AUTHENTICITY OF INFORMATION IN CYBERSPACE: IQ IN THE INTERNET, WEB, AND E-BUSINESS

(Practice-Oriented)

Abrar Haider
School of Computer and Information Science
The University of South Australia
Email: abrar.haider@unisa.edu.au

Professor Andy Koronios
Head School of Computer and Information Science
University of South Australia,
Email: andy.koronios@unisa.edu.au

Abstract The phenomenon of information in cyberspace can be likened to an almost limitless library where anyone can upload any information for the public to read. To live up to our belief in freedom of expression such openness should be defended as long as the material is not aimed at fomenting communal hatred, inciting violence and affecting public opinion. Lack of control and ease of publication signifies that a fair proportion of the cyber information is unauthentic. Internet is a self-regulated system and inhibits semantic, pragmatic and social barriers, which have the ability to create swings in cognitive styles and beliefs of its users. The essential problem here is how to establish authenticity of the available information. One way a website can enjoy authenticity is to earn it the hard way, like Amazon.com. Another way is to have explicit endorsements by individuals who are widely trusted for their competence, or organizations that are well known for their commitment to excellence, ethics and a sound track record of achievements. The third way is to gave accreditation by individuals and/or organizations that enjoy high level of respectability and confidence. This paper illustrates the point that reality in the cyberspace depends very much on the real physical world for it to be taken seriously and to function properly. The issue of authenticity, therefore, has significant implications for the roles of the state, established commercial and non-commercial organizations as well as socially committed individuals who have a track record of professional achievements.

Key Words: Cyberspace, Authenticity, Information Society, Internet regulation.

INTRODUCTION

A distinguishing feature of information society is the abundance of information that is changing human activities and human relations. As a global and easily accessible library, Internet provides information on almost every aspect of life, for example, news, entertainment, medicine, merchandising, religion, etc. However, abundance of information does not necessarily mean that people become informed. It is important to ascertain right information quickly and easily, in order to distinguish between what information a user needs and what information appears nice to the user, so that the user doesn't sink in electronic junk information [1]. Shapiro and Varian [2, p. 6], note that "most popular web sites, e.g. Yahoo, AltaVista, goggle etc., belong to search engines that allow people to find information they value. However, the real value produced by the information provider comes in locating and communicating what

is going to be beneficial to society". It is expected that more than 20 percent of all future jobs will require the employees to have the skills to locate pertinent information, assess data, and make decisions on the basis of their analysis [3]. Information serves as the foundation for our thinking, judgment, belief system, choices and understanding of our world [4]. Utopians argue that the Internet offers novel and enhanced modes of information dissemination [5]; while dystopians contend that the information potential of Internet can take people away from their communities [6]. Authenticity, reliability and validity of Internet based information is therefore, more important than just being able to access information.

Internet's self regulating and open structure makes it an easy platform to publish, access, retrieve, manipulate, and distribute information, and hence raises the problem of authenticity of information as well as of the potential beneficial or harmful effects of cyber information on society. These problems have increased with the increasing flow of information resources being distributed in the cyberspace without editors and fact checkers (traditional gatekeepers for print publications) monitoring them. "By creating a new global space that disregards national borders and that cannot readily be controlled by any existing sovereign, the Internet weakens many of the institutions that we have come to rely on to resolve the basic problems of collective action - the selection of means by which individuals coordinate and order their interactions so as to achieve what they believe is a greater good. Thus, the very nature and growing importance of the Internet calls for a fundamental reexamination of the institutional structure within which rulemaking takes place" [7].

The central goal of this paper is to explore the issue of authenticity of information in cyberspace and to discuss possible options by way of which authenticity of such information could be established. We argue that Internet as an open and self organizing system has the ability to aid the formation of public opinion, and create swings in cognitive styles and beliefs of its users. Particularly, we suggest that the Internet is a different form of media than, for example, the printing press, therefore there should be certain measures taken at the societal, community and global level to ensure authenticity of information in cyber world. This paper is divided into three sections; first, an overview of information in cyberspace and its influence on society, using the semiotic framework, is discussed. In the subsequent section, principles of authenticity are used to establish the process of ascertaining authenticity of information on the Internet, and in the final section we propose some ways and means through which authenticity of, content and purpose of, information in the cyberspace could be instituted.

ISSUE
E OF AUTHENTICITY OF ELECTRONIC INFORMATION

As information moves from an established paper based reality to electronic existence, its physical characteristics, which are vital for establishing the authenticity and reliability of the evidence they contain, are threatened [8]. Traditionally a variety of different criteria such as authorship, purpose, authority, origin, scope, paper quality, and print have been used to evaluate the authenticity of document, however, these criteria can not be applied in electronic paradigm, because it is often difficult to find these traditional authority indicators [9, 10]. Internet is also changing our traditional faith in visual documentation and as we move into virtual reality more digital manipulation is expected [11]. In fact new digital works have already started to affect our concepts of authentic representations, for example, digital imaging or photography, where digital manipulation has taken to new limits with the practice of retouching photographic prints beyond mere uplifts to misleading.

Concept of Authenticity of Information

In the dictionary “authentic” is described as "genuine; real; veritable; not false or copied; sharing the sense of actuality and lack of falsehood or misrepresentation" and "having the origin supported by unquestionable evidence; authenticated; verified; or entitled to acceptance or belief because of agreement with known facts or experience; reliable; trustworthy" [12]. In legal terms authentic is defined as "duly vested with all necessary formalities and legally attested; competent, credible, and reliable evidence" [13]. In business law, to authenticate means “to give authority; to establish the legal validity; to verify; or to establish the genuineness of a document, signature etc” [14].

Information generally has bias; therefore, authenticity is not limited to verifying authorship and diplomatics of a document. In fact it includes attributes such as completeness, accuracy, trustworthiness, correctness, validity, integrity, faithfulness, originality, meaningfulness, and suitability for an intended purpose. According to Fogg and Tseng [15], trust in information is generated though beliefs or levels of confidence derived from general assumptions and stereotypes existing within one’s own culture. It’s, therefore, the context that derives authenticity, and it is from within that context that an endeavor to establish it has to be made. Human behavior, beliefs, cultural attitudes, familiarity with and trust in technology are some of the aspects, which render authenticity and believability of information subjective. Hall [16], contends that people have distinct approaches when they evaluate information. On these bases, he groups them into two cultures:

a. Low context cultures, comprising indigenous English and German speaking cultures, and Scandinavian cultures. People from these backgrounds look for depth and detail of information, and like to receive important information in a simple and uncomplicated way.

b. High context cultures, which refers to the rest. People in these cultures are concerned about the source of the information, the status or position of the information source, and the method chosen to deliver the message.

Considering the multiplicity of beliefs and viewpoints of the cyber population, it is unlikely that one set of criteria for authenticity could be arrived at. Authenticity of information in cyberspace depends largely on the affiliation of the web site, any endorsements that it enjoys from professional and non professional bodies and opinion leaders; context from within the information originates, content’s trustworthiness and public perception about the contents.

Cyber Information and Semiotics

Drucker [17] defines information as data with significance and intention. O’Brien [18] identifies information as data transformed into a logical and meaningful context, which is beneficial to a particular public. Turban *et al*. [19], maintain that information is organized data that embodies meaning and is of value to the recipient. Stamper [20] is opposed to defining information as something that is obtained from processing of data. He interprets information in diverse ways as number of different properties of signs, and provides us with three characteristics of a sign, which are, physical representation, referential property, and interpretation of association between the first two. These signs have further been elaborated by Stamper [21] using a “semiotic ladder”, to illustrate different dimensions and levels of signs. “Semiotics reveals that our use of signs helps to determine what we regard as reality” [22, p. 170]. It deals with meaning, validity, truthfulness, and signification of information. However, the process of establishing authenticity and truthfulness will always be relative to the interpreter of information, as meaning itself has many meanings [23].

Human Information Functions	**Social:**	Beliefs, expectations, commitments, culture (***Collective conception***)
	Pragmatic:	Intentions, communications, negotiations (***Purpose of information***)
	Semantic :	Meanings, propositions, validity, truth, signification, denotation (***Authenticity of information***)
Technical Platform	**Syntactic:**	Formal structure, language, logic, data, records, deduction, software, files (***Forms and manipulations of Information***)
	Empirics:	Patterns, variety, noise, entropy, channel, capacity, redundancy, efficiency, codes (***Statistics of information***).
	Physical:	Signals, traces, physical distinctions, hardware, component density, speed, economics (***Economics and corporality of information***)

Figure 1: The Semiotics Perspective of the Cyberspace [Adopted from 21]

In information systems, technological and economic aspects of web based systems have been the focus of research for many scholars. However there has been little consideration given to the social and cognitive implications of people's interaction with the Internet [24, 25]. Figure 1 reveals that there has been greater emphasis laid on representation or syntax of information, with little or no consideration given to the semantic, pragmatic and social levels. Thereby rendering authenticity, purpose, and collective conception of cyber information doubtful, as the system does not possess holistic and all encompassing properties.

The intensity of this issue is further amplified, as people with varying degrees of knowledge, different ethnicities, variety of beliefs and values, use the internet for an assortment of reasons. It also raises a few questions about the impact of Internet, whether, it will contribute towards the decline of social interaction and assimilation, community involvement, political participation, and integration [26, 27], or it will foster new forms of identity and social interaction [28, 29, 30].

INFORMATION AND SEMANTICS IN CYBERSPACE

Due to its openness, 'online communication is as suitable to publish garbage as it is to gems of purest ray serene'[24, p. 133] , hence its users run the risk of being overwhelmed by information flows [31]. 'On 25 August 2000, stockholders were stunned by news that Emulex, a server and storage provider**,** was revising its earnings from a $0.25 per share gain to a $0.15 loss and that it was lowering its reported net earnings from the previous quarter as well. This press release was being distributed by news services like Dow Jones, Bloomberg, and CBS Marketwatch. Within 16 minutes, Emulex shares plummeted from their previous day's close of approximately $104 per share to $43. It was not a true press release, but was actually initiated by a former employee of, Internet Wire, a Los Angeles firm that distributes press releases. He launched the release from the company's server, which was believed to be true by the media companies as well as the general public. He didn't hack into the computer systems nor did he develop any complex algorithm to do that, he just manipulated with the perception of people and waited for altered

reality to produce desired actions that would serve his purpose. All he did was to write a convincing press release, used a believable distribution medium, and sat back to watch events unfold' [32]. This shows how easy it is to manipulate information on the Internet and influence public judgment.

In these circumstances, how would a high school graduate looking for an appropriate university to study, judge the claims in the homepage of a university website? How much can a person trust medical statements made by a group of diabetes patients on their website? Obviously, education has become an industry motivated towards maximization of profit, and any pharmaceutical company can arrange a website for a particular disease. In these cases there is hardly any way of proving whether the information is real, or a gimmick, or simply to stir up some public opinion. The issue here is not how to establish the source of information alone, but also how to evaluate the genuineness, trustworthiness, value, and quality of information content. Todd [33] warns of looking out for if the publisher of information has some stake in the opinion that the information is seeking to form. However, considering the fact that all information has an explicit or implicit purpose, it depends upon the knowledge and understanding of the user to be able to sieve out authentic information from unauthentic information. On the other hand, in certain cases information requires a high level of comprehension, intellect and understanding to be able to make a judgment about what is needed and what is not, for example, Berland *et al* [34] posit that ease of understanding, quality, and readability of the health information available on the net is inept, coverage of key clinical information is inadequate and inconsistent, and high comprehension is required to understand the information.

Pragmatics and Cyber-Information

In order for information to be useful, it must have an essential purpose, which could be attributed to its originator and its interpreter. This highlights an important relationship between information, the behaviors of its users, and the social context from within the information originates.

Search engines on the Internet assist users in finding the information but also contribute towards pluralism or multiplicity. These engines are mostly used for keyword searches, consequently the information that they find is more often than not irrelevant to what the user intends to find [35, 36]. Due to this diversity, a variety of new ideas emerge, each with its own perspectives, set of laws, contents, and modes of admission. The user is exposed not only to a differing and often conflicting set of ideas, but also to a variety of the new social settings. Each of which carries with itself its own embedded standards for judging the authenticity and suitability of the opinion. Reading the information through the associated links for a search string makes the user conscious of the pliability of authentic knowledge or truth. For example, a simple search for 'depression' will give a variety of different responses, including information on metal depression, economic depression, and mental depression and so on. A further exploration of mental depression reveals different approaches to handle anxiety and stress. Some of these sites also support euthanasia. Now the question arises, which information is authentic and trustworthy? For some it may be fine to commit suicide, whereas for some it may be totally unthinkable or a grave sin. However, at the same time credibility, genuineness and truthfulness of the information provided on these websites cannot be questioned, as they do represent particular social groups. It can be argued that although the Internet facilitates critical thinking skills, however, it also points in another direction that there is no ultimate truth available on the internet, therefore, authenticity of information is subject to doubt, if it is taken in isolation from the environment in which the information originated.

Intellectual Consciousness, Internet and the Social World

One of the vital issues in the information society is that postmodern institutions are being controlled by those laws, regulations, and norms that came into existence as a by product of industrial revolution. With

the wide presence of misinformation or spurious information the beliefs in the accepted wisdom of knowledge society, and common economic and cultural spaces, cannot be realized. Instead we face predicaments of ideology, identity, and social integration. Castells [37, p. 3] argues that 'our societies are increasingly structured around a bipolar opposition between the net and the self'.

Turkle [25] points out that Internet works as a postmodern object to think with, which deeply changes the users' belief systems. She argues that although postmodern ideas have been around for a considerable period of time, yet they did not receive enough attention from general public; nevertheless, it is due to the experiences on the Internet that these ideas are growing to be realized and becoming pertinent to everyday life.

Literacy in the form of printed word encouraged the development of abstract thinking, concern with literal meanings, and search of universal truths [38]. This helped shaping up the foundations of a single rational and logical worldview, that is modernism. The basic idea of modernism implies that there is always a truth to be revealed. It is concerned with the search of universal principles through linear, hierarchical and logical means. Postmodernism as opposed to modernism advocates the bias inherent in truth due to the context in which meaning is fashioned, and the plurality of perspectives that emerge as a result [39].

The postmodern ideas of perspectivism and multiplicity on the Internet are not only relevant to the illustration of information or knowledge, but also to the self [40]. All the way through the period of growth in literacy in human civilization, the written word symbolized a trustworthy voice for both literate and illiterate alike. Interpretation as it is understood now, as a subjective course of action, was not what was derived out of text. A manuscript was expected to be having unique connotations as that of the intent of the author [38]. This uniqueness of understanding was a prerequisite for endowing the text with ultimate authority. It can be argued that just as these ideologies are rooted in the technology of print on paper, new thought patterns are being fashioned in the electronic paradigm in response to a new set of forces acting on it, such as the interactivity of Internet. "Life in cyberspace seems to be shaping up exactly like Thomas Jefferson would have wanted, founded on the primacy of individual liberty and a commitment to pluralism, diversity, and community" [41, p. 53]. Popper suggests that critical rationalism, which advocates that no one has domination over truth and collectively we can get closer to it, is essential for the intellectual structure of the open society [42]. The three Greek virtues, which are actually the bed rock of any modern democratic society, i.e. the feeling for proportion and coherence; and the ability to critically examine an object, in order words examining both sides of a phenomenon, [43] add dimensions of tolerance, trustworthiness, balance, and permissiveness to information.

Issue of authenticity is embedded in the architecture of the Internet, through its emergent self regulation, openness, decentralization, and self-stabilizing tendencies. As an emergent self organizing system, it is far from equilibrium, in a non linear and chaotic state and possess vast amount of information. The characteristics of openness and decentralization are essential to the Internet, as they provide the Internet with its fuel i.e. information. Consequently the system is bound to accept different kinds and levels of information for its operation and growth, and inevitably there will be information that could be termed as unauthentic, manipulated, and unqualified.

Ascertaining Authenticity of Information in Cyberspace

There is apparently no single solution to the issue of authenticity of information on the Internet. Different evaluation criteria for Internet information have appeared in books, articles and web pages, as the evaluation of web resources is a subjective process and the criteria of evaluation of these resources are different for different publics. Fogg and Tseng [15], suggest three modes of evaluation, binary evaluation, threshold evaluation, and spectral evaluation. Binary evaluation is used when a user has little interest in

the subject areas and hence has a low capability of being able to compare and process information properly. Threshold evaluation is used when the user has modest knowledge and consequently moderate ability to compare and process information. Spectral evaluation is used when users have extreme interest and familiarity with the subject, and therefore, are fully capable of comparing and processing information provided by the resource. If the personal involvement in the subject area is low people tend to process and utilize information peripherally, whereas in case of greater personal interest and high motivation, people engage in a spirited evaluation of the source, thereby focusing heavily on the subject matter than on peripheral signs when assessing for authenticity, credibility and trustworthiness of the information [44].

Richmond [45] maintains that people should follow the 10 C's in order to make an assessment of the Internet resources, these are, content, credibility, critical thinking, copyright, citation, continuity, censorship, connectivity, comparability, and context. Fritch and Cromwell [46] contend that the evaluation criteria for Internet information should be based upon, author competence and trustworthiness, document validity, and overt and covert affiliation with an institution. Within each category they suggest some checks to be made so as to ensure the genuineness of the information. Alexander and Tate [9] propose that the credibility of a web resource can be established through judging that resource for accuracy, authority, currency, coverage and objectivity. These criteria have often been listed as standard criteria for evaluation of Internet based resources.

However, the issue is much boarder than establishing genuineness of the author(s), accuracy of sources, and technical correctness of documents, as it deals with the content's authenticity and what is trustworthy and is beneficial to society. Our discussion of authenticity suggests that the criteria for judging Internet based information have to be broad and all encompassing. Apart from establishing the diplomatics of information, the criteria should be based on four themes, namely, trustworthiness, affiliation, endorsement and individual's perception, of information. The process could be carried out by asking question such as the ones proposed by Todd [33, p. 4], "What is the website trying to do? Whose interests are being served through the information available on this website? What is the text aiming to convey? What could be the possible meanings? What do I already know and how does this relate to it? How does this relate to other sites? What are the alternative/opposing views?"

Trust is a very broad and subjective term and going in its details is beyond the scope of this discussion. For this paper we adopt the definition of trust as, "trust signifies a positive belief about the perceived reliability, dependability, and confidence in a person, object, or process [15, p. 81]. Publishing companies such as New York Times Company, Economist Group, and McGraw-Hill etc., have achieved their reputation for providing authentic information after years of operation and continued trust of their readers. In cyberspace Amamzon.com has established this kind of trust. Amazon's name works as packaged information, as it offers trusted information regarding various perceived attributes of their goods and service to its customers. Amazon invites customers to provide reviews and rate the books that they sell. These reviews are ensured for authenticity and suitability of purpose before they are published on the website for the reference of future visitors. Doing so Amazon involves the public and works on the popular sentiment prevailing among its market, and one that is acceptable to majority. In addition, through established security arrangements, observing privacy, and ensuring fast delivery, Amazon.com produces a sense of skillfulness and dependability in relation to a customer's perceived trustworthiness. For the same reasons, Amazon is endorsed by a variety of third party sites that refer their visitors to Amazon.com.

In the research conducted by Rieh and Belkin [47], organizational affiliation was one of the vital factors used by academics and students in ascertaining authenticity of Internet information. For example, an economics program at university X would be considered to be of high quality if the web site of university X claims to have an exchange program with the London School of Economics. Since its is easy to fake

such claims one way of handling this issue is to provide the link to the claimed organization's web site, referring to the information that proves the authenticity of such claims on it's web site.

Traditionally, endorsement of information by individuals and organizations respected and trusted for their impartiality and professional competence has been received well by the public. Another way of establishing authenticity of the information content is to have explicit endorsement by individuals who are widely trusted for their professional competence, or organizations that are well known for their commitment to excellence, ethics and a sound track record of achievements. Usually opinion leaders within a local community are regarded as authoritative sources for information and advice. A medical statement made by a diabetes patient website would be taken more seriously if it has the clear endorsement of a council of medical practitioners. One such example is that of the HON Code of Conduct for Medical and Health Web Sites and Devices, which seeks "to help unify and standardize the reliability of medical and health information on the World Wide Web" [48]. Morhan-Martin and Anderson [49, p. 738] argue that "uniform standards developed and published by recognized professional and nonprofit health associations serve two important functions. First, uniform standards provide creators of new sites with a set of principles to adhere to when developing a new health website. Second, uniform standards, when represented as a 'seal of approval' posted visibly on a site being viewed, provide the visitor with the assurance that the information he/she is viewing has passed the test of a review by professionals who are knowledgeable and confident about the quality of the information being discussed on the site".

Role of Institutions in Establishing Authenticity on the Internet

Establishing authenticity of the Internet resources is a phenomenon that is too broad to be addressed by any legislation or standard. Lemley [50] indicates that the Internet represents a diverse community, which consists of libertarians, communitarians, communists, socialists, rich, poor, nerds and literati. It is very unlikely that they will reach consensus on any subject. Berman [51] argues that the power of the actors in the cyberspace to make their own rules, which can be enforced by any Internet user, poses a problem because these entities do not have to enforce any constitutional reforms or legislations, or ethical principles that would allow for all the legitimate interests of stakeholders.

Some scholars have proposed international law, with particular emphasis on political and social aspects, as the appropriate way of governing the Internet [52, 53, 54]. While, others suggest norms as a substitute to legal legislation, especially considering the fact that the Internet population is not homogenous and many countries lack an established legal system [55]. Johnson and Post [7], suggest that existing legal frameworks are insufficient to control Internet; therefore, national governments are ill-equipped to handle the issue. They argue that the solution to this problem is creating virtual courts and virtual governments within cyberspace.

Reality as claimed in the cyberspace depends very much on the real physical world for it to be taken seriously and to function properly. The Internet and its apparatus function as a global unit and any national government embarking to control the information on the internet cannot succeed. The solution to the issue of authenticity of information in cyberspace lies in cooperation between communities, nations, commercial and non commercial organization and supranational organizations. This has significant implications for the roles of the state, well established business and non-business organizations as well as socially committed individuals who have a track record of professional achievements.

We propose a solution to this issue as a virtual organization operating on the principles of self organization by means of institutional and temporal cooperation. By endorsing and authenticating information originating out of their national boundaries, governments can offer a stable platform for information exchange to their citizens and economy, and for the development of varied commercial and

non commercial contents. However, the state cannot achieve its objective alone; it needs to be supported by society and supranational organizations. One example of how state can authenticate commercial websites is illustrated by Wang and Heng [56]. The authors have proposed the Taiwanese government to maintain website portals with links to national commercial organizations. This can be further extended to non-governmental organizations, news sources, educational institutions, various associations and organizations. We propose that the links provided by these portals should be authenticated by the government agencies for authenticity, credibility, and genuineness of information content. It is not to say that these sites should represent the official opinion. In true democratic spirit, these portals should only provide links to websites originating from their geographical boundaries, with each website displaying its own version of truth.

We propose a three step approach. At the first step, all commercial and non-commercial web sites should go through a process of authentication and approval by endorsers, such as, non-governmental organizations, professional bodies, professionals, opinion leaders, and community watchdogs. These organizations and individuals may have their own criteria for endorsement, but the guiding principles should be completeness, accuracy, validity, integrity, originality, meaningfulness, balance, and permissiveness of information. Once authenticated, these websites would become the voice or representative of their respective communities or organizations, thereby ensuring the freedom of speech and equality. At the second stage, the state is in a position to authenticate that the origin of the information on the website is within its geographic boundaries, and represents the opinion of a particular group. When each state does the same, the third step will arrive in the shape of collective organization at a global level that will be based on self-regulation and temporal cooperation. However, this does not mean that once having obtained the authentication these web sites are the free to publish any harmful content. The players at the first two stages also have added responsibility as they have to react to any infringements identified and deal with these according to the laws of the state.

However, this is not the ultimate solution, as there will always be countries, communities and cultures that would be sanctuaries of propaganda, misinformation and bogus information, to serve their vested interests. It is therefore, the recipient of the information who has to make a decision about the authenticity and acceptability of the information. The real role of the state lies in making the public digitally literate and promoting awareness of the possible hazards of misleading information by promoting consciousness about certain issues, for the reason that intellectual contributions do not come from education alone, it requires enlightenment.

CONCLUSION

Controlling the flow of information on the Internet is extremely difficult if not impossible. Due to the subjective nature of authenticity and the characteristics of openness and self regulation of the Internet, the problems associated with information in information society are enormous. Internet is not only becoming a part of our lives but is also fostering new behaviors. Perhaps the most important construct that derives information dissemination from the Internet is the perceived attributes of the Internet, i.e., the user's attitudes, beliefs, and information received by the user from his/her social environment about the Internet [57]. There is much information available in electronic form that we rely upon and believe it to be what it appears to be, for example, internet based news sources, business and academic documents, and images, most of which has its own intention and purpose. Internet on one hand fosters critical thinking, and on the other could also prove to be tool for cultural and cognitive invasion. Pluralism of information is leading us to suspect that what we see is not what actually is.

Authenticity of information on the Internet is not an easy issue to handle. We, the creators and users of information, have to become digitally literate. Specific communities, such as, government, NGOs, scholars, publishers, and the community at large have to decide what information they need to place high trust in and to develop protocols for ensuring the integrity of that information, so that its authenticity could be maintained. National governments can draw upon the base thus provided to act as a gatekeeper, while ensuring the freedom of expression and speech. Once each government has a mechanism in place that endorses information originating from within its boundaries, the issue authenticity of information at global level may become addressable. However, truth value of most information will always be subjective to user's judgment. These judgments have never been guaranteed in the off line world and that will certainly not change in the electronic environment.

REFERENCES

[1] Kehoe B. P., (1994), "*Zen and the Art of the Internet: A Beginner's Guide*", 3rd ed., Englewood Cliffs, N.J: PTR Prentice Hall.

[2] Shapiro C., and Varian H., (1999), "*Information Rules"*, Boston: Harvard Business School Press.

[3]. Morrison J., and Stein L., (1999), "Assuring Integrity of Information Utility in Cyber-Learning Formats", *Reference Service Review*, Volume 27, Number 4, p. 317-326.

[4] Harris R., (1999), "*WebQuester: A Guidebook to the Web*", New York: McGraw-Hill.

[5] Levy P., (1997), "*Collective Intelligence: Mankind's Emerging World in Cyberspace"*, translated from French by Robert Bononno, New York: Plenum Trade.

[6] Stoll C., (1995), "*Silicon Snake Oil: Second Thoughts on the Information Highway"*, New York: Doubleday.

[7] Johnson D. R., and Post D., (1997), "And How Shall the Net Be Governed? A Meditation on the Relative Virtues of Decentralized, Emergent Law", in *Coordinating the Internet*, edited by Kahin B., and Keller J. H., (eds.), Cambridge Massachusetts: MIT Press, p. 62

[8] Duff W., (1996), "Ensuring the Preservation of Reliable Evidence: A Research Project Funded by the NHPRC", *Archivaria*, Volume 42, p. 28-45.

[9] Alexander J. E., and Tate M. A., (1999), "*Web Wisdom: How to Evaluate and Create Information Quality on the Web*", Mahwah, New Jersey: Lawrence Erlbaum Associates.

[10] Donald A., Lindenberg B., and Humphreys L. (1998), "Medicine and Health on the Internet: The Good, the Bad, and the Ugly", *Journal of American Medical Association*, Volume 280, Number 15, p. 1303-13046.

[11] Brower K., (1998), "Photography in the Age of Falsification", *The Atlantic Monthly*, May, Volume 281, Number 5, p. 92-111.

[12] Random House, (1993), *"The Random House Unabridged Dictionary"*, New York: Random House, Inc, p. 197.

[13] Black, H. C., (1968), "*Black's Law Dictionary: Definitions of the Terms and Phrases of American and English Jurisprudence, Ancient and Modern*", 4th Ed., St. Paul, Minnesota: West Publishing Company, p. 168.

[14] Clark D. T., Gottfried B. A., (1957), "*University Dictionary of Business and Finance*", New York: Crowell, p168.

[15] Fogg B.J., and Tseng H., (1999), "The Elements of Computer Credibility". *CHI 99: Human Factors in Computing Systems Conference Proceedings*, New York: ACM SIGGHI, p. 80-87.

[16] Hall E. T., (1989), "*Beyond Culture"*, Garden City, New York: Anchor Books.

[17] Drucker, P. F. (1991) "The Coming of the New Organization", in *Revolution in Real Time, edited by* MacGowan W. G., Harvard Business Review, Boston.

[18] O'Brien J. A., (1996), "*Management Information Systems"*, Irwin, Chicago.

[19] Turban E., McLean E., and Wetherbe J., (1999), "*Information Technology For Management Making Connections for Strategic Advantage"*, John Wiley & Sons Inc., New York.

[20] Stamper R.K., (1973), "*Information in Business and Administrative Systems"*, New York: Wiley.

[21] Stamper R.K., (1996), "Signs, Information, Norms and Systems", in *Signs of Work: Semiotics & Information Processing in Organisations*, edited by Holmqvist P., Anderson P.B., Klein H. & Posner R. (eds.), Walter de Gruyter, N.Y. p. 349-397.

[22] Heng M.S.H., (2002), "Using Semiotic Framework to Study Social Consequences of IT", in *Coordination and Communication Using Signs Studies in Organizational Semiotics*, edited by Liu K., Clarke R. J., Andersen P. B., Stamper R.K., Klower Academic Publishers, London.

[23] Stamper R. K., (2001), "Organizational Semiotics: Informatics without the Computer?" in *Information, Organization and Technology: Studies in Organizational Semiotics*, edited by Liu K., Clarke R. J., Andersen P. B., Stamper R.K., Klower Academic Publishers, London.

[24] Levinson, P. (1997), "*The Soft Edge: A Natural History and Future of the Information Revolution"*, New York: Routledge.

[25] Turkle, S. (1995), "*Life on the Screen: Identity in the Age of the Internet"*, New York: Simon & Schuster.

[26] Putnam R. D., (2000), "Bowling Alone: The Collapse and Revival of American Community", New York: Simon & Schuster.

[27] Kraut R., Lundmark V., Patterson M., Kiesler S., Mukopadhyay T., and Scherlis W., (1998), "Internet Paradox: A Social Technology that Reduces Social Involvement and Psychological Well-being?", *American Psychologist*, September, Volume 53, Number 9, p. 1017–1031.

[28] Wynn E., and Katz J., (1997), "Hyperbole over cyberspace: Self-presentation and social boundaries in Internet home pages and discourse", *Information Society*, Oct-Dec, Volume 13, Number 4, p. 297-329.

[29] Parks M. R., and Floyd K., (1996), "Making Friends in Cyberspace", *Journal of Communication*, Volume 46, Number 1, p. 80-97.

[30] Turkle S., (1996), "Virtuality and its Discontents: Searching for Community in Cyberspace", *American Prospect*, Winter Number 24, p. 50-57.

[31] Elkin-Koren N., and Salzberger E.M., (1999), "The Economic Analysis of Cyberspace: Challenges Posed by Cyberspace to Legal Theory and Legal Rules", *International Review of Law and Economics*, Volume 19, Issue 4, p. 553-582.

[32] Cybenko G., Giani A., Thompson P., (2002), "Cognitive Hacking: A Battle for the Mind", *Computer*, August, Volume 35, Issue 8, p. 50-56.

[33] Todd, R., (1998), "WWW, Critical Literacies and Learning Outcomes", *Teacher Librarian*, Nov/Dec, Volume 26, Number 2, p. 16-21.

[34] Berland G. K., Elliott M. N., Morales L. S., Algazy J. I., Kravitz R. L., Broder M. S., Kanouse D. E., Munoz J. A., Puyol J. A., Lara M., Watkins K. E., Yang H., McGlynn E. A., (2001), "Health Information on the Internet: Accessibility, Quality, and Readability in English and Spanish", *Journal of Medical Internet Research*, Volume 285, Number 20, p. 2612-2621.

[35] Brouwer P., (1996), "Hold on a Minute Here: What Happened to Critical Thinking in the Information Age?", *Journal of Educational Technology Systems*, Volume 25, Number 2, p. 189-197.

[36] Shiveley J. M., and VanFossen P. J., (1999), "Critical Thinking and the Internet: Opportunities for the Social Studies Classroom", *Social Studies*, Volume 90, Number 1, p. 42-46.

[37] Castells M, (2000), *"The Rise of the Network Society"*, Cambridge, MA: Blackwell Publishers.

[38] Olson, D. R., (1994), *"The World on Paper: The Conceptual and Cognitive Implications of Writing and Reading"*, New York: Cambridge University Press.

[39] Gergen, K. J., (1991), *"The Saturated Self: Dilemmas of Identity in Contemporary Life"*, New York: Basic Books.

[40] Riva G., Galimberti C., (1997), "The Psychology of Cyberspace: A Socio-cognitive Framework to Computer-mediated Communication", *New Ideas in Psychology*, August, Volume 15, Issue 2, p. 141-158.

[41] Kapor M., (1993), "Where is the Digital Highway Really Heading?", *Wired*, July/August, p. 53-59.

[42] Popper K. R., (2002), *"The Open Society and its Enemies"*, 5th edition, London: Routledge.

[43] Cornford F. M., (1937), "*Plato's Cosmology: the Timaeus of Plato*", London: Routledge and Kegan Paul Limited.

[44] Tseng S., and Fogg B.J., (1999), "Credibility and Computing Technology", *Communications of the ACM*, May, Volume 42, Issue 5, p. 39-44

[45] Richmond, B., (1998), "CCCCCCC.CCC (Ten Cs) for Evaluating Internet Resources", *Emergency Librarian*, Volume 25, Number 5, p. 20-23.

[46] Fritch J. W., and Cromwell R. L., (2001), "Evaluating Internet Resources: Identity, Affiliation, and Cognitive Authority in a Networked World", *Journal of the American Society for Information Science and Technology*, April, Volume 52, Number 6, p. 499-507.

[47] Rieh, S.Y., and Belkin, N.J. "Understanding Judgment of Information Quality and Cognitive Authority in the WWW," *Journal of the American Society for Information Science* (35), 1998, pp. 279-289.

[48] Health On the Net Foundation (HON), (2003), *"HON code of conduct (HONcode) for medical and health web sites"*. Online document: http://www.hon.ch/HONcode/index.html, accessed online 31st January, 2003.

[49] Morhan-Martin J., and Anderson C. D., (2000), "Information and Misinformation Online: Recommendations for Facilitating Accurate Mental Health Information Retrieval and Evaluation", *Cyber psychology and Behavior*, Volume 3, Number 5, Mary Ann Liebert, Inc., p. 731-746

[50] Lemley M. A., (1998), "The Law and Economics of Internet Norms", *Chicago-Kent Law Review*, Volume 73, p. 1257-1294.

[51] Berman P. S., (2000), "Cyberspace and the State Action Debate: The Cultural Value of Applying Constitutional Norms to Private Regulation", *University of Colorado Law Review*, Volume 7, Issue 4, p. 1263-1310.

[52] Cochrane T., (1998), "The Law of Nations in Cyberspace: Fashioning a Cause of Action for the Suppression of Human Rights Reports on the Internet", *Michigan Telecommunications and Technology Law Review*, Volume 4, p. 158-193

[53] Nimmer R. T., (1995), "Licensing on the Global Information Infrastructure: Disharmony in Cyberspace", *Journal of International Law and Business*, Volume 16, Number 2, p. 224, 246-247.

[54] Selin S., (1996), "Governing Cyberspace: The Need for an International Solution", *Gonzaga Law Review*, Volume 32, p. 365, 366-69.

[55] Lessig, L. (1997), "The Constitution of Code: Limitations on Choice-Based Critiques of Cyberspace Regulation", *Journal of Communications Law and Policy*, Summer, Volume 5, p. 181-191.

[56] Wang Y. C. W., and Heng M. S. H., (2003), *"Bridging B2B eCommerce Gaps for Taiwanese SMEs Issues of Government Support and Policies"*, unpublished paper. University of South Australia, Adelaide.

[57] Karahanna E., Straub D.W., and Chervany. N.L, (1999), "Information Technology Adoption Across Time: A Cross-Sectional Comparison of Pre-Adoption and Post-Adoption Beliefs", *MIS Quarterly*, June, Volume 23, Issue 2, p. 183-185.