The Future of Reasoning in the Digital and Virtual Waves of Civilization: How to Educate and Act in a New Society

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Abstract

This paper investigates the role of the Digital and Virtual Waves of Civilization in the development of reasoning ability among average citizens and the information elite. Some recommendations on how to educate students and how to act in a new society to take advantage of these waves are defined.

Key words: Digital Wave, Virtual Wave, Civilization, Information and Communication Technology, Information Elite, Digital Illiterate, Digital Tourist, Digital Immigrant, Digital Native, Netizens, Society, Education

INTRODUCTION

The purpose of this paper is to investigate the role the Digital Wave of Civilization in the development of human reasoning and to sketch the repercussions for an educated society, including issues such as:

- How to write for those who do not read
- How to avoid seeing too much
- The future of books
- The future of news
- The future of periodical
- How to reason more with digital tools and less with written language

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- How to act in the Post-literate Age
- How journalism can regain its relevance
- How to educate the next generations of college graduates
- What is the future of an educated society?

The digital wave is becoming more visible by Google's current plan to digitalize all books and make them available to all of us. The late MIT scientist Ithel de Sola Poole was the first to argued for media convergence in his book *Technologies of Freedom* (1983), 27 years ago. He perceived the "convergence of modes" when lines between different kinds of media (*e.g.*, the post, telephone, radio, and television) are blurring. But many people today speak about divergence rather than convergence of media, particularly differentiating paper and electronic media.

In this investigation the convergence of media is perceived as a must if society would like to be harmonic and less dychotomic with [more reasoning by the elite and less reasoning average people]. The technological change is inevitable but must be regulated if society would like to be civilized. Certain new disciplines of knowledge should be developed in order to support these premises.

THE RISE OF THE DIGITAL WAVE IN CIVILIZATION

Civilization is about 6.000 years old and is defined as a system of society, culture, and infrastructure (Figure 1) that copes with nature and all kinds of challenges.

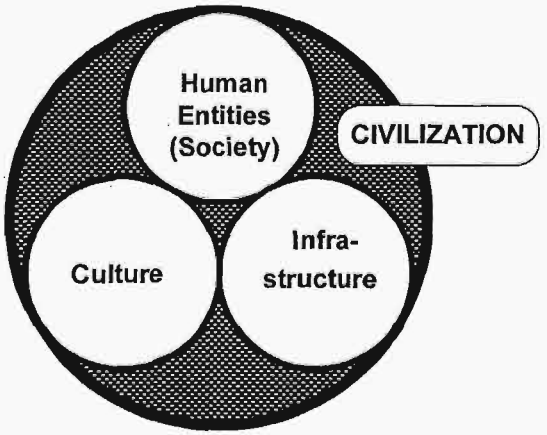

Figure 1 The Civilization System

Most of the writing on civilization waves was done by Alvin Toffler (1980), who recognized the three waves, First Wave (Agricultural Wave), Second Wave (Industrial Wave) and the Third Wave (Information Wave). However, there a total of ten waves of development of humankind (Figure 2):

I. Settlers' Wave (9,000 B.C. – 7,000 B.C.)
II. Agricultural Wave (7,000 B.C. ff.)
III. Industrial Wave (1814 A.D. ff.) - Industrial Revolution in England
IV. Information Wave (1980 A.D. ff.) - Microcomputer Creeping Revolution
V. Communication Wave (2000 A.D. ff) – the Internet proliferation
VI. Globalization Wave (1990 A.D. ff.) - Global Economy
VII. Digitalization Wave (2000 A.D. ff) – paperless media and office
VIII. Bio-nano Wave (1990 A.D. ff) – Biological Revolution
IX. Virtual Wave (2000 A.D. ff.) – activity-oriented environment without buildings
X. Post-literature Wave (2020 A.D. ff)? – no written language?

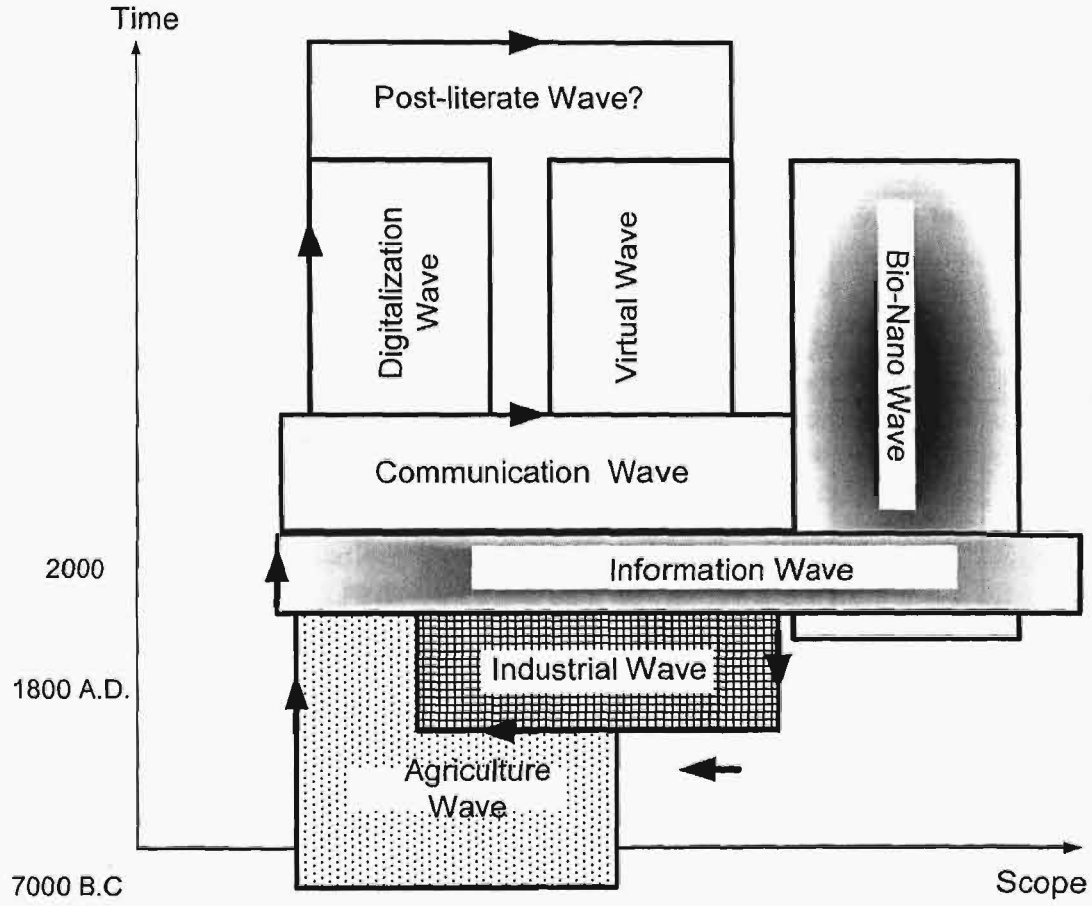

Figure 2 The Civilization Waves

THE EVOLUTION OF THE INFOCOSYSTEM

With the passage of the year 2000, we find ourselves at the same kind of turning point the world faced 100,000 years ago when human language arose, and again 550 years ago when

mechanical printing was invented in Europe. Since then, the deciding factor in human evolution has been INFOCO, whose various changes are illustrated in Table 1.

The change in the paradigm during the 21st century from informational to network communication is a more brutal change than the introduction of print. Certainly, writing and handmade books were already known before the appearance of print. The significance of the printed book lies in the fact that instead of reaching only tens or hundreds of readers, information began to reach thousands; in the 20th century this number swelled from hundreds of thousands to several millions. Of course, the greatest readership has been enjoyed by popular bestsellers rather than by books offering knowledge.

Table 1 The Evolution of the INFOCO System

INFOCO	Sense Organ	Humankind	Brain Size	Structure of Consciousness	Paradigm
Stimuli-Response	Nose	*Hominid* 10 M–6 M	500 cc	Archaic	Instinct Communication
Sound	Ear	*Australopithecine* 6 M.-2.5 M.	500 cc	Archaic	Sound Communication
Variety of Sounds	Ear	*Homo habilis* 2.5m.-1.8m.	750 cc	Archaic	Hand Communication
Intelligence (fire)	Brain	*Homo erectus* 1.8m.-200K	800 cc-1100 cc	Archaic Spaceless Timeless	Survival Communication
Wisdom	Brain	*Homo sapiens* 200K-60K	1750 cc-1350 cc	Magical 1D Timeless	Migration Communication
Language	Mouth	*Homo verbalis* 100K-4K BC	1350 cc	Mythical 2D Natural Tempos	Symbol Communication **INFOCO-1**
Civilized Language	Mouth "Feather"	*Homo tribalis & Homo scirba* 4K BC- 1454 AD	1350 cc	Mythical 2D Organized Tempos	Social Communication Writing **INFOCO-2**
Print, Records	Eye	*Homo libris* 1452-2000	1350 cc	Mental 3D Spacial Abstract Time	Information Communication **INFOCO-3**
Computer Networks	Cyber-space	*Homo electronicus*	1350 cc-1500 cc	Integral 4D Space Free Time Free	Networked Communication **INFOCO-4 INFOCO-5 INFOCO-6 (Post-Literate Tools)**

Source: A. Targowski. (2009). *Information Technology and Societal Development*. Hershey, PA & New York: Premier Reference Source, p. 84.

Communication that utilizes computer networks universalizes information and knowledge instantly among several hundred million users. It is impossible to say at this point what result and influence this massive spread of information and knowledge will have on

human development (Electronic Civilization). We can surmise that *perhaps* man will be more aware of his limitations and possibilities. Can this be true?

EARLY SYMPTOMS OF READING ONLINE AND OFF LINE

The printed word is under unprecedented assault by digitalization and network-driven dissemination. The battle is not just a duel among businesses and technologies – what is being decided is the future of how we think and how we perceive the world. The proliferation of image and text on the Internet has exacerbated the solipsism [the belief that the only thing somebody can be sure of is that he or she exists, and that true knowledge of anything else is impossible (Boorstin 1987)], because it allows us to read in a broad but shallow manner. We do not read more - we scan more. The fast invading streams of displayed images on a screen minimize our control over a written word. As Rosen (2009) argues, "we find ourselves in the position of living in a highly literate society that chooses not to exercise the privilege of literacy – indeed, it no longer views literacy as a privilege at all."

Due to the ease of the Internet's use, we prefer to scan The Huffington Post's links to hundreds of articles from other publications every day. Even focused information can be delivered to our e-mail boxes by all sorts of "aggregators," unfortunately, together with advertisements for more intensive consumerism. The power of virtually simulated events transforms us from participants to viewers, from readers to scanners. More and more we are satisfied by these secondhand experiences.

Numerous studies have shown that we don't read deeply online as much as we scan material. In a study conducted by Jacob Nielsen (a former Sun Microsystems engineer) and Don Norman, a cognitive scientist, the eye movements of Web surfers were tracked as they skipped from one page to the next. They found that only 16 percent of subjects read the text on a page in the order in which it appeared. The rest jumped around, picking out individual words and processing them out of sequence. Their web "reading" is quite different than book paper-based text reading.

A survey of 1,300 students at the University of Illinois, Chicago, found that only five percent regularly read a blog or forum on politics, economics, law, or policy. Nearly 80 percent checked Facebook, the social networking site. However, this famous social network is full of our pictures, résumés, and activity reporting. It is modest in interpersonal communication and in producing new knowledge/wisdom based on communicated parties. But it does not make us better readers or more knowledgeable and wise (Rosen 2009).

According to Maryanne Wolf, director of the Center for Reading and Language Research at Tufts University, "it's not just what we read that shapes us, but the fact that we read at all. With the invention of reading, we rearranged the very organization of our brain, which in turn expanded the ways we were able to think, which altered the intellectual evolution of our species." She asks, "What would be lost to us if we replaced the skills honed by the reading brain with those now being formed in our new generation of 'digital natives?'" (Rosen 2009).

NETWORKED MULTITASKING MAKES US SMARTER BUT INTELLIGENT?

Electronic info-communication technology is honing our ability to do many more things at once and to do them faster. Multitasking may even be making us smarter but are we more intelligent and wiser? According to Cowen (2009), "It is true that we access and absorb information more quickly than before, and as a result, we often seem more impatient." Using Google we can find information faster than in an encyclopedia and due to easy information that is globally accessible, [we can be better specialist and better generalist also. We may be overloaded by the volume of downloaded information but some filters may help in sorting the right one for us. Furthermore, we are as we were in the 1980s when we learned how to operate a PC computer steered by its hectic operating system, DOS. We have since learned how to operate iPhones and other related technologies (*e.g.*, electronic tablets, smart phones, and notebook computers) in order to know how to get the right information. Young people usually know how to use these devices; in fact, they are more active participants and creators of culture. It is a new benefit of the Digital and Virtual Waves.

However, knowing how to use new info-communication devices does not make us more knowledgeable and wiser. Being a better car driver does not make us a better tourist. We may drive better but not necessarily know where to and for what we should drive.

DO WE SEE TOO MUCH IN THE VIRTUAL NETWORKING (Figure 3)?

The advent of "augmented reality" (AR) threatens civility because it will provides filters to poison public discourse. The emerging technology called "Augmented Reality" enables users to see location-specific data superimposed over their surroundings. With AR applications such as Layar, the smart phone displays what its camera sees, accompanied by information about nearby buildings, travel directions, even notes and "tags" left by other users in that location. A person one meets on the street can be noted by the device and get a footprint about him/her from a database, such as Facebook page. If you do not want to see anybody who donated to the Palin 2012 campaign, you can request that their faces be covered by black circles. If you want to know who gave money to the 2014 on SUVs you can now see this data with green arrows pointing at their heads (Cascio 2009).

Can AR increase our ability to reason or will it reason for us?

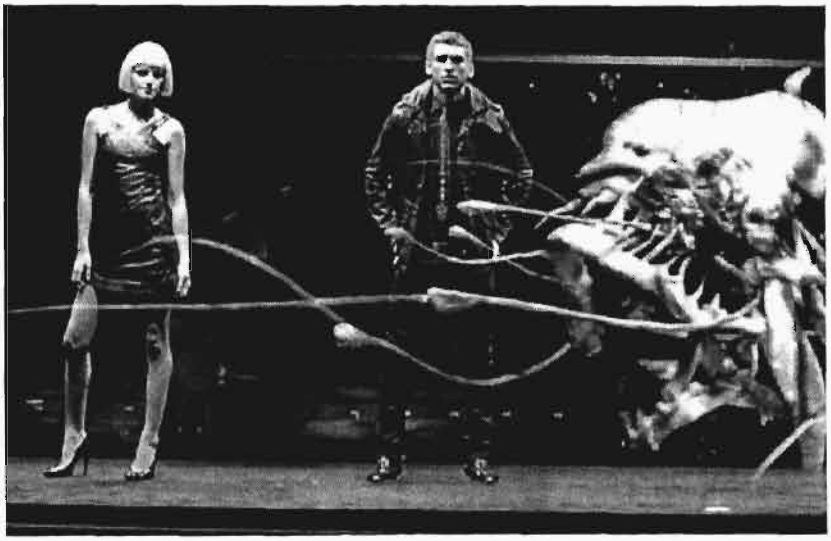

Figure 3 Virtuality

THE EVOLUTION OF REASONING TOWARDS WISDOM

Until now, humans struggled through millennia to progress step by step in advancing wisdom through reasoning at the levels of individuals, society, and civilizations. A model of wisdom patterns through the civilizational process is depicted in Figure 4.

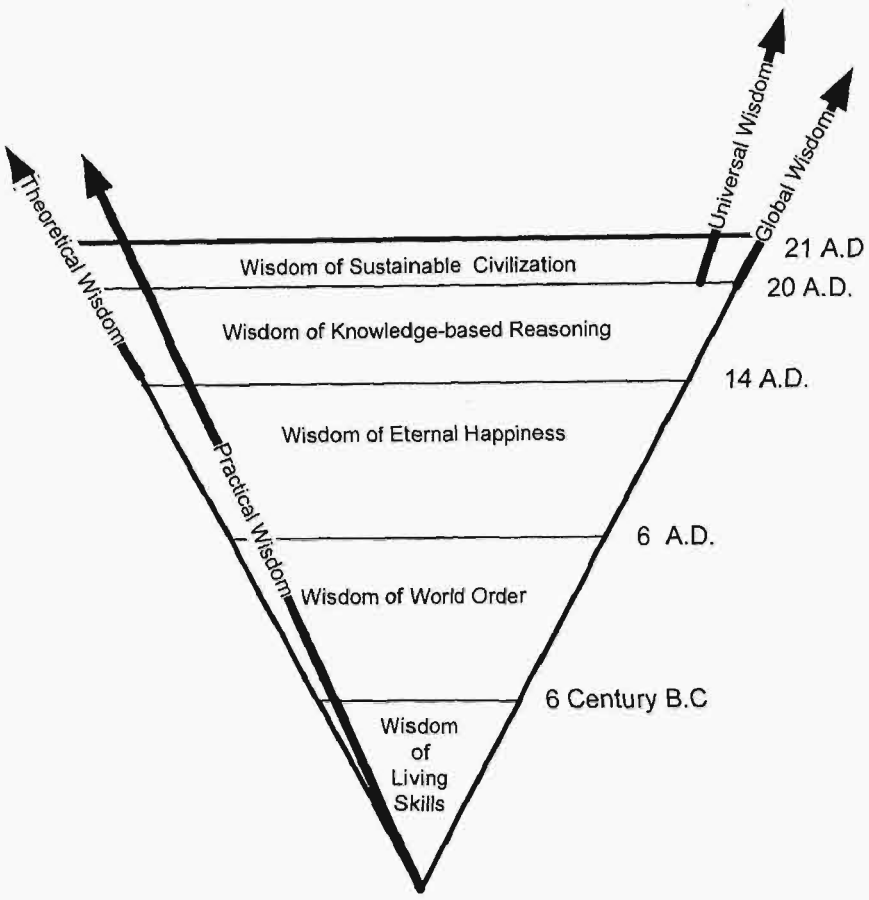

Figure 4 The Patterns of Wisdom
in Civilizational Development (The Targowski Model)

The development of civilizational wisdom took millennia and just in the 21st century is based on practical, theoretical, global, and universal wisdoms. However, the last three kinds of wisdom are not yet popular and practiced. These three last kinds of wisdom are the most important because they touch the critical issues of civilization in the long-term perspective. Until now, "civilization" was not the focus of humans' concern because the earth seemed an infinite source of abundant resources.

In the 21st century, man understands that the earth is too small for the practiced strategy of permanent growth. If this strategy is not changed, civilization as we know it will disappear sooner than we assume. So far, one can state that humans have paid too much attention to the understanding and developing of wisdom of eternal life. It took nine centuries (6-14 A.D.) and continues still. Wisdom based on knowledge-based reasoning took long six centuries (14-20 A.D.) and is still an unfinished process. Wisdom of sustainable civilization was the subject of study at the end of the 20th century and continues through the beginning of the 21st century. This kind of wisdom is practiced, unfortunately, only among society's elite and is

neglected at the level of political-economical processes. This wisdom is based on the two old wisdoms, practical and theoretical, and two new wisdoms, global and universal. The last two types of wisdom will be helpful in developing the wisdom of sustainability.

Can digitalization, virtualization and the abandonment of written language help in the development of the wisdom of sustainability?

WHAT IS THE PURPOSE OF HUMAN REASONING?

The purpose of human reasoning is to develop reliable sources of the following units of cognition (Figure 5):

- Data – measuring unit
- Information – comparative unit, providing change
- Concept – directional unit, providing solution options
- Knowledge – awareness-oriented unit, providing scientific data, rules, and laws
- Wisdom – judgment and choice-oriented unit, providing final solutions in terms of survival, cognition, existence, and action, under the forms of:
  - Conclusions
  - Suggestions
  - Decisions
  - Positions
  - Solutions
  - Actions

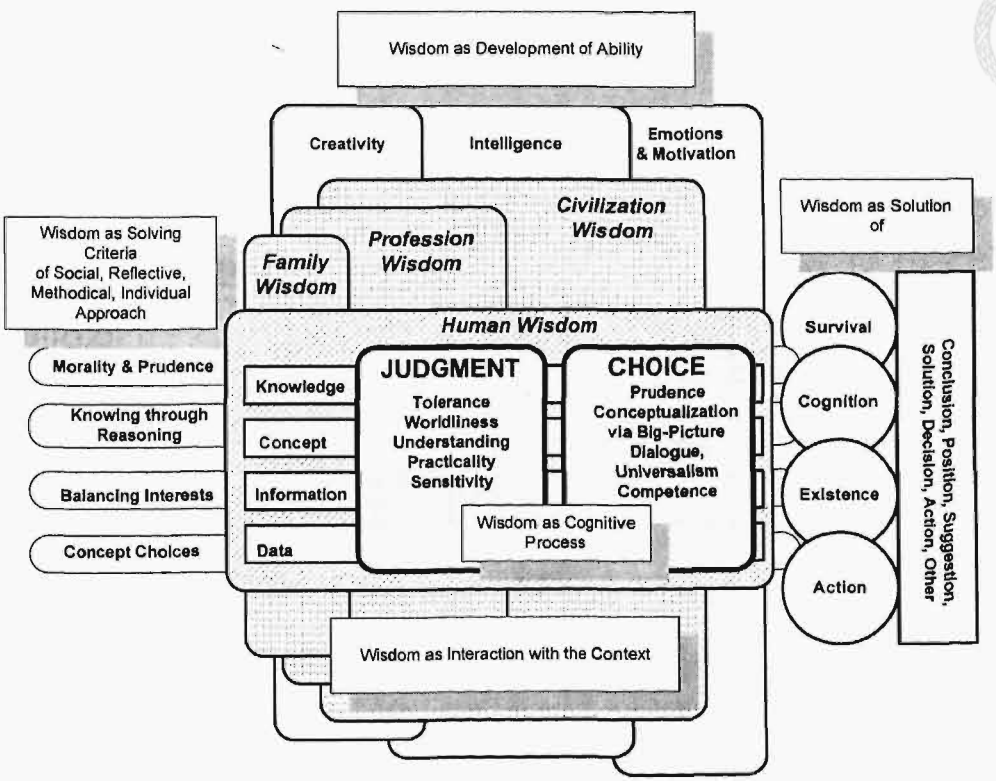

Figure 5 The Five Dimensional Model of Human Comprehensive Wisdom in the 21st Century (The Targowski Model)

HOW DO DIGITALIZATION AND VIRTUALIZATION IMPACT REASONING OF *HOMO ELECTRONICUS*?

The qualitatively estimated impact of the ICT upon reasoning of average *homo electronicus* is in Table 2 and upon information elite (researchers, professionals, politicians) of *homo electronicus* is provided in Table 3.

Table 2. The Qualitative Estimation of ICT'S impact upon Reasoning of the Average *Homo Electronicus* in the 21st Century

COGNITION UNIT	NETWORK ING	DIGITALIZATION	VIRTUAL-IZATION	CONCLUSION
DATA	Wide Reach	Overflow-scanned	Unreadable	**DATAMANIA**
INFORMATION	Wide Reach	Unreliable-scanned	Hidden	**MISINFORMA-TION (CONFUSION)**
CONCEPT	Wide Reach	Chaos-too many	Misleading	**"LOST IN TRANS-LATION"**
KNOWLEDGE	Wide Reach	Shallow-untested	Detached from Nature	**PSEUDO-KNOWLEDGE**
WISDOM	Wide Reach	Limited	Unreliable	**PRACTICAL, GLOBAL but TEORETICAL AND UNIVERSAL LIMITED**
CONCLUSION	**ALL AS ONE**	**SOCIETAL DYCHOTOMY**	**IMPRESSIVE BUT ISOLATING**	**MUST BE REGULATED**
REASONING	Potential for Better	Potential for Better	Potential for Better	**EQUILIBRUM REQUIRED**

Source: The Author's estimation

Datamania (Monstrous amount of data)?
[1 GB =1000 MB, 1 Terabyte (TB)=1,000 GB, 1 Petabyte (PB)=1,000 TB, Exabyte (EB)=1,000 PB, Zettabyte (ZB)=1,000 EB, yottabyte (ZB)=1,000 ZB]

- 1,200 exabytes of digital data will be generated in 2010 (Source: International Data Corp.)
- American households in 2008 were bombarded with 3.6 zettabytes of information per/person per/day. Mostly games and TV, the written word=0.1% of total. (Researchers from UC in San Diego).
- The total amount of information in existence in 2010 is about 1.27 ZB (The Economist, Feb. 27, 2010, p.5)

- ✖ Yotabyte (YB) – currently too big to imagine
- ✖ Too much to pay attention to the right data by the end users leads towards MISINFORMATION and MISDEMOCRACY (wrong feedback).

The conclusions of the estimation provided in Table 2 for average citizens are as follows:

1. Overused networking, digitalization, and virtualization lead to datamania, misinformation, and pseudo-knowledge, which are not conducive to human theoretical and universal wisdom. Both wisdoms are decisive in securing the survival of humans on the planet.
2. Perhaps practical and global wisdom can be extended via the application of the advanced ICT, particularly in handling short-term issues.
3. In order to use successfully the ICT in enhancement of human reasoning, these technologies should be regulated in order to secure the healthy equilibrium between technology and humans.

Table 3. The Qualitative Estimation of ICT'S impact upon Reasoning of Research Elite of Homo Electronicus in the 21st Century

COGNITION UNIT	NETWORKING	DIGITALIZATION	VIRTUALIZATION	**CONCLUSION**
DATA	Wide Reach	Better Support	Readable	**BETTER DATA**
INFORMATION	Wide Reach	Broader View	Readable	**INFORMED**
CONCEPT	Wide Reach	Better Choice	Creative	**BETTER AND MORE**
KNOWLEDGE	Wide Reach	New Knowledge	Detached from Nature	**NEW KNOWLEDGE**
WISDOM	Wide Reach	Better Judgment	Possible	**PRACTICAL, TEORETICAL GLOBAL AND UNIVERSAL**
CONCLUSION	**ALL AS ONE**	**SOCIETAL DYCHOTOMY**	**IMPRESSIVE BUT ISOLATING**	**MUST BE REGULATED**
REASONING	Better	Better	Potential for Better	**EQUILIBRUM REQUIRED**

Source: The Author's estimation

The conclusions of the estimation provided in Table 3 for the information elite are as follows:

1. Overused networking, digitalization, and virtualization lead to better data, better informed [better informed what? Incomplete idea], and new knowledge which are conducive to human practical, theoretical, global and universal wisdom. Both wisdoms are decisive in securing the survival of humans on the Planet.
2. In order to successfully use the ICT in enhancement of human reasoning, these technologies should be regulated in order to secure the healthy equilibrium between technology and humans.

HOW TECHNOPSYCHOLOGY CAN HELP IN ICT-DRIVEN REASONING

The digitalization and virtualization of the society leads to the spectacular simulation of reality and at the same time removes humans from reality. These kinds of technologies neglect the primal bond between man and nature. Western psychology must work on the development of technopsychology as it does finally contributes to the developing field of ecopsychology. The latter investigates the relationships between environmental issues, mental health, and well-being. The former should investigate the relationship between info-communication technological (ICT) issues and human reasoning and well-being. It should look for rules governing the link between ICT and mind in the scope of the following:

- Reasoning deficit disorder caused by the overuse of ICT
- ICT anxiety and addiction to it
- ICT paralysis of digital illiterates

Support for the development of technopsychology's premise that an imperiled human adaptation to new info-communication skills creates an imperiled mind can be found in the data of 15 million unemployed workers in the 2010 U.S. economy. Despite many factors, the most frequently repeated factor of their plight is that they do not have the right knowledge and skills. Needless to say, a large percent of these people struggle with depression and anxiety and the American Society, sometimes referred to as the Prozac Society. It is perhaps a sign of "technostalgia," which is an emotional response to the challenges of advanced ICT and a person's degradation because he/she does not fit to the current level of work requirements. Today, for these unemployed people, mental health requires being technologically attuned, and being technologically attuned requires being mentally healthy.

HOW TECHNOPHILOSOPHY CAN HELP IN ICT-DRIVEN REASONING

Technophilosphy should investigate the wisdom of developing technology which can potentially conquer mankind. Technology triggered the development of civilization 6,000 years ago when the irrigation system was introduced in agriculture and gave the input for the rise of wealth. Since then, civilization requires cities, administration, and police to protect collected resources. In the last 200 years, the Industrial Revolution brought tremendous progress of civilization in terms of mechanization and automation of human effort [as well physical as intellectual] in addition to human effort or is this a separate idea? Unclear. It was particularly feasible by the application of computers and their networks in the last 50 years. In the 21st century they, like the ICT, changed the modus operandi of humans.

For 6,950 years technology has human culture. But in the 21st century it conquered human culture. It leads to super consumerism, the depletion of strategic resources, and harm to the climate. We are facing the change of climate, food, population, and morale for the worse. Hence, technophilosphy must support human reasoning in such a way they we will be more focusing upon the survival-oriented solutions.

In order to do so, the following laws of service systems (which dominate Western Civilization's economy) are recommended (Targowski 2009:273):

Law I – Do not develop service systems without human presence.
Law II – Do not develop service systems which harm society.

Law III – Do not develop service systems which endanger human race.

Law I protects people against passivity. Law II protects society against structured unemployment. Law III protects the human race against bifurcation into two kinds of species.

HOW TO ACT IN THE POST-LITERATE AGE?

There is no way to stop the proliferation of the ICT in the Global Society. Any anti-movement against this technology won't be successful or wise. Instead of stopping this technology one must instead learn knowledge/wisdom and skills in how to operate in it. An architecture of electronic culture is shown in Figure 6 (Targowski 2009:306).

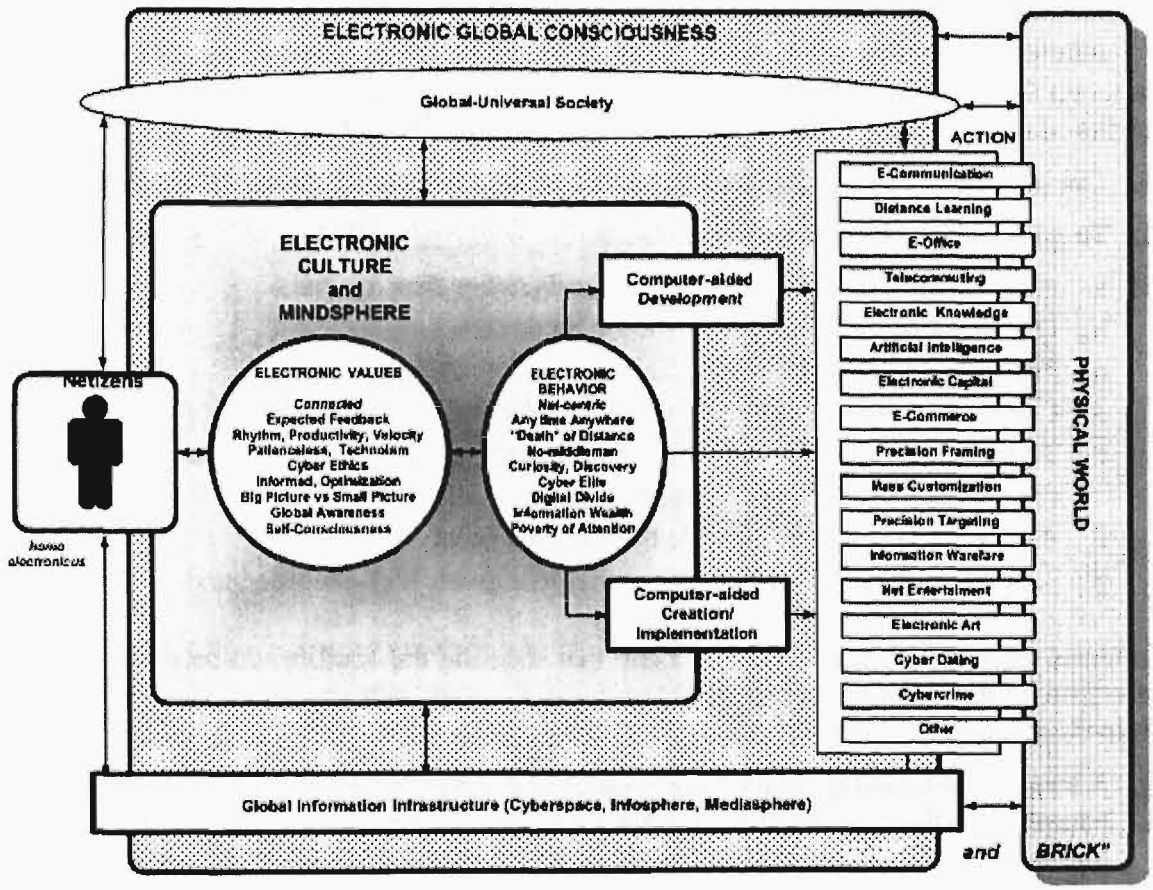

Figure 6 The Electronic Culture Architecture

In the 21st century electronic culture is becoming more and more visible, particularly among the Net Generation, Millennials, Generation Y, or Digital Natives. These are groups of young people, born between 1980 and 2000. There is a widespread consensus among educators, marketers, and policy makers that digital technology has given rise to a new generation of students, consumers, and citizens who see world in a different way. Growing up with the Internet, this group has transformed its approach to education, work, and politics.

HOW TO EDUCATE THE NEXT GENERATIONS OF COLLEGE GRADUATES?

Schools and colleges educate students quite well on how to be an electronic global citizen. Particularly, the application of the Internet is very well established at campuses and work environments. However, after noticing that the ICT in the 21st century does not lead to human wise reasoning among average *homo electronicus* which would secure our survival, the following issues should be addressed:

A. How to teach writing those ones who do not "read" (Since they quickly scan the Web).
B. How to teach all academic courses to secure the equilibrium between physical and electronic cultures
C. How to regulate the development and operations of the society in the 21st century to secure its well-being in all dimensions of humanity and technology

In terms the issue A, one can recommend the teaching of writing a text which is going to be published on the Web should be characterized by the following:

3. The potential reader will scan a planned text and eventually read it shallowly.
4. To gain such a reader's attention:
    a. A text should be at the level of synthesis rather than analysis
    b. One clear idea per paragraph should be written
    c. The keywords should be highlighted
    d. Conclusions should defined in a short bullet
    e. The writing should be specific for each level of cognitive units; data, information, concept, knowledge, and wisdom
    f. A graphic model can illustrate the author's point
    g. A video may turn attention of a reader to a given Web-recorded text.

In terms the issue B, one can recommend that securing the equilibrium between physical and electronic culture in taught academic courses, the approach should be characterized by the following:

- A strategy of teaching online cannot be treated as the "most advanced" strategy of education in the new emerging electronic society. It is rather a strategy which saves the cost and misleads students about teaching them "new skills" (Since electronic communication is information poor in a contrast to Face To Face (F2F) communication which is information rich).
- Each academic program should keep balance between traditional and electronic-oriented topics (knowledge-wisdom) and skills.
- Educated graduates are those who can converge traditional and electronic cultures.

WHAT IS THE FUTURE OF AN EDUCATED SOCIETY IN THE AGE OF NETWORKING, DIGITALIZATION, AND VIRTUALIZATION?

The intensive applications of the ICT in the Society at the dawn of the 21st Century leads to the strong divergence of among media users. Figure 7 illustrates at least four main groups of citizens, classified by their knowledge and skills in handling information by old and new ICT.

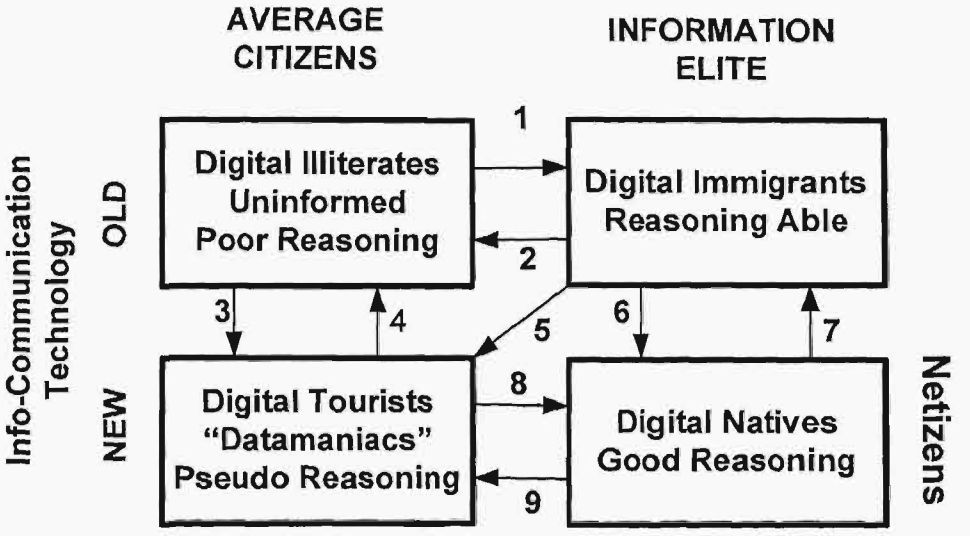

Figure 7 Technology and Society

Among them one can distinguish:

- Digital Illiterates, apply traditional (OLD) ICT. They are uninformed and reason purely, however, if they improve knowledge/skills they may advance (path 1) to Digital Immigrants who work on the adaptation to new conditions of handling information. They may improve skills in using the Internet and its resources as Digital Travelers (path 2).
- Digital Immigrants, have good knowledge/skills in handling information but mostly apply OLD ICT. They only occasionally apply NEW ICT, usually with the help of other people. They may improve digital skills to advancing to Digital Travelers (path 5) or to Digital Natives (path 6). They able to reason.
- Digital Tourists, are good Netizens (mostly young generation) who spend hours using the Internet, but their knowledge/skills of handling and understanding of cognition units is shallow, as is their level of reading. They collect a lot of data and become "Datamaniacs" but their reasoning is pseudo-reasoning, sometimes good, mostly is questionable. If they improve their knowledge and skills of handling information, they may become Digital Natives (path 8).

- Digital Natives (Prensky 2001) belong to the information elite and apply NEW ICT. They reason very well.

If those specialists do not practice gain knowledge/skills they may lose them (paths 2, 4, 7, and 9.

It is wrong to say that since Digital Natives reason best, we should educate only this kind of graduates. One cannot forget that they are not only good in digitalization but also belong to the Information Elite. This kind of elite has a very comprehensive education in humanities and given professions and the ICT knowledge/skills is the second layer of their education. Furthermore, in order to belong to the Information Elite, they cannot be separated from the nature in a simulated virtual/digital environment, since they may lose their human biologically-driven.

Hence, it is "done deal" with traditional way of handling information, since F2F communication or P2F or F2P (P-paper) is still information richer then electronic communication.

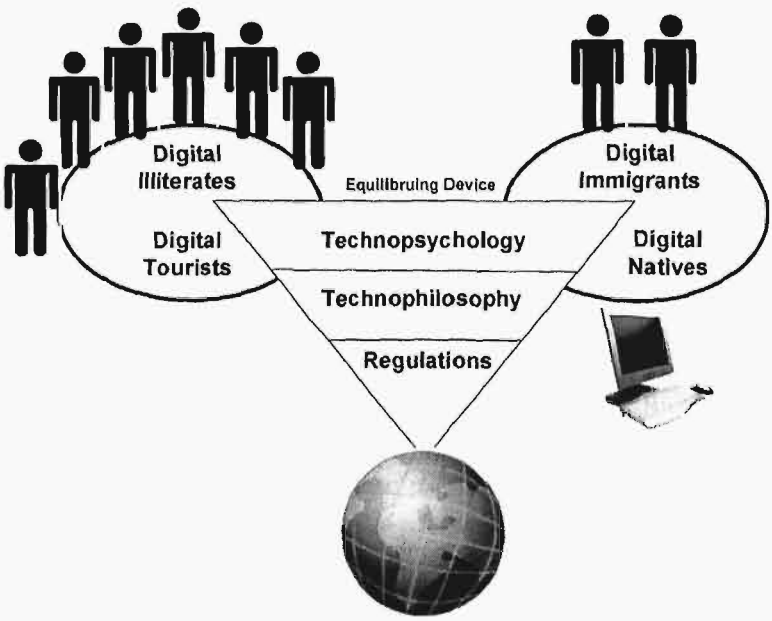

Figure 8 The Society in the Process of Digitalized Equilibrium

Therefore, it is important to keep equilibrium in the society between OLD and NEW ways of handling information in order to minimize the dichotomy of people. It should be done by intensive development of Technopsychology, Technophilosphy and Regulations how intensively and broadly ICT should be applied. The required regulations may dramatically challenge many well already established values in certain civilizations. Certainly they challenge the values of Western civilization.

CONCLUSION

1. The Digital and Virtual Waves of Civilization:
   a. Improve reasoning of the Information Elite because they make a broad scope of information for problem solving and decision making instantly available.
   b. Worsens the reasoning of Average Citizens because they do not have good knowledge/skills of handling information as the Information Elite does. They become "Datamaniacs" whose reasoning sometimes is good sometimes is bad.
2. The Digital and Virtual Waves of Civilization lead to the dichotomy of Society into developed and undeveloped citizens. To minimize this process one must develop Technopsychology and Technophilosphy and Regulations how to apply the society friendly ICT. Whether the society is able to regulate the technological change it is another question. This author is rather pessimistic.
3. The divergence of paper and electronic media looks like a "done deal" in the dawn of the 21st century, in fact it must be transformed into the convergence of these media, if the dichotomy of the Society should be minimized and the society would like to be well informed and civilized.

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