

Knowledge City: a digital knowware

The construction of a knowledge-creating public space in Brazil

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ABSTRACT

This paper discusses the design of communities of practice mediated by a public university in the light of Hirotaka Takeuchi and Ikujiro Nonaka's vision of tacit knowledge as the key competitive factor in organizations. Our project is to build a community connecting high school, undergraduate and graduate students with professionals from all areas of knowledge and social status. It has been approved by the University of São Paulo and is now under construction with the support of banks, high tech companies (such as IBM), NGOs, the most important media groups in Brazil as well as developing a global network. This "Knowledge City" also reflects concepts developed by French sociologists Luc Boltanski and Eve Chiapello ("city of projects paradigm"). The activities are organized in three areas: 1. construction of a public knowledge creation network involving students from high school to graduate levels and professionals of all areas and skills; 2. organization of a complementary network of professors and professionals working in the educational system; 3. organization of another complementary network of professionals working in governmental and non-governmental organizations as well as in private companies. Moreover, as part of the activities, a symposium on media convergence and the construction of digital cities will also be held, next August-September, in São Paulo.

According to the philosopher John Searle, what is special about culture (that is to say, civilization as construction of civil, urban life) is that the collective assignment of functions to phenomena is a process where the function "cannot be performed solely in virtue of the sheer physical features of the phenomena". What Searle, Castells and institutional/evolutionary economics have in common is the perception that social and institutional structures have symbolism as a special feature, but the construction of symbols (and thus of social reality) requires the ability (or even the "biological capacity", according to Searle) to make something symbolize or "mean, or express – something beyond itself". This is the basic capacity that that "underlies not only language but all other forms of institutional reality as well".² Language (and thus any informational/linguistic structure, no matter what physical or technical infrastructure it relies on) is itself an "institutional structure" because it "involves the imposition of a special kind of function on brute physical entities that have no natural relation to that function".

Our fundamental research interest, when discussing and constructing a digital city whose purpose is to democratize knowledge producing processes, is to identify and develop this "special kind of function" that connects linguistic patterns to social reproduction, confidence building and creative/evolutionary (in other words, historical) time.

There is a fundamentally human "agreement involving the capacity to symbolize" which is the key to the memetic metaphor, thus leading from pure information (even from a genetic dimension) to confidence and institution building and the making of history (rise and fall of civilizations). We focus on tacit knowledge as this key, special kind of function, following Hitotaka Takeuchi and

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² Searle (1995, p.228).

Ikujiro Nonaka (who have contributed to a Zen-like approach to the development of business cultures and economic development).³

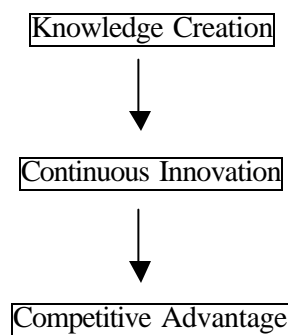
As a matter of fact, socially significant applications of information and communication technologies (ICTs) require careful perception of cultural, epistemic and institutional dimensions. The challenge of designing the architecture of virtual learning communities is one key example of such factors at play. Since this socio-cultural evolution is taking place on a global-planetary scale, there arises the need for a cross-cultural, community-based, ICT-mediated environments. But the evolutionary leap cannot be derived from a simple, mechanistic description of tools and rules. Only if organizational culture and knowledge producing cycles follow creative, innovative paths can evolution take place.

The growing literature on knowledge management has come to emphasize the role of organizational culture, collective action and economic externalities as key elements of the 21st century corporation. At the same time, in most nations educational “reform” is considered to be “a strategic site for intervention that can promote the modernization of nations, enhance the viability of economic systems within world markets and link macro issues of regulation with micro patterns of socialization and child rearing”.⁴

According to Popkevitiz, power is exercised less through brute force and more through the ways in which knowledge (the rules of reason) constructs the “objects” that comprise the issues, problems and practices of daily life. He organizes the discussion around three themes:

1. the relation of global and local,
2. the transformation of educational systems and problems of governing and governmentality,
3. the relation of intellectuals and knowledge in the problem of educational change.

We could add a fourth dimension, which is crucial for the aims of our own research agenda, that is the relation of knowledge management methods and educational reform. This is exactly the issue which calls into play the thought of Japanese researchers like Ikujiro Nonaka and Hirotaka Takeuchi. They formalize the causal process embedded in the competitive dynamics of present day capitalism as follows⁵:



³ See *The Knowledge-Creating Company*, by Ikujiro Nonaka and Hirotaka Takeuchi, Oxford University Press, 1995 and *Enabling Knowledge Creation*, by Georg von Krogh, Kazuo Ichijo and Ikujiro Nonaka, Oxford University Press, 2000.

⁴ See Thomas Popkevitiz, “Globalization/Regionalization, Knowledge and the Educational Practices”, in *Educational Knowledge – Changing Relationships between the State, Civil Society and the Educational Community*, State University of New York Press, 2000.

⁵ In Nonaka, I., Takeuchi, H. (1995), pg.6.

However, the new focus on “knowledge” as a competitive resource requires a very peculiar reconstruction of philosophical foundations, that the authors describe as a “distinctive Japanese approach to knowledge creation”. Western observers take for granted a view of the organization as a *machine* for information processing, a tradition “deeply ingrained in the tradition of Western management, from Frederick Taylor to Herbert Simon”.

According to the Nonaka/Takeuchi assessment, Western traditions view knowledge as synonymous with a computer code, a chemical formula, codified procedures or universal principles, thus failing to grasp knowledge that is not *explicit*. Contrary to it, a new approach has become crucial in the analyses of knowledge management processes both in Western and Eastern contexts, which stresses the tacit knowledge: highly personal and hard to formalize, “making it difficult to communicate or to share with others”.

Again quoting at length our Japanese authors: “the distinction between explicit knowledge and tacit knowledge is the key to understanding the differences between the Western and the Japanese approaches to knowledge (...) the subjective and intuitive nature of tacit knowledge makes it difficult to process or transmit the acquired knowledge in any systematic or logical manner (...). For tacit knowledge to be communicated and shared within the organization, it has to be converted into words or numbers that anyone can understand. It is precisely during the time this conversion takes place – from tacit to explicit, and (...) back again into tacit – that organizational knowledge is created”.

Based on this framework, we believe that the tacit knowledge insight can also be a starting point to a critical vision of network architectures, insofar as the observation and the practices focus on knowledge creation and interactive transformation of tacit knowledge into a flow (assuming that at any given time there is a stock of tacit knowledge embedded both in techniques and cognitive schemes, beliefs and perceptions).

Roughly stated, our ambition is to create a flow of creative tacit knowledge *among* organizations, thus creating a public space for the continuous sharing of tacit and explicit knowledge. The creation of such a network would form the performative structure within which the community becomes a *knowledge community* beyond the codes, softwares and hardwares involved. As a matter of fact, we are defining this extended socio-political framework a *knowware* with its own temporal and spatial attributes.

The central challenge for the construction of knowledge-creating public spaces which involve intercourses among different organizations (and thus among different organizational cultures) is to rank *interaction* as a priority, so that the changing potential of the structure becomes continuously evident and tacit knowledge resides wherein as permanent flow.

What kind of organizations are we talking about? Although there is no limit or predetermined boundary for the construction of permanent learning networks, from a policy-making point of view we stress the urgency of building interactive networks between the educational system and the labour market, mediated by explicit knowledge-creating institutions like universities which, by their own medieval structure, are transdisciplinary.

The idea of *knowware*, of community-based information design through shared and diversified learning practices, embraces current research on the anthropology of networks wherein work, learning and innovation exist in a state of flow. These communities of practice can only be grasped through “composite concepts” such as “learning-in-working”, which represent “the fluid evolution

of learning through practice”.⁶ In these spaces, “the actual noncanonical practices of interstitial communities are continually developing new interpretations of the world because they have a practical rather than formal connection to that world.” What is learned is profoundly connected to the conditions in which it is learned.

Still according to Brown and Duguid, the communities that we should be concerned with are often not recognized by the organization. They are more interpenetrative than bounded, often crossing the restrictive boundaries of the organization to incorporate people from outside, so that “the canonical organization becomes a questionable unit of analysis from this perspective.”

Mentoring practices have been the subject matter of a specialized literature, with a growing concern with establishing formal organizational procedures in order to “prove” that this is a viable coaching alternative for companies.⁷

What strikes as particularly interesting in mentoring is the insight of approaching the fluidness of interactive learning by reference to communities of practice much like the processes analyzed by Nonaka/Takeuchi. Our line of inquiry is to further develop this convergence of Ancient and Modern or even Post-Modern approaches to ICT-mediated knowledge networks. Among the many issues that arise from such a comparative and transdisciplinary approach, the following are noteworthy:

- discovery of common ground between opposing views so that *win/win solutions* can be created,
- ability to *learn from failures* and setbacks,
- a sense of *flexibility*,
- a *humanistic style* of leadership, guidance and teaching,
- a strong understanding of the *interdependent nature of relationships* and of the *interconnectedness* of all life.

For the peripheric nation-states of the world system, a new threat emerges: there is a growing concern not only with technological and knowledge gaps, but also with the emergence of a digital divide within developing societies. On the other hand, neo-illuminists preach on the creation of new development opportunities based on new technologies.

The main question in face of these inequalities is: “whose internet is to be developed?”. Are we condemned to wait for a natural expansion of the market or can we alter this profile through policy-led changes in the organizational cultures of companies and communities?

In order to face these challenges, the role of networks must be stressed and their communitarian, public nature should be ranked first among the organizational features of the emerging development paradigm. New regulatory controls and grassroots development of networks could work as antidotes for the ultraliberal approach to capitalism. One should look for alternative governance strategies at various levels (family, companies, governments and international public spaces).

The revolutionary implications of the internet and the digital economy now require the State and non-governmental organizations from civil society (NGOs) to take on new roles and develop new

⁶ John Seely Brown and Paul Duguid, “Organizational Learning and Communities of Practice: Toward a Unified View of Working, Learning, and Innovation,” *Organization Science*, February, 1991. Quotes from the online version available in: <http://www.parc.xerox.com/ops/members/brown/papers/orglearning.html>

⁷ See, for instance, Margo Murray, *Beyond the Myths and Magic of Mentoring*, Jossey-Bass Publishers, 1991 and Chip R. Bell, *Managers as Mentors*, Berrett-Koehler Publishers, 1996.

policies and governance institutions. The increasingly global character of the digital economy has prompted the advocacy of international governance bodies, the incorporation of foreign interests in American dominated institutions, and the development of new organizational forms for governance of the digital economy such as privatized or quasi-private governance institutions (even companies beginning to favor self-regulated agencies to tame market forces or build up compensatory policies).

Alternative views of the new society could emerge out of the “new economy” (or even new business models and organizational cultures as symptoms of a new economy), as opposed to the ultraliberal, U.S.-led view can be built on the spread of leading-edge users of the Internet and e-commerce in other parts of the world (Europe, Asia and Latin America).

The cultural and educational implications of such a broader view of network design are vast. Two complementary ideas should be taken into account: the idea of design and the idea of plastic, evolutionary networks. In both, interaction is the key to change and innovation.

Experienced designers already realize the new trend to treat design as a cultural rather than strictly technical or functional competence. One such case is exemplified by the father of modern Japanese design, Takuo Hirano, for whom “until the present, designers have been closer to manufacturers than to consumers. Designers must alter this relationship by becoming (...) less dependent on the leadership and demands of manufacturers (...) designers must develop *interactive relationships* with both users and producers”(italics added).⁸

With respect to a plastic and evolutionary view of network architecture, leading researchers also are coming to realize that no fixed boundaries should be placed between the physical infrastructure and the social, cultural and institutional context of interaction. For Phil Agre, for instance, “confusion about technology arises partly because the word “technology” shifts silently among different uses. Its narrowest use pertains to physical artifacts such as laptop computers. But artifacts do not simply drop from the sky. They come surrounded by cultural meanings (liberatory or oppressive, rational or spiritual, stabilizing or disruptive, traditional or modern, elitist or populist, and the like), and they are knitted into institutional arrangements (access, identity, maintenance, budgeting, space allocation, compatibility, intellectual property, and so on). If we focus only on the artifact, then the cultural meanings and institutional arrangements become invisible. In fact, the relationship between artifacts, meanings, and institutions is complicated and variable.”

The combination of mentoring and Internet has led to *telementoring* programs in the U.S.⁹ As an editor of a newsletter on technology and career directed towards high school students in Brazil since 1998, it became clear to me that students faced growing difficulties to choose among careers and even to understand what a “career” has become under the impact of technological change and globalization.

What we are in the process of setting up in Brazil is a program connecting schools to companies through an internet portal sponsored by the University of São Paulo’s Institute of Advanced Studies. Company executives act as mentors, while high school students and undergraduates are mentorees (undergraduates, if engaged a mentorees, must also play the role of mentors with respect to lower level students in high schools). The basic target are public schools where students face very demanding conditions. The average students has no stable economic condition and many have

⁸ Takuo Hirano, “The Development of Modern Japanese Design: A Personal Account”, in Victor Margolin and Richard Buchanan, *The Idea of Design*, The MIT Press, 1998.

⁹ For a list of *links* to telementoring programs, see <http://www.tnellen.com/ted/telebook.html>.

problematic families. Companies such as BankBoston, Volkswagen, IBM, the largest media groups in the country, NGOs and different universities are engaged in the preparation of the project. The Ministry of Science and Technology's Information Society Program is also supporting this project.

Among the results, we expect:

- to generate a "laboratory" for the creation of knowledge communities (testing methodologies, database designs and network architectures),
- to develop innovative metrics with respect to online behaviour,
- to generate a "talent database" that can foster employment opportunities,
- to build a network of experts in knowledge creation in Brazil and abroad,
- to create a public space beyond the boundaries of existing institutions in the educational system as well as in corporate organizations and regulatory agencies,
- to promote a flexible and evolutive consciousness of the role and risks of ICTs,
- to offer a permanently updated portal with links to worldwide centers of excellence in innovation and knowledge creation, thus promoting the competitive insertion of the Brazilian society in the global knowledge economy.

This community has been named "Knowledge City" (Cidade do Conhecimento) and has already set up a preliminary website with basic information (www.usp.br/iea/cidade). The activities are organized in four areas:

- construction of a public knowledge creation network involving students from high school to graduate levels and professionals of all areas and skills engaged in the labor market, aiming at the development of tacit knowledge exchanges through an ICT-intensive infrastructure as a means to improve all members' employability;

- organization of a complementary network of professors and professionals working in the educational system, based on a 7-months long graduate course on the impact of new technologies in learning spaces and approaches;

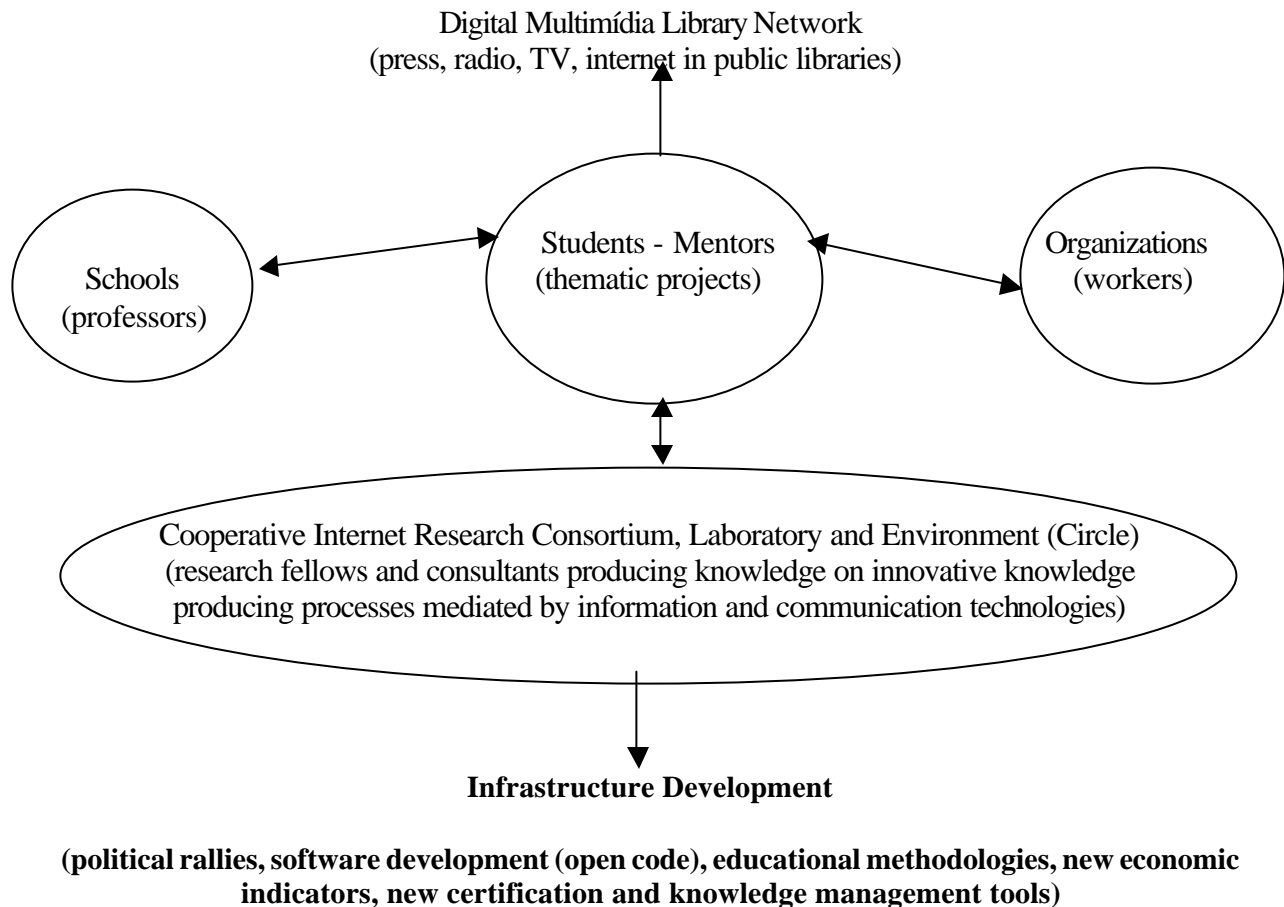
- organization of another complementary network of professionals working in governmental and non-governmental organizations as well as in private companies, based on a 10-months long graduate program on knowledge management and the political economy of intangible assets, exploring advanced policy issues such as media convergence, HDTV standards, digital inclusion and regulation in the new economy, connected to an international network of scholars and consultants.

- finally, a network of research fellows and consultants from different areas both from the university and from other organizations will produce knowledge on this new form of knowledge production, discussing issues such as the definition of the digital TV standard in Brazil or the effective utilization of information and communication technologies in the development of permanent learning processes.

Activities related to the construction of the Knowledge City take place both in internet environments and presentially. More than 400 private school teachers and around 1,500 public school teachers have enrolled in the course "Educating in the Information Society" for primary and secondary school teachers, organized in partnership with the Education Faculty Foundation of the University of S. Paulo.

To keep everyone in the network, we shall create pages for monitoring the content of the classes, maintained by the students and teachers themselves. Videos are also being produced for subsequent distribution to all schools and teachers connected to the City. And new activities (seminars and courses) will be announced shortly, to be undertaken in bigger areas in order to accommodate all those interested.

Since the Knowledge City will be a network for undertaking collaborative projects between students and professionals already working in the labor market, a pilot project is being undertaken between April and June, 2001, in partnership with the Faculty of Education and IBM. The overall design of this digital city can be depicted in the illustration below:



The diagram shows at least 4 interconnected networks at play:

1. professors networked to the university by permanent learning processes,
2. students and workers networked by thematic projects,
3. workers networked to the university by permanent learning processes,
4. research fellows and consultants networked as a community of practice that focuses on the development of the other 3 networked communities.

Both the permanent learning processes and the thematic projects are also designed so as to express each communities's priorities and intellectual needs. The university acts as a moderator/mediator in the interplay of these different collaborative knowledge producing networks as well as an instance for quality control and certification of participants (thus creating new opportunities for

employability and social mobility among professors, students and workers). It is expected that this new organization will significantly expand the supply of university degrees of different sorts, beyond the traditional diplomas.

The development of new certification strategies is a key element in the quest for recognition of tacit knowledge. In other words, while a university diploma might retain a specific value-adding capacity in the future, other forms of knowledge recognition must be addressed if the university itself is to remain competitive in face of “corporate universities” and “distance education”.

Moreover, the nature and form of permanent learning processes vary according to the communities involved. Now under construction, the network involving organizations (corporations, government and non-government organizations) and the university will be a “cooperative university”. Instead of creating new MBAs and other sorts of commoditized programs, the university becomes a hub for a constantly evolving marketplace of knowledges and competences, where organizations (including other universities and research centers) constantly bid and offer knowledge of different types and under different packagings.

In this perspective, Paulo Freire’s ideas become up-to-date, since his teaching model, his view of the learning process is precisely sustained by the three core elements of confidence and institution building required by contemporary ITC-mediated environments: interactivity, community and informality.

In 1996, Freire published the book "Pedagogia da autonomia: saberes necessários à prática educativa" (Independent teaching: knowledge required for educational practice) (Ed. Paz e Terra), where he emphasizes the need for respect for knowledge that students bring to the school.

In this short phrase lies the seed of great change, if teachers, students, teaching institutions, corporations and governments can first manage to change their rules, their hierarchies and their control mechanisms.

But it is precisely in this that the “revolutionary” nature of Freire’s work lies. Since he is not saying that this or that tool or rule will create a new type of education. He insists on an idea that is much more difficult to put into practice: that only by changing the power relationship between those who “teach” and those who “learn” will it be possible to create genuine interactivity (that is to say, dialogue and confidence as requirements to true knowledge creation). If this degree of dialogue between equals is achieved, then interactivity will be the basis for creating a community.

In other words, creating a community where shared, collective, practical production of knowledge rather than the mere conveyance of knowledge is at stake.

It is what the more recent theoreticians and strategists in the field of business and organization administration call “communities of practice”. Only in this environment, where trust is crucial, can knowledge flourish – particularly that resulting from informality, in other words, not necessarily coded, recorded, measured and controlled – in a process whereby all participants are not just learning and teaching at the same time, but taking part in a process of social and political change of which the school is only part.

Obviously, computers, the Internet, digital television, and other powerful technological tools may well facilitate this change, but they are far from guaranteeing that it will happen.

If it does not happen, individuals using these machines will just be their slaves, data in a strategic marketing schedule, users of a system controlled for dubious and untransparent purposes, characters in a society similar to the worst scenes imagined by science fiction of the “1984” sort.

We pass the word to Paulo Freire: we cannot accept ourselves as being “figures subject to search, decisions, breaks, choices, as historical figures and changers, except by accepting ourselves as ethical figures (...) It is for this ethical construct, inseparable from educational practice, regardless of whether we work with children, young people or adults, that we must fight”.

In the second semester of 2001, the Knowledge City project will host a very ambitious cycle of events, workshops and conferences: Digital São Paulo. Federal, State and Municipal governments will be involved, as well as companies, schools, universities and other social actors (NGOs, artists, etc.). Starting in August, 14, Digital São Paulo is expected to attract media and public attention to the needs and challenges involved in the development of a digital civilization. As chairman of the process, of course our intent is to promote and raise funding for the Knowledge City itself, but the networking initiatives certainly go beyond, so that as an ideal we would be preparing the ground for an amalgamation of São Paulo and the Knowledge City.

The 5 largest media groups in the State of São Paulo have already agreed upon forming a consortium to celebrate the development of digital networks: Folha de S. Paulo, O Estado de S. Paulo, Gazeta Mercantil, Valor and Exame, however, are country-wide publications that cover 80% of the Brazilian market. Radio and TV Cultura, the public broadcasting network of the State of São Paulo, also adhered, so that many of the events, workshops and conferences that will take place during this digital festival will be channeled live through Cultura’s program grid.

The Ministry of Science and Technology’s Information Society Program will provide funds for the development of many of the scheduled activities. Other events will take place during the same period, so that as a matter of fact we will simply enter into marketing agreements with their organizers and sponsors so as to have them under the umbrella of our Digital São Paulo brand. In other words, building this digital city involves a crucial effort in brand creation so that all the events have their value increased by cooperation. Moreover, given the multi-level, multi-actor nature of this organizational effort, it is expected that a new digital infrastructure will result that will continue to operate afterwards, so that while other Digital São Paulo festivals may occur in the future, a permanent digital construction work will be in place.

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