense in the music industry especially in today's highly digitized world. Music recording has never been noise-free, lower cost and high-quality recording sound and the impact is so massive. Digital applications flood in the internet with such applications as Spotify, Youtube, among other music applications that carry digital music mostly.

Analog Computer

Analog computer is a type of computer that uses physical quantities popularly used in science and engineering. An example of a physical quantity in analog function is a car's speedometer that has needle pointing to a continuous movement of a car as it speeds up, or a

thermometer with liquid mercury that rises and falls with difference in temperature reading.

The earliest form of analog computers were machines with special purpose as in the case of tide predictor developed by William Thomson in 1873. They were considered workhouses of scientific computing that resulted in the invention of proportional compass also known as the sector and logarithmic slide rule. Some early applications of analog computers were small analog machines mainly used in laboratories while very big machines involved large transmissions or telephone networks. Early explorations on rocket and space travels were made possible by studying analog machines.

In another reference, astrolabe, first invented in Greece during the 1st century, was believed to have been the first known analog computer. This device used pointers and scales on its face and a complex arrangement of bronze gears to predict the motions of the sun, planets, and stars (encyclopedia.com). Another example is sundial which traced a shadow's path to determine the time of the day. Slide rule was also invented in 1620 and which had a long history of use until the invention of electronic calculator in the 20th century.

In the 1930s, Vannevar Bush from Massachusetts Institute of Technology (MIT) created the modern analog computer dubbed differential analyzer that solved engineering equations. In the 1950s, RCA developed the first reliable analog computer but during that time there were several analog functions were being absorbed by digital computers.

Today, analog computers are being used in specialized engineering calculations, in industrial processes and many other functions due to their unlimited processing power.

Digital Computer

The basic idea of a digital computer is its binary bit summed up into numbers 0 and 1 which what digital computing is all about. Zero (0) indicates 'off' and one (1) indicates 'on' – such binary bit is exemplified in examples like a bicycle with two wheels, a plane with two wings, among others. In the case of digital computer, when it is literally opened, a circuit board will be seen where little boxes have been plugged with each box containing a chip with a multitude of electric circuits which can be switched 'on' or 'off'.

Blaise Pascal from France and Gottfried Wilhelm Leibniz from Germany invented the first mechanical calculating machines in the 17th century. However, the first automatic digital computer was Charles Babbage. In his invention of 'difference engine', mathematical tables were made possible and the creation of algebraic functions became possible.

In another account, the principle of modern computer was first coined by Alan Turing based on his seminal paper in 1936 on "Computable Numbers". He was later attributed to the concept of a 'Universal Machine' that allowed to perform tasks of any other machine including computing.

In 1964, Douglas Engelbart displayed a prototype of the model computer with a mouse and graphical user interface (GUI). This marked the evolution of computers that would not just be confined to engineers and scientist but accessible to the general public. Later on, in 1971, Alan Shugart with a team of IBM specialists discovered the 'floppy disk' which allowed transfer of data to other computers. And of course, the popular Steve Jobs, together with Steve Wozniak started Apple computers in 1976 on April Fool's Day with Apple I, the first computer with a single-circuit board.

In today's digital world, digital computers have wide applications in many areas of commerce, education, health and so much more. In education, for instance, the preponderance of e-learning in distance education is providing opportunities for flexible and distance learners to maximize their learning potentials with greater use of digital resources such as videos, animations, e-journals from the internet without the need for classroom teachers in their learning at the very least, or with minimal and facilitative roles in a highly student-centered online learning. Digital computers paved the way for numerous applications on the internet that have made consumerists dependent on technological usage giving both positive and negative impacts.

On the whole, it cannot be discounted that analog and digital revolutions have shaped human lives into a heightened state of advancement and the evolution is not even stopping. Hybrid computers are on their way of re-shaping human relationship with non-human agents. Computers now are able to communicate virtually without human interference and the impact continues to grow in greater proportions. This is not for humans to succumb into technological dependency throughout their lives. A critical scrutiny of technological influence can also be done especially on its effect on values, morality and humanity in general.

Technological Attributes and Capabilities

For one, digital recording does not degrade for a long time for as long the numbers can be read and deciphered. Numbers can be compressed and patterns can be found between them which make them easy for various information processing. In the case of analog technology, recording is done in its original form, not broken down into binary units the way digital recording does. The continuous waves in analog is amplified to a speaker which produces the sound without any intricate breaking down of sound in numbers.

In addition to the concept of signal discussed previously, analog signals have lesser adaptability and adjustment while digital tools have greater adaptability and adjustment for a range of use. Analog type of transmission is wire or wireless, while digital signal is a wire. For types of data produced, analog data are continuous in nature while digital data are discrete. Next, security of analog signal is not encrypted while digital signal is encrypted or encoded.

In terms of bandwidth, analog tools have low bandwidth (4kHz) that means low data transmission of limited channel bandwidth. Bandwidth is a range of frequencies within a given band, in particular in transmitting signal. For digital technology, the presence of high bandwidth which can support high-speed data including multimedia, video which makes digital popular in use.

Finally, in terms of power requirement, analog tools have higher power requirement since the signal has a wide range of frequencies. In digital forms, power requirement is relatively low because there are only two signals needed – one and zero that need to be transmitted.

In terms of recording capacity, analog uses microphone that turns air pressure or sound into electrical analog signal sent to analog tapes or vinyl records where sound is produced by continuous rotation. For digital recording, recording is done by converting sound into digital units (one and zero) which can be stored in compact discs, MPs and other digital devices or uploaded online for widespread playback. The mechanism is not continuous but discrete.

The sound recorded in analog is in its original form which can also include noise in the surrounding. Analog sound is susceptible to noise while digital recordings are devoid of noise within the surrounding. Digital sound is clean and can be replicated as such many times for as long as the encoded digits are readable. The proliferation of digital music, for instance, in many platforms like CDs, ipods, ipads, and various internet applications is proof of media versatility that digital music brings. Movies in digital form dominate today's theaters because of the clear picture and sound production digital technology brings. Simply put, digital uptake is increasingly shaping many of our transactions.

In spite of technological advantage of digital forms, analog counterparts have their share of distinctive properties like continuity of signal which can mean control in the signal produced instead of a basic 'on' and 'off' mechanism in digital appliances. The simplicity of audio processing makes analog preferred by some institutions. But today, it has become a vintage concept with vinyl records, cassette tapes ending up as collector's items. Also, the continued uptake of analog tools has become expensive these days so more people are turning digital.

Advantages of Analog and Digital Tools for E-Learning and Risk Communication

The use of analog technology in learning has survived amidst the use of digital technology. For instance, whiteboards as analog applications provide greater cognitive support as learners have continuity of thinking and writing. The study of language, Korean, Japanese or Chinese language, for instance, uses intricate character symbols which need continuity in writing the strokes. Whiteboard or paper as analog tools enhance effortless, smooth-flowing and uninterrupted way of writing.

In many instances, analog tools provide students with greater depth in self-expression, critical analysis and other aspects of cognitive processing because information is not decomposed into binary forms but rather in continuous flow of messages. How can this be applied using digital platform? Following the idea that technology is not the message but just a medium, it makes sense to develop synchronous interactions between students and with their teachers. The process simulates a standard classroom setting using video conferencing tool. With the teacher on one side of the video and the class on the other side, the idea of analog-like interaction can be replicated but the cost is staggering. Video conferencing as a tool for distance learning has not been used optimally because of its economic costs. Thus, other forms of synchronous interactions such as chat, messenger video calls though smaller in terms of group participation can achieve a smooth, immediate interaction within a virtual environment.

On the other hand, advent of digital technology has made e-learning, mobile learning and computer mediated learning ubiquitous because of their greater flexibility and innovative capacity. In addition, digital platforms have interactive capacities that allow learners to interact with content by way of editing information, for instance, as in the case of blogs, vlogs, wikis in Web 2.0 technology.

Digital learning makes learning more personalized with customizing mechanisms. Within customization, learners enjoy opportunities to expand learning from abundant learning resources and the capacity to collaborate with other learners virtually is not an impossibility. For instance, the use of communication platforms such as wikis, blogs, vlogs, and many other video applications create a sense of belongingness in a learning community. This characteristic is made possible due to the interactive capacity that many digital technologies offer. Also, with digital education, learning is distributed, no longer within the confines of the school. Flexibility is enjoyed by busy learners who cannot attend classroom meetings. In distance learning, students and teachers are connected through technological mediation. Finally, the high implementation of digital learning increases constructivist learning due to the autonomy and learning control the students enjoy. They take full responsibility of their own learning.

However, preponderance of digital tools has also created blended use of analog and digital counterparts where, for instance, interactive writing on whiteboards are embedded in certain applications like “screen-o-matic” where continuous writing of information can be made possible using a video camera with digital quality.

With the use of analog equipment such as television, radio for educational purpose in the past, a small amount of interference like power problem can cause disruption of signal waves with larger impact so that distance learners using these types of technology in the past had more susceptibility to interruptions of signals exacerbated by poor antenna frequencies rendering poor connectivity. Nowadays, digital tools have discrete units of data that are encoded in terms of ‘1s’ and ‘0s’ similar to an ‘on’ and ‘off’ switch pattern that can be stored and copied in exactly the same copies unlike in analog technologies that have difficulty in duplicating due to the continuity of data stored. In effect, e-learning with analog tools will have lesser life span while digital forms can be stored and replicated for longer use. The effects multiply due to the ability of stored information to reach more learners.

Take the case of recorded MP3s and MP4s as digital application. The same quality of sound and video is replicated every time a copy is made while analog recordings using cassette tapes or VCRs will diminish audio and video quality over time. This implies that digital copies can be replicated numerous for flexible learners to take advantage of. As evident in mobile learning, lessons are chunked into bits of information from digitally stored data while previous analog learning tools are not widely popular, most of them are stored in libraries only.

Next, the use of whiteboards, journals, papers and so on where learner actively jot down notes indicate higher cognitive retention according to ECAR National Study of Undergrads (Brown, 2018). Simply put, learners actively engage with content which allows them to penetrate deep into their own thought patterns. Thus, constructivism is applied and strengthened using analog tools. Even with the use of white board surfaces, people have the opportunity to gather space in a space and visually think through ideas. This back-and-forth process and revising of ideas may not necessarily be present in digital solutions (Brown, 2018).

What this implication does is to remind learners that technology is merely a tool, a medium, not to be treated as message. Uses determinism philosophy espouses the idea of technological affordance that supports learning, not technology as learning per se. In which case, analog technology provides constructivist approach to learning that learners can develop with the wide opportunities for self-expression that is uninterrupted for the most part. The same analysis can also be drawn with digital tools that provide finite steps, ideas that are easily stored and retrieved for multiple usage anywhere, anytime. Again, it is technology at work here. Learning interference with Learning Management System (LMS) as a product of digital technology provides vast array of learning opportunities and management for differentiated learning styles of students yet at the end of the day it is how learning becomes optimal with the use of LMS, or with simply analog tools. In this regard, both ways manage to deliver learning in different modes according to the scenarios affecting learners.

One scenario worth pondering here is how learners adjust to a given technology in the period they were born with. Meaning to say, technology is given at the time of birth, when they begin to go to school and so on. Technology, as in the case of analog types, are commonplace occurrences within a specific period where people do things in the manner that technology affords them to do. It becomes rooted to day-to-day learning. When technology improves as in the case of digital revolution, remarkable changes do happen and learners start to realize how the present is an improvement from the previous. New paradigms and attitudes are attached to digital learning which ultimately becomes commonplace knowledge to those born in the digital age. When technology deepens, the same process of paradigmatic shifts can occur which also becomes standard practice to new learners. In other words, the cycle of advantages and disadvantages can only occur when new advancements occur, in which case analog was at some point the pinnacle of learning enhanced by digital solutions when technology developed.

Thus, it becomes convenient to argue the optimality of learning opportunities for both analog and digital technologies according to the needs and resources available during the time technology is popular in usage.

Risk Communication and Technology

As defined by World Health Organization (WHO), risk communication is an interactive process of exchange of information and opinion on risk among risk assessors, risk managers, and other interested parties.

The main idea in risk communication is essentially communication – dissemination of risk information after all assessments and management concerns have been scrutinized by various stakeholders. The influence of analog and digital technologies has to do with the delivery of message to various parties. Based on the pervasiveness, flexibility, and duplicability of digital data, it makes sense that the latter has more impact in forming solutions of risk-related issues even in distance mode of communication dissemination. What analog tool does is to enhance up-close and personal communication during meetings where a manager will use whiteboard presentations that are more engaging and interactive. This is the same cognitive effect on analog learning discussed previously.

At the core of risk communication is communication strategy which includes the what, how, when and why will form part of the overall strategy. It is also to be emphasized the importance of the how in communicative strategy which essentially puts analog and digital solutions formative. For digital use, communication can be more dynamic and interconnected using digital tools like power point presentations, internet-based content that can be read anywhere. This enhances individual involvement to risk-related issues. For analog tool, the same interactivity can be applied but in more close parameters and information may not be preserved for longer use. However, communication strategy is essentially human intervention to technological affordance. Both have a blended impact approach in risk assessment and risk management even with digital solutions having more powerful effect.

Finally, risk communication is critical to the success of any organization. Knowing the risks allows organizations to look into deeper structures of interrelated causes and potential impacts. The use of analog and digital technologies paves the way for deeper understanding of the issues, allowing for strategies to be formulated with the participation of different stakeholders.

Understanding the issues before a chaotic situation occurs calls for pre-emptive measure which can be done by developing plan of actions ahead of time, such communication plan to be brought and dispersed widely to the public for any preparation that needs to be done. It cannot be over emphasized the need for adaptive, flexible and available technology that will facilitate in information dissemination. In critical, far-flung areas digital technologies might not be the best option since accessibility is an issue for many underprivileged individuals. For instance, the use of crude megaphone, microphone, television and other analog devices can serve expediency and immediacy of mass communication because of their continuous message creation and widespread use in many areas. This can also be blended with digital communication through mass and social media that will serve those with access to internet. Nowadays, disaster warnings such as typhoons, tsunamis, disease outbreaks reach wide ears due to the popularity of social media platforms such as Facebook, twitter, and so on. This new level of journalism is creating citizen journalism where people create, re-create news that can also have critical outcomes if not cautioned.

Nevertheless, information campaign as risk communication strategy reduces devastative impacts of unlikely situations. What is important here is a concerted effort among individuals and the proper use of technology that will create massive dissemination should not be discounted in any way.

Finally, there is a consciousness that needs to be unraveled in using technological apparatus whether analog or digital. As a collective will among stakeholders, managers in devising disaster-related plans, the use of technology per se determines power relations within a system brought about by consensus-dissensus polarity. What this means is that technological use has something to do with how people manage to create a culture of conforming and non-conforming (critical) views as in the case of digital divide that polarizes not just technological affordance but relationship suffers as well. What this means in risk communication is that technological use in itself creates dialectical tensions among users and receivers because those who have better technology like digital use can discriminate analog technology users, thus, creating imbalance in power relations.

Environmental Communication and Technology

Environmental communication is argued as both a distinct professional field and a communication practice for all laypersons. As a professional field, it involves policies, techniques, strategies, procedures and elements that will guide policy makers in adopting ways and means of communicating and discerning solutions in tackling environmental issues such as climate change, environmental degradation, among others. However, because of its direct impact on human lives, environmental communication is a concern for all people such that it should form part of our communication practice brought about by adaptive solutions to various physical changes in our environment. As such, both practices require an ecological mind such that a person is conscious of his relationship to his environment, an essential element in the first theory of the press, development communication. Doing so instigates a natural care for environment so that our actions, our economic activities do not harm the environment. As the article implies, deep ecology is required in order to discern the importance of environmental communication in human life.

That being said, there is a subtle call for students to pursue a career in Environmental Communication because we are in a world of climate change. The impacts of these changes need to be understood so that we preserve our future generations. Also, as rather a new field, it invites students and practitioners to dwell on scientific communication strategies to better inform citizens of any environmental crisis and at the same time to remind government leaders of its importance in policy formations.

What is the role of digital and analog technologies in environmental communication? First, both technologies provide technological affordance. They are instrumental in the implementation of communication policies with the use of various platforms according to the capacity and availability of technology. For instance, in a far-flung area where technology is not advanced, information dissemination can make use of simple analog technology such as microphones, megaphones or personal meetings with different constituents. The idea here is to use available technology in its utmost capacity rather than hinder communication just because appropriate technology is absent.

Risk communication is aversion to risk. Environmental communication deals with damages to environment brought about by natural

and man-made activities should follow adopt communication strategies that will increase awareness and participation in forming solutions. The use of analog or digital tools will be determined by the availability and capacity to use whatever technology is available for as long as communication is delivered to the rightful constituents.

Lastly, in today's world of constant environmental upheavals - from earthquakes to typhoons, among others, disaster risk management is an urgent issue within our midst. Even with the idea that nature's wrath cannot be challenged, it remains a responsibility for us to do something so that we are not swept into an ocean of decay and oblivion. Environmental preservation is human preservation. Communication strategies for environmental protection are human interventions that need constant monitoring, upgrading to answer the needs of many individuals. The urgency to disseminate information is educative in purpose at the same time pragmatic to solutions required for amelioration. Technologies, whether analog or digital are only technical support systems that will not deliver if not properly used. In many instances help is not delivered to rightful persons because there is no proper channeling of information. A bureaucratic government with top-down communication flow needs to hasten delivery of information instead of confining it among decision makers to argue about. Corollary to top-down communication flow is a bottom-top approach where ordinary individuals should have the audacity to inform higher echelons of the institution on events, issues and problems besetting their locality. For the most part, the disparity between planning and implementation outcomes is due to miscommunication between implementers and the constituents. Once again, the powerful interplay of communication strategies on both ends with the use of proper technology according to availability, necessity and capacity will deliver communication properly.

Towards this end, the arguments above ask the question as to who create those digital and analog technologies that also have a share in environmental conditions? Aren't they created by power capitalists and technocrats that have been domineering economic activities since the dawn of history? It is quite saddening to realize that despite today's uncontrollable environmental risks, there are not enough companies complying with waste disposal, or developing new technologies to address environmental issues.

The economic implications of economic growth are truthfully sending negative externalities by way of pollution in many aspects. It is because there are no direct sanctions from our governments to punish corporate culprits who do nothing in environmental preservation. Yes, we have advocates for climate change. But, most of these individuals are from middle group to lower group in the society voice is their only hope.

Sadly enough, negative externalities are coupled with instruments of destruction as a consequence of heightened digital production. The proliferation of war armaments, cybercrimes, nuclear tools is a testament of how technology is bringing us harm rather than benefit. Nations competing for world domination is taking advantage of digital explosion to create man-made tools that will one day wipe out all that technology created – humans and no-human machines. Again, these are risk-contributing ventures that we need to be reminded every time an innovation happens.

There is so much effort being made to ameliorate from abject conditions or to achieve economic advancement but what about the environment? This and all other concerns should be at the forefront of communication policy. Certainly, we can develop digital and analog technologies that will keep us safe from the dangers of environmental wrath – improved tools for communication, community-based technology that is reflexive, constitutive and practical in so many ways that are not divorced from community issues will be the answer to our technological needs.

Digital and Analog Communication: A Comparison

Analog communication as a method of sending voice, data, image and signal uses continuous signal that varies in amplitude, phase among others. The use of analog communication is still very much popular today most especially if communication is within short distance but fails to deliver good transmission when signal is poor and in great distance. Moreover, noise is one factor in analog transmission that seems to make the technology a bit of a burden. In digital communication, messages are transferred over a point-to-point or point-to-multipoint medium. Digital communication transmits data efficiently using digitally encoded information through data signals.

Advantages of digital communication are: it is fast and easy, no waste of paper use, messages are stored for a longer period of time without being destroyed, the use of internet makes digital communication reach far distance, cheaper in production, semantic barriers are removed as data can be channeled using different software.

On the other side of advantages are disadvantages of digital communication which include: the use of software for data storage can easily be hacked, digital communication is swift with a click of the mouse which can be a problem if content is not thoroughly read, it is devoid of human element as everything is digital, environmental hazards are a result of digital wastes, misuse of digital communication abounds.

From the comparisons mentioned, it can be easily deduced that digital communication is the new trend in information dissemination. Borderless communication is the key in today's advancement. Even more so is the fact that with globalization that creates global vil-

lage, digital communication ensures connectivity between people and organizations. So much of today's global issues are discussed openly using digital technologies. This reduces cost in assembling people from different nations. All that it requires is a good internet signal and a digital equipment to connect a person with the rest of the world.

With digital communication in our midst, people are abreast with issues affecting them and the whole world. Gone are the days when newspapers, radios and televisions were the main source of information. Those where analog-driven technologies that had their time of usage. With today's fast pace of communication, the use of digital tools, indeed, is sweeping cultures from around the world.

What is exciting about this revolution is that analog communication still exists in some areas where digital communication is not heavily practiced. Indeed, with different levels of economic upsurge, digital divide that defines Global North and Global South disparity manages to bridge the gap with people in less-developed countries somehow trying to integrate with the Global North at least in communication. The spread of knowledge and information is limitless for as long as the tools for diffusion are widely accepted.

What does it take to connect the two technologies? Governments and private sectors need to exert more effort in transforming ways of communication as they see fit. In other words, with digital communication sweeping cultures over the world, some are not included or integrated. These people, though efforts must be made to uplift technological usage, must not be displaced and discriminated altogether. Just because analog technology was popular in the past, it does not mean its purpose has waned.

A blended use can be in order in this situation. Nations that have lesser technological awareness can exploit their analog tools for national development while efforts are also being made to switch to digital ways as the situation arises. Such duality of progress will certainly not displace one over the other.

Finally, it is fitting to explain the importance of human touch as explained in the advantage of using analog communication earlier pointed. Analog communication preserves communication in its original form. It is pure and uncompromising in some ways. This kind of mentality can be nurtured among analog users so they are not demeaned by technological affordance. The argument that a person is born to a technology and manages to live his or her life according to the technology within the period is very much apt here. Analog communication defines a culture of communicative individuals without any consciousness of what digital communication is until the latter is developed. In other words, analog communication exists, it is nurtured, reaches its depth and saturation, however, the world still recognizes its importance. Therefore, it does not have to fade away so easily.

So, what then will blended technology bring about? Certainly, there will be a duality as seen in today's use of both technologies. If governments are serious in adopting a blended approach, analog technologies can increase in production, this time with some changes to adopt to new trends. The idea of digitizing analog device and vice versa can be done indulgently if the effort is really to save analog tools. If the objective is to go digital all the way, analog tools will die a natural death. However, the fact remains that human communication is analog in nature and it cannot just be replaced by digital communication.

Digital Revolution: Concerns and Warning Signs

A number of concerns confront digitization of human life today. One issue is information reliability as a result of reproduction of data. Digital explosion that creates mass produced goods is susceptible to authenticity issue despite the idea that digital transformation can preserve original form. The problem here is playback of stored data. For example, DVDs that are stored digitally have to be converted to analog signal before they can be viewed on television. If there is no compatibility of stored data to playback signal, digital quality is not experienced. Nevertheless, the issue of authenticity is also magnified in terms of how original forms retain their original quality with many reproductions that take place in digital transformation. Digitally remastered phono records, for instance, might lose rawness of music that some listeners might opt to consider listening. In other words, not all that is digital is superior quality.

Another thing that haunts the public is security of digital information amidst digital influx. The pervasiveness seems catastrophic because fraudulent individuals can pretend to use digital information the way the original form is presented and inject some harmful components that can implicate the company that launched the product in the first place. Where is monitoring in this sea of duplicity? Just how concerned is the government in ensuring safety of technology users? Amidst all the confusion, one wonders which among the billions of data, products and services can genuinely uphold ethics in information dissemination? What have we to lose, or to gain in the long run?

With all the fuzz about digitization process, increased autonomy of digital consumption and production asks the value of human communication not mediated by technology. With digital revolution reaching global individuals and institutions, it remains a concern for many such that interconnectedness being an offshoot of digital revolution, those discriminated citizens that cannot integrate in the globalization process are basically lost in the transformation process. Or, are they really lost? Isn't it a human value to preserve communication practice the way it should always be done: with people hearing nuances of conversations and reacting upon them rather than assuming interconnectedness of virtual interaction that is basically human-nonhuman interaction in all honesty.

Technological dependency presents inevitable repercussions following its overuse. With digital revolution waging dominance in many aspects of human processes, what is left for us? Is it the rule of artificial intelligence over human intelligence? Is it the pulverization of the self in an impersonal world of digital living? These questions haunt the value of human existence because computer intelligence is exponentially emerging in catastrophic proportions. There might be a time that humans will no longer be relevant in a highly robotic world. The sad thing is we are creating those technologies that backfire on us. Once, they were controlled by human brains but sadly technology has outwitted us in many ways.

On the whole, the aforementioned concerns and warning signs are not meant to discredit digital revolution. True enough it has transformed life in many ways. Cultural appropriation of technological affordance, digital for that matter, intends to make people divulge in communication practice permissive of technological affordance. Digital age defines a cultural practice significant for that age. Young individuals today create a culture of interconnectivity, faster it may seem whether it lacks depth of character understanding or not, what matters is the formation of ideology and practice that defines digital age is what comprises their daily practice in the same way as analog revolution before transformed lives and created a culture of viewing public when television became popular. In other words, technological uptake is a matter of cultural appropriation that dwells in people's consciousness following its use. Norms and values are formed, paradigms are strengthened until a new wave of technological revolutions sweeps through.

Technological Determinism

Coined by Thorstein Veblen, technological determinism is a reductionist theory that aims to provide a causative link between technology and society's nature. Technology is viewed as the driving force of culture in a society and it determines its course of history. In relation to digital revolution that resulted to interconnectivity at a faster speed, this explains how technology created a cultural consciousness among its users. It can also be argued that digitization of society deepened economic transactions with increased commodification and consumerism, and of course, digital revolution has made online learning an educational path in 21st century learning where students are now more autonomous and creative with massive information from the internet at their disposal. With this, the role of the teacher has changed from an instructor to a facilitator.

The same analysis accrues to analog technology that created a culture of a viewing public with televisions invading the home. In another scenario, analog sound production also resulted to increased awareness in social issues as more people watched and listened to public speeches using analog microphones, radios and other analog devices that were critical in information dissemination.

It can be gleaned from the theory that, indeed, technology created a culture that defined its period of usage and at the same time it also managed to diminish technological knowledge and use from the one before as in the case of analog tools that gradually faded when digital technologies on the rise.

Which is Better, Analog or Digital: Conclusive Remarks

So much hype is given to digital technology because of its popularity and currency. But using the same analysis of the clock, an analog clock will have more time accuracy for as long as the hour and second hands have high-precision movements. Analog clock hands sweep through the entire clock so that micro 'time movements' are easily spotted as opposed to digital clocks that pulsating hour and minutes are seen.

Then there is the issue of preservation and legacy. Perhaps it is due to the near obsolescence and rarity of analog tools that make them worth preserving. For instance, vinyl records are so precious today with so many collectors wanting to re-own previous recording in LPs as opposed to digital recordings that are abundant, yes, therefore not so much considered as collector's item. In other words, the near-antique value of technology in the past raises its market value more than the present tools. Corollary to this is the idea of legacy of information stored in analog forms that museums, for instance, would want to display. Written texts in stone tablets, old monographic transcripts are valued as treasures more than a digital copy of a photograph.

With all the talk there is which one has high preservation value, functionality and practicability still become robust arguments for and against usage of technology, be it analog or digital. It cannot be denied that digital solutions are sweeping most of society's activities for many reasons, it is readily acceptable that digital tools indeed have powerful benefits. Because we live in a digital world, technological determinism creates a society of technological users that shape their lives, create paradigms, beliefs and practices. It is the currency of digital technology that makes activities current. If we continually utilize analog tools that are not much attuned in today's demands, there will be a mismatch.

The challenge is for us to preserve what needs to be preserved both from the functional and practical value otherwise a technology will collect dust in the archives. Yet, it is not technology per se that needs to be preserved but people's way of doing of things, transformations through growth and development with the use of technology are more paramount more than anything else.

With digital education primarily influencing the way people learn nowadays, different from what it was in the past, society has come

to an information age, so complex and rich in products and processes that humanity can forever benefit from - it goes back to the same need for higher consciousness that did not start from digital revolution. It started way in the past even before analog transition, but the latter had some important contributions. The legacies of analog technology are within us to cherish, nurtured and can be re-incorporated, blended somehow with today's digital productions. We do not need to obliterate just because the new one is a hype, a fad, or trendy.

Environmental communication is argued as both a distinct professional field and a communication practice for all laypersons. As a professional field, it involves policies, techniques, strategies, procedures and elements that will guide policy makers in adopting ways and means of communicating and discerning solutions in tackling environmental issues such as climate change, environmental degradation, among others. However, because of its direct impact on human lives, environmental communication is a concern for all people such that it should form part of our communication practice brought about by adaptive solutions to various physical changes in our environment. As such, both practices require an ecological mind such that a person is conscious of his relationship to his environment, an essential element in the fifth theory of the press, development communication. Doing so instigates a natural care for environment so that our actions, our economic activities do not harm the environment. As the article implies, deep ecology is required in order to discern the importance of environmental communication in human life.

That being said, there is a subtle call for students to pursue a career in Environmental Communication because we are in a world of climate change. The impacts of these changes need to be understood so that we preserve our future generations. Also, as rather a new field, it invites students and practitioners to dwell on scientific communication strategies to better inform citizens of any environmental crisis and at the same time to remind government leaders of its importance in policy formations.

What is the role of digital and analog technologies in environmental communication? First, both technologies provide technological affordance. They are instrumental in the implementation of communication policies with the use of various platforms according to the capacity and availability of technology. For instance, in a far-flung area where technology is not advanced, information dissemination can make use of simple analog technology such as microphones, megaphones or personal meetings with different constituents. The idea here is to use available technology in its utmost capacity rather than hinder communication just because appropriate technology is absent.

Risk communication is aversion to risk. Environmental communication deals with damages to environment brought about by natural and man-made activities should follow adopt communication strategies that will increase awareness and participation in forming solutions. The use of analog or digital tools will be determined by the availability and capacity to use whatever technology is available for as long as communication is delivered to the rightful constituents.

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