

The New Knowledge Management and Online Research and Publishing in the Humanities

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**Steven Tötösy de Zepetnek,**  
**"The New Knowledge Management and**  
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**Abstract:** In his article, "The New Knowledge Management and Online Research and Publishing in the Humanities," Steven Tötösy de Zepetnek discusses the problematics of new media scholarship and technology and online publishing in the humanities today. He argues that while there are legitimate questions about scholarly material in the humanities online, the reality is that most undergraduate as well as graduate students today use the web for at least the initial stages of their research. In order to increase the quality of content of scholarship on the world wide web, scholars in the humanities ought to get involved with new media scholarship and, consequently, publish new work online. However, as obvious this may be, scholars in the humanities tend to be suspicious of online publishing and are slow to adopt new media technology. In his paper, Tötösy de Zepetnek discusses aspects of both theory with regard to the information highway and new media technology and practical matter such as online research. Tötösy de Zepetnek hopes that while a radical change in thinking and practices is not likely to happen too soon, humanities scholars would employ, increasingly, the possibilities and the advantages -- in both content and form -- new media technology offers for knowledge management and scholarship in the humanities.

## Steven TÖTÖSY de ZEPETNEK

### The New Knowledge Management and Online Research and Publishing in the Humanities

The question is this: How does new media technology impact on research and publishing in the humanities and what is online work and research in the humanities in general and in the study of culture (and literature) in particular? In the following, the question is discussed with focus on aspects of the current situation of the study of literature and culture including issues of theory and methodology. Theory and methodology are important as tools of thinking and of structuring the object per se and the process of research and study. When it comes to theory and methodology, the study of literature is -- more so than any field in the natural sciences -- a rather rigid field that resists paradigm shift. In the last thirty years or so, the humanities do not look kindly upon observational, operational / functional, and "scientific" paradigms of research. Theories of literature tend to be self-referential with specific sets of terminologies but which are often not explicitly defined. The self-referentiality of research in literature is, among other things, manifest in the exclusion of material available in other disciplines and languages. For example, it is not exceptional to find publications by internationally recognized scholars who venture to interpret a particular text or begin to outline a theoretical approach without introductory mention of similar work done by others or work done elsewhere, especially when this has occurred in a different language. This could not happen, by and large, in the natural (basic) or medical sciences and for a good reason. In view of advances in new media technology and the information revolution and their speed it is crucial that the study of literature (and culture) reevaluate and renovate itself. It is proposed that this reevaluation and renovation is to occur with regard to the said new media, that is, specifically the internet and the world wide web (see "What is the Web?" at <[http://www-personal.umich.edu/~mattkaz/history/what\\_is\\_the\\_web.html](http://www-personal.umich.edu/~mattkaz/history/what_is_the_web.html)>; Cailliau <<http://www.inria.fr/Actualites/Cailliau-fra.html>>; Leiner <<http://www.isoc.org/internet-history/brief.html>>) and their impact on scholarship in the humanities and social sciences, including the study of literature when viewed in a global context Grabovszki <<http://docs.lib.purdue.edu/clcweb/vol1/iss3/1/>>).

Following the development of new media technology and knowledge management, online publishing in scholarship whether learned journals or data bases is of some importance in several fields such as history or communication studies while in the natural sciences and medicine it is (almost) established practice. The premise is that "humanities online" in time becomes an additional and powerful tool in scholarship no matter what field. In a general context of new media technology and publishing it should be noted, however, that the situation of online journals and publishing in scholarship is different from the situation of online newspapers and magazines. The currently much discussed miscalculation of magazine and newspaper audience is a matter different from online audience and use in scholarship (for recent data on online magazine and newspaper audience, see Blair). I agree that the hard copy and tactile mode will remain a preferred mode of reading for many years to come, regardless of e-books and other technological innovation. It is true that the computer screen with web-connect has its own draw-backs and that the pleasure (emotional and intellectual) of reading scholarship -- let alone primary texts -- in the tactile fashion can override the online way for many. However, I propose that "humanities online" is an alternative and parallel way of doing scholarship. In addition, there are the next generations of scholars whose use of new media technology is already much different from days past (more on this below). But even the matter of primary texts -- "literature online" -- undergoes changes and Stephen King's experiment of one of his novels on the web, downloadable to one's computer and printer, is a pointer of possibilities and things to come. And as to the matter of the primary text, "literature online," here is a quote, for example, from an article by Robert Lepage, the internationally renown Québécois-Canadian playwright who recognizes the advantages and positive meaning of a global and new media-oriented view for his own plays as well as contemporary Québécois-Canadian literature as a whole. Lepage argues that the world wide web and "its spread is part of the reason why Quebecers are so abruptly questioning their identity and coming to such new conclusions. New technology leaves no room for xenophobia. How can Quebec sell its Internet products if it continues to have an isolationist image? And if you send me an e-mail, and you don't have all the accents and the c and the little hat [circumflex] -- what is so French about it? So a lot of people decided to write in English. These things may seem trivial, but they are hints of a much bigger shift" (69). It ought to be self-evident that the world wide web and the internet provide possibilities for the study of culture and literature scholars in the humanities must exploit. However, for various reasons, there is much resistance among scholars in the humanities including scholars of literature toward all aspects of new media technology and new media scholarship. The issues surrounding new media technology and scholarship including the matter at hand, namely online research of literature and hypertext are clearly complex and range from epistemology and philosophy to the question of funding, the question of globalization and knowledge transfer, copyright, and so on (see Ryan).

One thorny issue involves the question of content on the web and the relative lack of quality of scholarly texts on the web is, indeed, a matter of concern. How could it be that today there are only a very few peer-reviewed humanities journals published online and in open access and why is there a lack of high-quality corpus of secondary literature of/for the study of literature on the web?

One obvious reason is the said reluctance -- at times explicit hostility -- of scholars in the humanities towards new media and the web. This reluctance to embrace the internet and the world wide web simply as a tool to be used in scholarship and teaching at times takes comical dimensions. Here is an example: In 2000 a tenured professor of English publishes in *The Chronicle of Higher Education* an article describing how she "held off on using e-mail because it didn't seem necessary." Then she tried it -- and discovered, to her dismay, just how "potent a tool it could be" (Perillo). What is truly amazing here is that this academic is apparently not concerned at all with how far behind she is in times in relation to her own students and does not appear to have any inkling of how comical her description appears, not the least in view of her rank as a tenured professor. It is yet another matter, an equally surprising one, that *The Chronicle* -- one of the main public journals of higher learning in the United States -- publishes such an item. The next level, as it were, namely the use of the world wide web as a tool of knowledge transfer and new media, is equally underrated among a good percentage of scholars in the humanities and social sciences. One encounters situations frequently where professors clearly have no idea about the web and if they do have an idea, they do not use it themselves. This is no trivial matter for scholarship nor is it trivial in the pedagogy of the humanities either. And there is further evidence of the lack of interest by the humanities professoriate in new media technology and its possibilities for scholarship, in this case with regard to publishing online. Advertisement strategies of *CLCWeb* include e-mail messages sent to academics whose work is in comparative literature and cultural studies. The e-mail addresses of scholars targeted are taken from home pages of departments of literature, language, culture, etc., in principle all pertinent areas of the humanities. A standard description of the journal is sent by e-mail directly to the targeted scholar, with an invitation to explore the journal and to consider publishing new work in it. It is understood that advertisements of new journals arriving in traditional hard copy in one's department mailbox are "recycled" quickly. However, taking into account the specifics of e-mail protocol and practices of e-mail correspondence (i.e., the protocol of reply to a personal invitation arriving by e-mail), it is more than surprising that in the two years of the journal's existence and several hundred of such e-mail, less than a handful replies were received. The strategy to advertise the use of the journal by sending e-mail notices to university libraries -- so that the library lists the journal in its web site for journals and data bases available online -- has been more successful and a large number of university libraries link to the *CLCWeb*.

The professoriate of the humanities at large may not be aware but it is no secret that whether it is undergraduate or graduate students, the number of students who use the world wide web as their primary and first source of information in their scholarship has exploded in the last few years. When it comes to considering the impact of the web, this is deemed a positive one. Considering some of the negative impacts of the web, in first-year English literature courses the occurrence of students submitting papers simply copied from material available on the web or by simple purchase of papers from sites providing such a service is increasing exponentially (there are now methods and software to detect such plagiarism, however). As said, even in graduate school many students use the web for basic research. Yet, the existence of bona fide scholarly online journals in the humanities is negligible while the social sciences are doing better in this and the natural and medical sciences are of course way ahead. When it comes to online publishing, here is an example: On the web page of the US Library of Congress there is a large number of links to webpublishers in the sciences while there is not a single one such publisher listed for the humanities (this is in 1999-2001; see also Michael Cader's "Never Mind the Friggin' E-Book. It's All About the Web"). At best there is strong caution toward new media scholarship including doubts about the quality of material currently available on the web. While this is in many instances justified, the solution is not to resist new media scholarship and technology but to make sure that good material and outstanding scholarship become available on the web. But here is yet another example of the said reluctance and attitude: A reputable professor of history at one of the major universities in Germany announces, in 1998, with some pride that he does not even own a computer (a situation I experienced during a guest professorship I was invited to). This attitude would be acceptable -- even if somewhat odd -- were the individual announcing his opinion and practice as a private individual. But that is not the case here: He is an educator who receives his salary from taxpayers' money and this is why his attitude and statement with all their implications are not only comical but also unacceptable with implications of questionable work ethics.

Granted, from a global perspective there are some infrastructural problems with regard to technology and access which affect the situation of the web and the internet in general. There are two such problems of major impact: One is the obvious problem of different technological development and availabilities among regions of the world and the second one is the infrastructure of telephone line and cable providers and their economics. Technologically advanced societies of Europe are at this point handicapped in the development of the internet in comparison with North America for the simple reason that local calls are expensive in Europe while they are much less to minimal in North America. Clearly, in Europe the monopoly of the state telephone companies will have to be modified and this has started to begin: Whether it will evolve to similarly easy access to telephone lines or other ways of web access -- such as cable TV -- remains to be seen (soon enough, web access via satellite will also evolve). Further aspects of online material -- and thus research online -- include a range of matter such as the question of stability (both as to the reliability of servers and the stability of links in web sites, i.e., "dead links"), the question of

archiving and the preservation of online data as compared with (or opposed to?) hard-cover material, the types and speed of access (e.g., DSL versus cable versus satellite). But back to learned journals published online, that is, as they relate to online research and the study of literature. "What is online research?" may be an obvious proposition: We use the world wide web and material found in web sites and data bases to do research just like we do with material in libraries in hard-copy form; increasingly, also primary texts can be used online. However, in the inter-relationships of work in the humanities, the study of literature, and new media scholarship and technology, to answer a simple question like "what is online research?" can become complicated. And the discussion about this extends, obviously, to all sorts of matter such as the contentious issue of distance education in all of its facets, etc. The perception of scholars in the humanities of the emergence and significance of web journals and thus, in general, the forms and content of scholarly material available on the world wide web, as said, is of extreme caution. It is true that some online journals do not have comparable scholarly content traditional hard-copy journals offer. But this can (and will) be improved and the financial constraints hard-copy journals suffer will make it ultimately imperative that knowledge transfer and management make use of the world wide web and new media technology (see, e.g., Rosenzweig; see also Czipin, "Internet Journals: Uses and Opportunities for Cultural Studies"

<[http://www.inst.at/trans/6Nr/czipin\\_e.htm](http://www.inst.at/trans/6Nr/czipin_e.htm)>). With regard to content of online publishing it is yet another piece in the puzzle about the relationship of humanities scholars and new media scholarship and technology that the majority of thinkers and critics who do embrace new media scholarship and technology rarely if ever publish their work online.... That an online journal in the free-access mode has much potential is obvious and here is the example of the previously mentioned online journal *CLCWeb* with regard to the use of its material: In the first available period of statistical analysis of the *CLCWeb*'s access and online use, 13-30 April 1999, the journal received 1,950 hits and page views. This means 108 hits per day on the average and for an esoteric subject such as comparative literature and culture this shows high-level and involved use. The statistics also show -- among many aspects of the ways, length, precise use of specific sections of the journal, various technical aspects of access, data about where the visitors access the journal from, etc. -- that *CLCWeb* has been accessed from a large number of countries, incl. many countries outside North America and Europe and from the data it is possible to determine that the majority of the users are from institutes of higher learning. The relatively large traffic on *CLCWeb* has not subsided: In June 1999 there were 118 hits per day and in July of the same year there were 126 hits per day, plus similarly high numbers of user sessions, etc., and by November 2000 the daily average went up to 984 hits with a daily average of 114 user sessions and this level of use has remained to date (for the monthly data, link to "Web Traffic" from the journal's index page). Of course, it remains to be seen how and how deep and long-lasting the impact of the contents of the material published in the journal will be and this only time can tell. In some cases scholarship published in *CLCWeb* receives much attention as in the case of Mabel Lee's paper about the work of the 2000 nobel laureate of literature, Gao Xingjian, published in *CLCWeb*'s 2.3 (2000): <<http://docs.lib.purdue.edu/clcweb/vol2/iss3/2/>>.

A further element of the situation of new media and online journals is the question of funding, that is, the costs of the production and maintenance of online journals. In different countries the funding of journals, hard copy or online, is done differently of course. However, in all cases funding is of major concern and an important element for obvious reasons. Most journals published online in all fields opt for paid subscription similar to traditional hard-copy journals and there are several companies and institutions performing such for-profit service such as the Muse Project of Johns Hopkins University. In the spirit of knowledge transfer and access to knowledge (knowledge management) in the free-access mode made possible with and on the world wide web, it is institutions of higher learning who ought to carry the costs from internal as well as external funding such as government funding or private sponsorship. While this is indeed the case in a few instances, there is similar resistance towards online publishing in government agencies and as discussed previously with regard to scholars in the academe. In Canada, for example, the Social Sciences and Humanities Council of Canada (SSHRC) refused to even consider funding of the online journal *CLCWeb* -- first established at the University of Alberta and published on the server of the Faculty of Arts of the university -- precisely because the journal is of free access. After several attempts of explanation and clarification the journal was advised by an SSHRC official that because *CLCWeb* does not have minimum 200 paid subscribers, it is ineligible for funding. The explanation that *CLCWeb* is apriori in the mode of free access and thus does not have paid subscribers, logically, was not accepted and the large web traffic with the e-journal -- which clearly shows that the *CLCWeb* is being used by the scholarly community -- did not make an impression either. Obviously, this government agency is in a traditional mindset and its policy makers -- who include academics -- have not followed developments made possible by new media technology available for scholarship. Scholarly communication and knowledge transfer and management on the world wide web ought to be facilitated by open and competitive funding by government agencies, just as are other types of scholarly activities. Online journals ought to be able to compete for such funding because government agencies use taxpayers' money in the first place and this way some of that money is returned to the taxpayers (scholars) as well as taxpayers' offspring (students), just like in other areas of scholarly activity. As the example introduced here shows, the policies of the SSHRC have not followed the emerging situation of scholarship in the

humanities where online journals in the mode of free access perform the said meaningful service for the scholarly community and where they perform knowledge transfer on an international scale previously unheard of.

There are many theoretical and methodological frameworks available for the study of literature and each framework has its advantages and this which to use is always a matter of contention and controversy (on this, especially since Edward Said's 1983 *The World, the Text, and the Critic*, there is a slowly expanding corpus of work; see Cohen; Jay; Kamuf; Simpson; Sosnoski; Veese; for a theoretical discussion of the problematics of knowledge transfer, see Gibbons). Here, it is proposed that the theoretical framework of "comparative cultural studies" and the methodology embedded in the "systemic and empirical study of culture and literature" be employed. Of some importance is that while the proposed framework is a construct that is deemed advantageous and application-oriented, it is a framework that includes methodology and that both theoretical framework and methodology take into account the importance of new media technology and scholarship. Comparative cultural studies is a new field of study where the notion of comparative is merged with the field of cultural studies from the basic premises of the discipline of comparative literature, meaning that the study of culture and culture products -- including but not restricted to literature, communication, media, art, etc. -- is performed in a contextual and relational construction and with a plurality of methods and approaches, inter- and multi-disciplinarity, and, if and when required, including team work. In comparative cultural studies it is the processes of communicative action(s) in culture and the how of these processes that constitute the main objectives of research and study. However, comparative cultural studies does not exclude textual analysis proper or other established fields of study. In comparative cultural studies, ideally, the framework of and methodologies available in the systemic and empirical study of culture are favoured. Evidently, it is not proposed here that culture (or, e.g., literature) ought to be studied with one specific approach; rather, it is proposed that several approaches may be applicable. It is suggested, however, that the intersection of systems theories, attention to data and the processes of data collection (the "empirical"), and advances in the information sciences and new media technology offer solid avenues to affect the study of culture including literature. Systems approaches to culture and literature are theoretical frameworks and methodologies which implicitly allow for the absorption and for the expansion of the information sciences and the new media technologies perspective. In the framework, the notions of operationalism and functionalism are of some importance, including the insistence on the repeated application of the framework (for an introduction of the systemic and empirical approach see Tötösy de Zepetnek, *Comparative Literature*; "From Comparative Literature" <<http://docs.lib.purdue.edu/clcweb/vol1/iss3/2>>). The systemic and empirical approach -- in its varieties of sub-approaches -- in particular has generated a fairly large corpus where the application of new media technology and information science tools occurred. This can be seen clearly, for example, in the bibliography of the systemic and empirical approach: The bibliography covers, in addition to studies exclusively in the systemic and empirical approach, neighbouring disciplines such as cognitive science and psychology, and reading and readership research (audience studies), where the use of statistical methods, data bases, etc., relying on various methods involving computers take a large proportion (see Tötösy de Zepetnek "Bibliography" <<http://docs.lib.purdue.edu/clcweblibrary/systemccsbibliography>>). And here is a brief dictionary definition of the systemic and empirical approach: The systemic and empirical approach is a theoretical and methodological framework for the study of culture including several fields such as comparative cultural studies, cultural studies, comparative literature, literature, anthropology, ethnography, audience studies, and cognitive sciences. The main question is what happens to products of culture and how: It is produced, published, distributed, read/listened to/seen (etc.), imitated, assessed, discussed, studied, censored, etc. The systemic and empirical study of culture originates as a reaction to, and an attempt at, solving the problematics of hermeneutics. The approach and methodology(ies) of the framework are built on the theory of constructivism (radical, cognitive, etc.), in turn based on the thesis that the subject largely construes its empirical world itself (for constructivism, see Riegler

<<http://www.univie.ac.at/constructivism>>). The consequence of this line of thought -- as seen in the work of scholars in Germany, Holland, Belgium, Hungary, Italy, Canada, the USA and elsewhere in several fields and areas of study -- is the replacement of (metaphorical) interpretation with the study of culture products and the processes of the products as based on radical constructivism, systems theories, and the empirical (observation and knowledge-based argumentation). The system of culture and actions within are observed from the outside -- not experienced -- and roughly characterized as depending on two conventions (hypotheses) that are tested continually. These conventions are the aesthetic convention (as opposed to the convention of facts in the daily language of reference) and the polyvalence convention (as opposed to the monovalency in the daily empirical world). Thus, the object of study of the systemic and empirical study of culture is not only the text in itself, but roles of action within the system(s) of culture, namely, the production, distribution, reception, and the processing of culture products. The methods used are primarily taken from the social sciences, systems theories, reception theory, cognitive science, psychology, etc. In general, the steps to be taken in systemic and empirical research are the formation of a hypothesis, putting it into practice, testing, and evaluation.

With works such as Pierre Lévy's *La Machine univers. Création, cognition et culture informatique* (1987), *Les Technologies de l'intelligence. L'Avenir de la pensée à l'ère informatique*

(1990), and *Colective Intelligence: Mankind's Emerging World in Cyberspace* (1996), Jean-Pierre Balpé's *Hyperdocuments, hypertextes, hypermédia* (1990), George P. Landow's *Hypertext: The Convergence of Contemporary Critical Theory and Technology* (1992), Norbert Bolz's *Am Ende der Gutenberg Galaxis. Die neuen Kommunikationsverhältnisse* (1993), Paul Delany and George P. Landow, eds., *Hypermedia and Literary Studies* (1994), Derrick de Kerckhove's *The Skin of Culture: Investigating the New Electronic Reality* (1995), Mark Poster's *The Second Media Age* (1995), Andrew Herman and Thomas Swiss, eds., *The World Wide Web and Contemporary Cultural Theory* (2000), and Marie-Laure Ryan's *Cyberspace Textuality: Computer Technology* (Ed., 1999) and *Literary Theory and Narrative as Virtual Reality: Immersion and Interactivity in Literature and Electronic Media* (2001), the problematization of information technology and its relationship with literary and culture theory has undergone significant debates and continues to do so. That the internet and the web are or ought to be obvious matter in pedagogy, where the use of hypertext as a tool has much to offer, is being increasingly accepted (see, for example, Miall; Jones; for a discussion of hypertext see Shields; for the use of hypertext specifically in literary studies, see, for example, Browner; Cumming and Sinclair). The implication is that with hypertext the traditional way of teaching by means of lectures is -- while not necessarily replaced -- certainly given an expansion in several ways, because of the range of textual and visual possibilities that hypertext can handle. This is, in a sense another version of the systemic approach because of the range of the possibilities to explicate a literary text by moving -- potentially -- to any and all types of secondary and supplementary information and material -- in essence whatever the particular text allows for in its content and in its wider parameters of genesis, production, and processing. This new perspective of literature and pedagogy is systemic because it is presented in an observing and rational, systematic and organized manner, and at the same time it allows for a wide spectrum of the text's exploration. In addition, strictly textual and narratological features, for example, in hypertext, can also be explicated and explored.

The operational and functional aspect of the impact of new media technology and the information sciences have implications beyond the simple observation that pedagogy, for example, may benefit from the use of online research including hypertext. In an operational sense, technology, in general, is at a stage of constant and rapid innovation and expansion. However, all is not a strictly positive development. At a conference on the status of the information highway in 1994 focusing on questions of technology, business, and industry, many leading figures of the information industry warned that the real effect of the electronic revolution will occur ten to fifteen years into the future (McNish). This time frame clearly refers much of the present enthusiasm to a more cautionary and relaxed attitude. Another cautionary opinion, by Siegfried Zielinski, focusing here on the question of technological application in a macro context, is with regards to the "electronic text," which "is distinguished by the attempted take-over of the whole process of the production of signs, their storage, duplication, distribution and the users' interaction with the allocation of signs on offer by symbolic representation. The basis has been provided by information technology which is now able to break down those particles which were formerly the smallest of the semiotic process: the discrete characters, sounds and images can be converted into symbols, their computation and the processing of these computing operations done by machines and programmes. Microelectronics, digitalization, semiconductor technology and communication networks, which organize the transport of information at the speed of light -- these have become the determinatives of a technoculture which, on a new qualitative level, are picking away at the traditional fabric of communication architecture and its internal relations" (Zielinski 132). Michael Conrad argues further, suggesting that computer science, in its whole range from word-processing to artificial intelligence and especially in the area of problem solving is not as convincing as some of us believe. Conrad suggests in his conclusion that "At this point in time there is a real danger that our society will be driven in the counterproductive direction by convinced administrators and a committed computer science work force, neither of which is properly educated to analyze the complexity of problems being addressed and the capabilities of the machines used to address them. This social formation is aware of the problems that are emerging, but appears to believe that these can be overcome by technical solutions, to be found in software engineering, artificial intelligence technique, and advanced architectures" (Conrad 7).

Both Zielinski's and Conrad's opinions are valid cautionary notes in the context that new media, information science, and computer technology are, while also conceptual and theory-impacting, in the first instance tools. Hence the suggestion above that aspects of new media technology and the information sciences may aid us foremost on the operational and functional side of literary studies, such as online research. At the same time, this is not to underestimate the impact and importance of computers, new media technology, and the information sciences in their epistemological implications. The information highway, as the daily media suggests, affects -- in industrial societies of the Western world -- virtually all areas of human interaction, in other words, communication and culture. Beyond the every-day impact of the computer and information and media technologies, their influence becomes particularly important when the areas of communication studies and media studies are considered. Siegfried J. Schmidt, for example, has proposed a decade ago, from a systemic and empirical point of view, that the study of literature is in need of revival and that this revival can be done most effectively by a focus on the notion that literature should be studied in the context of communication and media studies (e.g., 1991, 1993; for work

by and about Siegfried J. Schmidt in literary studies, philosophy, communication and media studies, systems theory and literature, etc., see Barsch, Rusch, and Viehoff

<<http://www.schmidt.uni-halle.de/>>). This prescribes that while attention may still rest primarily on literature, other forms of artistic expression which are in connection with literature (e.g., adaptations of novels to film, theatre, the visual arts, and radio, web art, etc.) and their distribution and consumption be also studied. Naturally, as distribution and consumption and their mechanisms strongly, if in some ways not even entirely, involve the mechanics of techno-culture including aspects of the information sciences and new media technology, these then become prime foci in the study of literature. But in general, there is evidence that besides written (printed) and oral cultures (products of "tecto-culture") there seems to develop a parallel culture that is very active, productive, and innovative but that is known to a limited and not as of yet fully recognized group of individuals who work artistically on the world wide web. In other words, this parallel culture of "techno-culture" is produced mainly via electronic means.

Obviously, the advances of techno-culture impact cultural participation per se and thus the study of cultural participation in the context of cultural studies, including literature, should be a concern of literary scholars. In the case of literature, while textual studies -- including the whole range of new critical approaches, lexicographical-empirical analyses, cognitive psychological studies of reading, and hermeneutics, etc. -- still represent advances in knowledge and new discoveries, the study of literature should be performed in the systemic mode as proposed here, not the least because of the systemic postulate of system self-referentiality and its a priori recognition of a techno-cultural (computer technological, new media technological, information scientific) perspectives. This implicitly suggests that in addition to a systemic framework and methodology, more cooperation and interaction is necessary between technocratic and theoretical knowledge. It is often the case that while the technocrat lacks theoretical sophistication, the theorist lacks the technological knowledge. In many instances these two areas of knowledge cannot be combined in one person and this is particularly noticeable in the humanities in general and in the study of literature in particular. For this reason more team-work and interdisciplinarity are necessary in the study of literature, that is the cooperation, team-work, and inter-disciplinarity of the experts of technology with those of the humanities. A further component of techno-culture including the study of literature and culture would be the frequent application of theoretical frameworks, thus returning to the demands of operationalism and functionalism in the study of literature. This process would confirm, for instance, Zielinski's conclusion that, for better or worse, cultural participation "has become an operational relation" (137). And further yet, Pierre Laurette suggests that the process of transformation occurring by the impact of the information highway should be considered from a "global epistemological perspective where enduring philosophy comprises a referential framework where, in turn, the horizon of departure includes a relation and contact between theories, disciplines, and objects/subjects of research. ... In a local perspective this should take the shape of pragmatic analyses and a differentiated knowledge, methodologies, and technologies from the information and cognitive sciences in a critical as well as practical (pragmatic) epistemology. This approach should allow for a meaningful evaluation of the impact and importance of new developments in the information sciences on both society in general and on the humanities in particular" (136). This blueprint for an epistemological schema is supported by Peter M. Spangenberg's proposal that "systems theories and radical constructivism emanate from the point of view that cognitive and communication-discursive realities and properties are the result of and are based on self-constructed autopoietic systems" (70). The suggestion is that if the world can be explicated through systems and by the study of processes, this will be done by systems which resolve cognitive and communicative questions and problems in a differentiation between self-referential and outside-referential frames and so through the postulate of "observability" (Spangenberg 70). The epistemological argument for systems thinking is forwarded by Schmidt, who suggests that "cognitive systems influence communication as a social system -- if not causally -- in that, for instance, they create media products based on their history of socialization and by employment of collective knowledge with view on social systems and in expectation of operational conditions which are in existence there" (251). In sum, the proposition that a theoretical framework and its application -- whose objective is to study the impact of the electronic revolution and technoculture on culture, for instance -- may be best placed both epistemologically and operationally/functionally within tenets and parameters available and already explored in systems theories. And this suggestion is particularly applicable in and for the study of literature.

A further aspect of the theoretical bases of the intersections of new media technology, the information sciences, and new media scholarship including online research and e-journals is the notion of communication and system in a socio-semiotic context. The attention here is on thinking about how a tool we call "the information highway" impacts on and changes our communicative interactions and ultimately, how this impact and the resulting changes reorient the study of literature. Here, the theoretical points of departure are notions found, in addition to the systemic and empirical approach, in socio-semiotics, and Niklas Luhmann's social interaction and systemic approach (see Luhmann 2000). The designation "socio-semiotics" draws attention to an aspect of semiotics that prescribes that we investigate "the structure of all possible sign systems, and the role these play in the way we create and perceive patterns (or 'meanings') in sociocultural behaviour" (Crystal 399). In the context of the objective here, while "communication" as a form of

human interaction may be defined in a semiotic sign in systemic perspective, it is modified in the context of Luhmann's thought and the cognitive-science oriented notion of constructivism (for material on constructivism and radical constructivism as applied in literary and culture studies, see Riegler <<http://www.univie.ac.at/constructivism>>). In the proposed (theory) approximation of Luhmann's systemic model and (radical) constructivism with the concept of socio-semiotics, a further factor emerges. Again this factor is the notion of operationalism and functionalism. The notion of function is, of course, conceptualized in semiotics. From a semiotic point of view, in the social sciences and psychology, for example, functionalism means "structures, which fulfill the objective to maintain a system" (Nöth 154). This semiotic definition converges with the notion of system and operationalism of the Luhmann- and constructivism-influenced framework of the systemic and empirical approach. The notion of communicative function with reference to language is again very similar to Luhmann's systemic concept of social interaction. Winfried Nöth defines communication as one of the primary functions of semiotic systems, in which the system is "utilized as a medium of communication, in other words, as an instrument of social interaction" (157). However, the difference in the understanding of the role of system between the semiotic and the systemic or constructivist notion is that the literary system -- a system within larger system of social interaction and communication -- is both in existence a priori and it is (open or semi-permeably) self-referentially motivated. With reference to literature and the study of literature, the researcher's task is to observe and to describe how the system operates. In other words, the observation of the how is the operational and functional task of the observer. This how of the observation and description has, however, several basic operational components. In other words, operationalism refers the observer to proceed in a certain manner which is predetermined by systemic factors. Among others, this procedure involves the observation and description of a second order observation (Maturana). Second order observation simply means to take into account the observation of the observer.

In its most basic level, this second order observation involves description, such as the objective of my discussion here, namely the systemic impact of the new tools of communication, collectively termed "the electronic highway" or the "electronic revolution," or "electronic technology." In other words, how does it occur and what is the impact of tool-generation and the use of tools of the information highway in the understanding and the study of literature and culture? I propose that from an operationalist point of view, the process and implementation of information technology suggest that the tools of the information highway, in other words, information technology itself, impact not only the primary activity, that of social interaction, i.e., communication in all of its semiotic and other aspects including literature, but also the activity of the study of literature. Or, to use Pierre Lévy's words, the information technology and the information highway will become "the norm, a new system of writing and a metamorphosis of reading" (1990, 42). It is evident that society in the industrialized Western world is much preoccupied with information technology and the process and impact of the information highway and their collective potential (and industrially and technologically less advanced societies are rapidly following suit). To illustrate the local situation in English-speaking Canada from a historical perspective, here is data from the early years of the web revolution: The references range from the straight technical to the more socio-semiotic. For example, at the time when the interest in electronic communication first really reached the general public, in the 13 May 1994 issue of the *Globe and Mail*, a full 22 page advertisement under the title "Superhighway to Information Heaven" with key articles appeared, covering subjects from Cable, Education, Glossary, and Internet to Technology, Telecommuting, Telemedicine, and Telephone. By 1997, the *Globe and Mail* has devoted pages to electronic communication and the art on the world wide web with articles about on-line magazines and youth culture; see, for example, "The Home Page" (1 November 1997): C12. Today, in 2001, virtually all newspapers in most languages devote sections to new media and new media technology. Of course, detractors of the most varied kind do abound just as before. In the 31 May 1994 issue of the *Globe and Mail*, in the article "Books a Dying Art? Don't Believe It," Pulitzer Prize winner E. Annie Proulx discusses the impact of the electronic media and argues that "In a curious way the computer emphasizes the unique virtues of the book. ... Nobody is going to sit down and read a novel on a twitchy little screen." Proulx also writes that the "electronic highway is for bulletin boards on esoteric subjects, reference works, lists and news -- timely, utilitarian information, efficiently pulled through the wires." While the author of the article is right in her perception that the electronic highway is indeed a "tool" of communication facilitating the process of information and she may be right in her prediction that the screen is not going to replace the readers' preference for the tactility of a book, she also misses the view of a larger picture. Proulx, along with book historian Geoffrey Nunberg, is one of the few who believe that the electronic revolution and the web and internet are not going to replace reading as a cultural standard activity, while Sven Birkerts, for instance, in his book, *The Gutenberg Elegies: The Fate of Reading in an Electronic Age* describes the situation of reading culture as already lost. And with regard to the information highway as easy access to data for research, in literary studies there are dissenting voices who suggest that the hasty, improper, and uninformed usage of the world wide web result in poor research papers by students (see Knowlton).

The larger picture is that while the electronic revolution is primarily a creation of tools for communication, at the same time it impacts the process of communication in its foundations. In Niklas Luhmann's systems theory and theory of communication, there is a differentiation between

medium and form whereby medium is defined by such examples as light, air, or noise, and on a higher level by money, power, and freedom, while form is defined by such concepts as language, organization, or institutions (see Bolz 44-45). Analogously, then, the information highway is another type of medium (see also Nunberg). It appears, however, that Luhmann's theory stops here: it negates dialogue with the technology of the new media (Bolz 50) and arrives, essentially, at the same conclusion as Proulx and reflects on the existence of society built on George Steiner's "sacred texts." With a divergent opinion, Bolz argues that Gutenberg's invention results in the book becoming both medium and form (192). But he proceeds with the argument that typography (in essence, the technology of the printed word) represents the *raison d'être* of the Gutenberg galaxy and its subject is the passive, non-responsive reader (194). Against this static state Bolz argues, with László Moholy-Nagy and Marshall McLuhan, for example, that creativity, information, and communication in its latest shape, hypertext, become radically temporal and provisory (198-99). This creates, in his opinion, a release from the typographical prison, from the prison of the "hard copy" (200). Bolz suggests that typographical reading has given way to screen reading, at least so with children in schools today. This understanding converges with, for example, Pierre Lévy's, who argues that "reading, by transcending oral culture, inscribes the new age of humanity into a new cycle of social memory. Similarly, the Information Sciences recode the previous cultural content into a new mode of communication" (41). Lévy also recognizes, albeit in a more conceptual way, that audience and readership is impacted by new forms of communication and information retrieval. While I agree that this is the case in many countries in their urban schools, this may not be the case altogether even in technologically most advanced countries. It is another matter that there is good reason to hypothesize that the screen reading mode is an inevitable reality, including the various ways of communication on and with the computer screen. I do agree with Lévy that the prominence of screen reading and screen communication does indeed result in a different construction and process of communication in that the concept of reality is substituted by function and that classification and causality is substituted by configuration, and that thinking in the reflective mode is under the constraints of the necessity of immediate response (202). The most immediate and important impact the electronic revolution will have on literary studies is the cumulative result from the electronic revolution's equally cumulative effect on social interaction, immediately and also secondarily connected. For example, while the above discussed impact on the reading of books may not happen in the way E. Anne Proulx suggested, the information highway will have and already has had, presumably, an effect on audience and readership. Not necessarily on the first level of the actual reading of a book, however. Rather, this impact is cumulative in factors of secondary or tertiary activity, such as the reasons for reading a book and the how of dealing with the book after its reading. For example, it would give us empirical evidence and further food for thought if we knew what the frequency of the reading of a particular novel may be after the viewing of a film or video.

George P. Landow discusses a range of areas where the electronic technology, that is, the information highway including hypertext, impacts the process and the outcome of the study and the pedagogy of literature. Most importantly, Landow's explanations of the nature and effect of the electronic technology and hypertext touch on both the situation of social interaction, in general, and on the shape and form of the literary system he calls the "nonlinear network" (23-27). Drawing, among others, on J. Hillis Miller, Landow, too, sees the convergence of impact based on the "limitations of print culture, the culture of the book" (28). An important result of Landow's, but also of Bolz' discussions, about the mechanism and impact of electronic technology is the suggestion that the literary system as postulated by Schmidt, for example, in its autogenesis, conceptualized and defined within the larger Luhmannian system of communication, appears to lose its semi-permeable self-referentiality (for thoughts on print culture and its systemics, see also Kernan). In other words, the implications of the electronic highway are the decentralization and the proliferation of communicative possibilities and, at the same time, "electronic linking shifts the boundaries between one text and another as well as between the author and the readers and between the teacher and the student" (Landow 33). And I would like to suggest here that information technology and new media scholarship and their ramifications impact the study of literature in one area in particular and that is the area of audience studies. Consequently, if the audience is impacted by change and if the readership of literature is undergoing profound changes as to how literature is read and processed in Western society, the study of literature and literary theory will also undergo significant alteration. This alteration then is not only in the domain of the first order, that is in the factoring of computer use and speedy communication such as e-mail, and in the pedagogical possibilities of hypertext but more importantly in the foundations of communication, culture, literary, and other.

Yet another aspect of the new functions and possibilities of new media technology for knowledge management in the humanities and social sciences is the following. As I argue, the availability of scholarly material online (including peer-reviewed journals online in free access) is of great necessity. At the same time, new media technology for knowledge management can make an impact in another area of scholarly publishing. I take the example of Purdue University, the publisher of *CLCWeb*: In addition to the foresight of the Press to take on the journal and publish it in open access -- very much in the same mind-set I present here and which is one of the reasons why the Press and the journal found each other (for a brief history of the journal see "History" <<http://docs.lib.purdue.edu/clcweblibrary/clcwebhistory>>), the Press is also developing a "print on

demand program." This mode of publishing is particularly advantageous for the humanities and social sciences where even in the US with its large population and many universities a scholarly book rarely sells over 400-500 copies. The print on demand mode of publishing is that the Press prints a book (in four colors; the product looks and feels in all aspects just like a regular book) upon order by the customer directly to the Press (by e-mail, phone, fax, or order form). Advertisement of the book is traditional, by brochures and leaflets to universities, academics, university libraries and bookstores, etc. In other words, the copy-by-copy print of the book is not only feasible, financially, but advantageous. And as in traditional publishing, the book has the proper ISBN number and two copies are deposited with the Library of Congress. As far as I know, similar to the publishing of the journal, the Digital-I program of Purdue University Press is at the forefront in the current development of knowledge management in publishing.

In returning to the most obvious operational effect of the information highway, that of the access to data, I would like to touch on a controversial question of literary scholarship, namely the problem of basic data gathering as it affects the results of scholarship. The electronic highway and new media technology have impacted and is in the process of further facilitating the access to data and the creation of reading i.e., hypertext and thus online research. On a basic level, the access to data I am referring to what Anne Proulx describes as "bulletin boards on esoteric subjects, reference works, lists and news -- timely, utilitarian information, efficiently pulled through the wires" (A19). This accessibility to primary data, for instance access to the international bibliography of the MLA: Modern Language Association of America online (by scholars with access to a university library with a subscription to the MLA), should make the prevalence of repetitiveness in literary scholarship unacceptable. My contention here is that too often what is suggested as new and original in scholarship has appeared before. The researcher claiming originality does so in face of lacking sufficient primary research of his/her topic. This mechanism is facilitated by established forms and methods of presentation of argument in literary research. In literary studies one frequently encounters works which are uninformed in the sense that the author neglects similar research done elsewhere. I am aware that many other factors, such as the lack of knowledge of languages -- particularly in the US and Canada, or power plays, for example in French intellectual circles or in Germany where explicit references or footnotes to what is decided by the author to be common or "insider" knowledge are consciously omitted, when in actuality the matter is only known to the few in the particular, e.g., a Parisian inner circle -- may also play a role resulting in conscious or subconscious omission of knowledge. But often it is simply the lack of primary data accumulation and the ensuing acquisition of familiarity with the similar subject of inquiry that is the cause of the said problem. It is difficult to predict whether advances in information and new media technology will remedy the sorry status of data access I am speaking about and, more importantly, whether the access to data online would affect a more rigorous way of literary and culture scholarship. In my opinion, even if we cannot hope for a radical change, at least there will be, undoubtedly, an increase of literary and culture scholars who employ the information highway including the production and the use of scholarly material online and thus demonstrate competence of knowledge management (primary and secondary information gathering, production, and use), hopefully resulting in a higher level of knowledge as well.

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