

Researching Globalization: Re-thinking the Future of Collaborative Research

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In the late 1980s the National Science Foundation advanced a proposal to integrate researchers working in different disciplines around the United States in virtual laboratories. Inspired by the potential for physical networks like the Internet to support and foster collaboration, the emergence of these "collaboratories" was celebrated as heralding a new epoch in scientific collaboration, which would both maximize the use of remote technology and accelerate the pace of discoveries and innovations. By the late 1990s, enthusiasm was dampened by the realization that participation in collaboratories had declined considerably after the first few years, resulting in much debate over why collaboratories have not lived up to their potential. This paper examines the birth of collaboratories at a time of euphoria about the possibilities of the information society, and analyses reasons for their relative failure. It proposes a fresh approach through a network-focused matrix, dubbed the Globalization Atlas and Portal Project. A working prototype of this model may offer a solution to what remains a major problem in academia and research circles in general – the difficulty of achieving ongoing, meaningful collaboration across disciplines. It concludes with a deconstruction of the question whether collaborative research has a future.

Future (Im)perfect: On the Perceptions and Expectations of Information Society

In his book, *The Media Lab*, Stewart Brand advanced the notion that information wants to be free (because of the new ease of copying, reshaping, and distribution), at the same time as it wants to be expensive (because it is the prime economic event in an information age), an inherent tension made worse by advances in technology.¹ This troubling dichotomy was overshadowed by a dominant romantic idea of the "digital community" in the 1990s: free flow of information achieved through open access to cyber networks. Evangelists described how these networks would produce new "cognitive ecologies," inhabited by "netizens" dwelling in a space of radical expressive freedom and unimpeded exchange of information.

The most common reaction to the remarkable rise in the numbers of computer networks is one of triumphalism. Rapid advances in computing, networking and telecommunication technologies appear to have profoundly impacted all aspects of social, economic, political, and cultural life. Financial networks now operate 24 hours a day and 7 days a week; product life-cycles are shortened; and work time has become more flexible.² The use of new information and communication technologies (ICTs) in interactions between people

and institutions has rendered patterns of production and consumption "time-less." Cultural encounters are similarly accelerated, rendering nation-states into powerbrokers in a world of shifting alliances. These changes are understood as a qualitative transformation in human experience. Sociologists like Castells see networking as the defining social structural characteristic of the information age, closely linked to political and economic developments such as the collapse of communist economies, the end of the Cold War, the spread of global capitalism, and the emergence of global security as a new focus of concern.

Many narratives present these wide-reaching changes as technologically driven. Writers like Negroponte and Gates have popularized a view of technological innovations which contends that the days of mass media are numbered: they will be replaced by new communications systems with boundless and benign social consequences.³ Other authors, however, query the depth and nature of these transformations, and ask whether "not just the forms of economic activity have changed, but the axial principles that define the society have also changed." (Tracey 1998: 194) Some query whether there has been or will be any real disjuncture with the past at all. Critical theorists like Schiller, for example, see the technological improvements that have produced the information society as an inevitable concomitant to capitalism's endless drive to increase efficiency and profitability. Robins and Webster (1999) question whether the expansion of work based on information, as identified by Reich, Castells and others, can be equated with any fundamental change in the nature of capitalism, other than the birth of a sub-variety they term "informational capitalism."

Inasmuch as speedy communication is regularly spotlighted as one of its distinguishing features, the debate has been given renewed currency by increasing awareness of the phenomena of globalization. Chapman has speculated that the ongoing communications explosion is tantamount to "a massive parallel computing system of pandemonic architecture, multi-purpose components, and evolutionary

cacophonic competing ideas," on a scale which allows it to have the emergent property of consciousness (1993: 31). However, a radical innovation or transformation will not necessarily precipitate the utopian changes predicted by Toffler and Negroponte. The ambivalence that lies at the heart of globalization and the complexity that characterizes it are central to any information society.

Marshall McLuhan put forward a clear view of the political and social agency involved in new communications technology transformations. In *Understanding Media: The Extensions of Man*, he identified speed, power and control as central to the mechanism of information flow.⁴ Today there is little argument about the prime role communication technology plays in policy development. Whether in China or Cambodia, information and communication industries have become vital to the state. Nation-states and transnational corporations continually struggle for control of communication and information resources.

In short, the rise of a network society does not entail the demise of inequalities of political and economic power in accessing information - in many ways it exacerbates them. There are still considerable regional, education, age, and gender disparities in the diffusion of ICTs and therefore of information. Network society is highly selective, and those who are disconnected risk being further marginalized.

If You Build It, They Will Come: Collaboratories as a Model of Scientific Networks

Advances in network technologies had appeared to promise instantaneous presence and exchange, and to point to an era of global, virtual democracy. This was an unrealistic conception that ascribed technology a transcendent quality, glossing over the resiliency of social inequities and minimizing institutional and individual agency. Some implementations of the network society⁵ have fallen short on key network society promises. This was epitomized by the American experience with collaborato-

ries.

The concept of collaboratories emerged in the late 1980s as scientists recognized the productive potential of expanded collaborations and exchanges structured through computer networks. In contrast to conventional academic and research collaborations that rely principally on face-to-face interactions and hands-on experimentation, collaboratories were conceived as centers without walls, in which researchers would perform their work unhindered by geography and time, remotely interacting with colleagues, sharing data and computational resources, and accessing instrumentation and digital information.⁶

In 1989, under the auspices of the National Science Foundation (NSF), three fields of study - molecular biology, oceanography, and space physics - were selected to participate in a workshop on the construction of collaboratories. These fields were chosen because of their technical and theoretical sophistication, and the broad range of institutions and approaches to research they represent, qualities thought ideal for testing the basic capabilities of collaboratory networks: real-time data sharing and archival data access, sharing of platforms, telecommunications, and remote access and control of scientific instruments.⁷

While from a technical vantage point the choice of a handful of natural science disciplines as test beds for the initiative seemed logical, it was undergirded by a circular argument that limited ready access to network technology to groups already deemed technically sophisticated. Such an approach restricted collaboratories to a small number of users relative to the rapidly growing population of the internet.⁸ Perhaps as one consequence, there has been a dramatic decline in collaboratory use since 1995, as illustrated by the experiences of the Space Physics and Aeronomy Research Collaboratory (SPARC). Its number of new users changed from 10 in 1993 to 12 in 1994, and then rapidly declined to 2 in 1995 and 1 in 1997. The total annual hours of system use soared from 700 in 1993 to 4,586 in 1994, then fell to 2058 in 1995, and 363 in 1997.⁹

It is important to consider whether the

reported declines in system use reflect a failure of existing collaboratories to address technological, social, organizational, and/or behavioral challenges associated with the development of appropriate models of virtual collaborations. For example, while responses from 100 researchers at 25 labs described the Worm Community System (WCS) - a National Science Foundation-funded collaboratory - as easy to use and relevant to *c. elegans* research, most had not signed on to use WCS and in fact chose to use alternate tools.¹⁰ Besides resistance to complex system installations and changing work environments from desktop machines to dedicated workstations, many researchers were reluctant to share ideas or data via WCS for fear of being anticipated or scooped by others.

Why They did not Come: Analyzing an Apparent Failure

After more than a decade, collaboratories remain in their infancy, and major challenges remain in the design, deployment, and adoption of new collaboratories.

First, while the free exchange of data and information was laid as the foundation stone of collaboratories, information does not, in fact, run easily between competing research teams. The profit/not-for-profit dichotomy identified by Stewart Brand continues to trouble the dream of free flowing information. Insofar as information is intellectual property, it plays a central role in academic competition to secure research grants. The persistence of stylized presentations and refereed publications as the principal vectors for the dissemination of research shapes the nature of inter-group exchanges and drives efforts to preserve the intellectual property rights of authors. Hence, in the short-term, these institutional processes and conditions present considerable obstacles to achieving the ideal of open access that informs collaboratories.

Second, as noted earlier, the governing assumption of collaboratory design is that participating institutions have the requisite technological infrastructure and expertise. However,

while infrastructure and expertise are necessary, they are not sufficient for the optimal operation of collaboratories. One of the major problems visited upon collaboratories has been the need to integrate existing systems operating under a variety of platforms, many of which are not compatible. The cost to users - who are frequently forced to find work-around solutions to compatibility issues - often proves too high, adversely affecting the scale and scope of participation.

Third, the move from a physical to a virtual setting habitually undermines the effectiveness of the collaborative process as traditionally conceived, increasing the risk of loss of shared cognitive understanding. The virtual environment complicates exchanges among participants, necessitating research into applications that compensate for the absence of physical presence. In a virtual setting, researchers must ensure commonality by establishing the same representational matrix and by ensuring that a feature referenced by any member is the same viewed by all.

To fulfill its promise as one model of a network society, the next generation of research collaboratory will have to directly tackle the social, technical and imaginative challenges associated with the design and use of networks. As Kling et al. have argued, it will need to begin by expanding our understanding of collaboratories and see them as socio-technical interaction networks, which necessarily include people/organizations, equipment, data, diverse resources (money, skill, status), documents and messages, legal arrangements, enforcement mechanisms, and resource flows.¹¹

Finally, it may be necessary to consider the relationship between social structures and collaboratories more broadly, and to question the very nature of collaboration. One way to do this is by linking collaboration to the manner in which scientific knowledge is organized. If we take Western medicine as an example, a hospital represents both a reservoir of expert knowledge, and a model of collaboration in action, where the receptionist, the nurse, the doctor,

the laboratory technician, the pharmacist, the office support staff and many others, supposedly all work together. But in this worldview of medicine the focus is on the doctor at the top of a pyramid designed to support the expert, not on the patient, who becomes an almost anonymous "case" to be processed. The impetus is to find the cure and move on, with the unspoken, underlying metaphor being the defiance of illness and ultimately death, not on quality, care, context, love. The contrast might be with a visit (or rather, series of visits, as once is never enough) to a Chinese herbalist, who will start with a most general discussion about life style and physical condition, will develop an individual recipe of herbal treatment in a process of listening, responding and refining, and will continue to fine tune the treatment in dialogue with the person and with the ailments over a period of months. The hoped-for aim is to achieve a balance in nature, not to defy it or overwhelm it.

What is suggested here is a change in worldview, from the pyramid model of knowledge to the networked. Also implied is that one man's collaboration is another's command structure. One possible answer to the conundrum of why collaboratories have failed, despite access to generous funding and abundant technological resources, may lie in a lack of imagination, and a reluctance to look at deeper questions of cultural or philosophical bias. Instead of asking, "why don't collaboratories work?", maybe the question should be, "what is it about our approach to learning and research that make collaboration difficult?" The first challenge would be learning how to learn, or how to research, to provide a model for learning and researching, which is equally accessible and equally applicable to all, regardless of status. The goal would be for the learning and researching to be a collective experience. The question then becomes whether the bureaucratic structures of the university, the laboratory or the thinktank could be open enough to such a fundamental reimagining of their roles.

Envisioning the New Collaboratory: The Globalization Atlas and Portal Project (GAPP)

Researchers at the Globalization Research Center (GRC) at the University of Hawai'i, Manoa, early saw that meaningful research into the complex processes of globalization had to be genuinely interdisciplinary, and would require significant collaboration from the outset. In 1998 they began work on developing an alternative, network-focused approach to globalization research, a conceptual structure which came to be called the Globalization Atlas and Portal Project (GAPP).¹²

The tensions and contradictions inherent in debates about the shaping of a network society also haunt much of the scholarship on globalization. Bell, Schiller and other information society theorists have noted how opposing political, cultural and technical dynamics can complicate local as well as international issues, raising questions about the desirability of a fully interconnected world (cf. Webster 2002.) Globalization scholars are compelled to address

these questions in order to understand the effects of globalization.

The intention behind GAPP was to measure the multiple dimensions and effects of globalization and, not incidentally, to foster interdisciplinary research into the phenomena of globalization. In October 2000, the GRC convened an international steering committee meeting in Honolulu, and charged it with helping refine the conceptualization of the project. The committee made a series of recommendations to develop a web-based portal, based upon a set of modules, to allow users to share complex datasets and diverse interpretations irrespective of their geographical locations. Each module - later developed as "clusters" of indices - would feature the collaborative work of experts in identified fields and would encompass different interpretations of the data.

What emerged from these discussions was the notion of a matrix. An early proposal was for a model was based on a Rubik's cube, displaying the varying dimensions, scale, and extent of the impact of globalization, according to the cube's orientation. The design also called

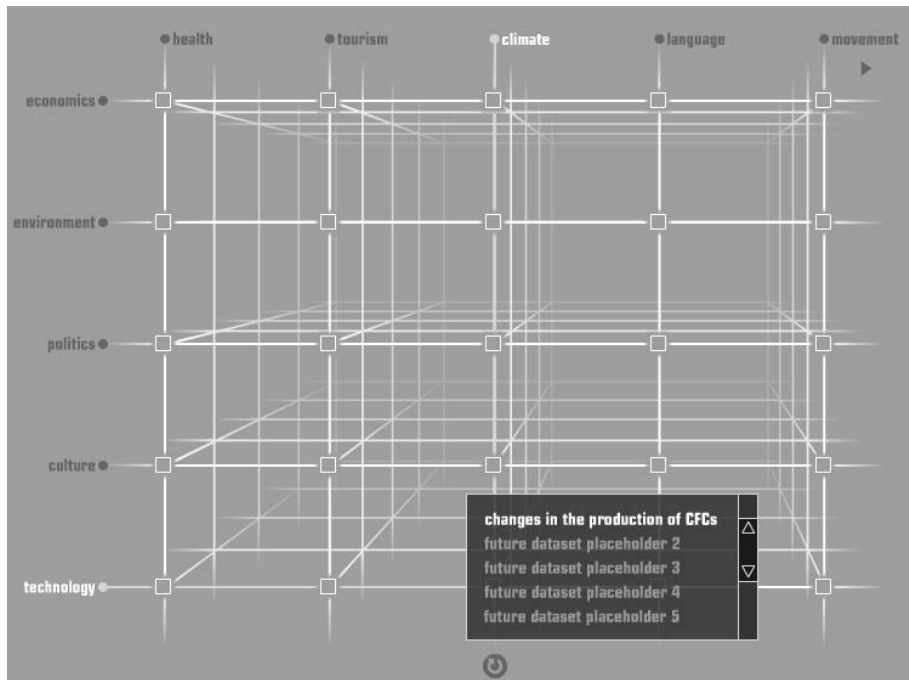


Figure 1 The GAPP Matrix with Sample Cluster

for a built-in data verification activity, with source data available on demand. The key elements were linkage and collaboration, and the focus on globalization as a series of processes. Following the panel's report, the GRC developed the GAPP as one of its core projects (See Figure 1.)

The GAPP had two drivers: finding a way to organize existing information *on* globalization so that it is both accessible and manipulable, and encouraging researchers into globalization phenomena to think *outside* their disciplinary boundaries, and ultimately to work cooperatively with others.

To avoid simply reproducing disciplinary boundaries, the GAPP used a matrix approach inspired by Arjun Appadurai's conception of cultural interpretations.¹³ Appadurai approaches cultures not as isomorphic with spaces, but rather as loci produced by the interaction of global economic, social, and political forces. Thus all localities are products of the intersection of multiple "scapes". This network/fractal approach allows globalization to be understood not as a unitary phenomenon dependent on a

narrow spatiality, but as phenomena best approached through a fractured totality.

The GAPP matrix extends Appadurai's arguments in two ways. First, it maps locality thematically. As reflected through the organization of the clusters, the matrix approaches globalization not as spatially determined, but as contingent.¹⁴ The clusters are less determined by spatial practices than by thematic convergence. Second, the GAPP matrix submits the processes that produce locality - culture, politics, economics, and technology - to constant questioning.¹⁵ In this manner, it makes possible a continuous reframing/refracting of globalization, lessening the chances that it will settle into a rigid interpretive structure.

For example, to examine the complex, inter-related issues surrounding cigarette smoking, researchers may bring together data sets within the matrix in ways that question conventional understandings of health and the links between health, politics, economics, and the environment. (See Figure 2.) The matrix allows for the correlation of clinical health, measured through morbidity and mortality data associat-

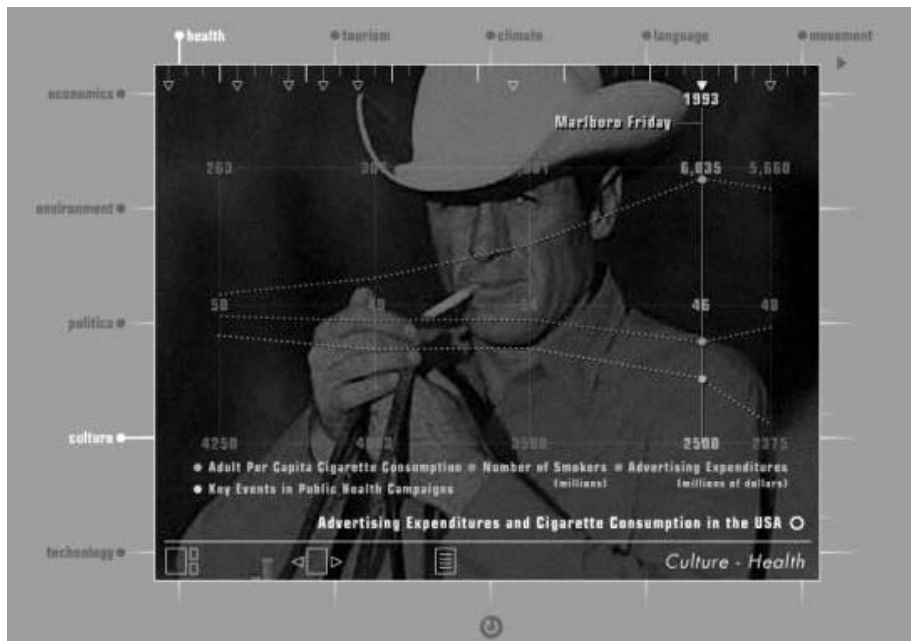


Figure 2 Health/Culture: Datasets Juxtaposing Cigarette Advertising Expenditures, Public Health Campaign Events and Cigarette Consumption in the US

ed with cigarette smoking, and national and international data on imports and exports of tobacco products. By highlighting the effects of trade initiatives on the availability of cigarettes, it makes clear the limitations of reductive understandings of health. Such a linkage expands our understanding of health by folding medical discourses together with discourses on international trade and law. Moreover, insofar as the matrix invites interdisciplinary inquiries, it makes it possible for researchers to further expand our understandings of the health effects of tobacco smoking by exploring the environmental impacts of tobacco farming.

By presenting alternative categories of interpretation, the GAPP matrix encourages multiple readings and interpretations of globalization. It provides a mechanism for examining Achille Mbembe's contention that late-modern spaces enclose "multiple *durees* made up of discontinuities, reversals, inertias, and swings that overlay one another, interpenetrate one another, and envelope one another."¹⁶ The GAPP environment allows researchers to use the data archived in the matrix to produce new and ever-shifting readings of globalization.¹⁷

Rethinking Collaboration Infrastructures: Bringing in the Social Actor

The GAPP is a toolset for data examination and information exchange, and its value is highly dependent on the ways in which it is *used*. The approach taken by the authors focuses on use and design-in-use to fully support collaborative efforts among globalization researchers as social actors, and particularly to provide an infrastructure for data sharing. A GAPP matrix-based collaboratory must accommodate interpersonal exchanges and the complication of a variety of human and machine interactions. It cannot be effective if it is envisioned simply as a "smart" repository or merely as a technical conduit for collaborative exchanges.

In general, network society discrepancies between promise and delivery have centered on use (and non-use) of information and communication technology (ICT) implementations; and collaboratory researchers and developers

have struggled with this realization. Their own evaluations judge existing collaboratories to be impeded by key technical challenges (Finholt 2002), and, more seriously, by an array of social challenges (Olson and Olson 2001, Finholt 2002, Kiesler 2003.) Collaboration is difficult, and difficulties are compounded when collaborators are multidisciplinary, and when they try to coordinate their efforts at a distance. After careful study, collaboratory researchers have identified areas for needed improvements that fall into three general categories:

- Technology
 - visualization tools
 - meta-data development
 - authentication and verification
 - phased introduction of tools
- Policy
 - communication policies
 - coordination management
 - coupling of work
- Culture
 - disciplinary differences
 - institutional practices
 - collaboration incentives
 - cultural accommodations

The GAPP matrix currently provides some but not all of these needed improvements. It incorporates a flexible set of visualization tools, and its data management strategies rest on an expandable thesaurus of meta-data. Its network and database infrastructure incorporates a robust set of security mechanisms, and its component-based design should easily allow for the phased integration of a wide variety of toolsets. But, as Finholt (2002) has observed, accommodating technical protocols is relatively easy, while incorporating social protocols is hard. The GAPP matrix was designed with this realization in mind. The authors believe the GAPP has the potential to accommodate important disciplinary and cultural differences and to mediate institutional practices by allowing for an innovative reconceptualization of the research space.

Policy and cultural collaboratory improvements cannot simply be built-in to the matrix, but they may be addressed by using a theoretically informed perspective of collaborating social actors as a framework for guiding *use* of

the GAPP matrix. The social actor model provides an empirically grounded view of a multi-dimensional social actor. (Lamb and Kling 2003) It characterizes scientists, professionals and their organizational networks in ways that can help frame analyses of integration and shape practical strategies. Its primary strength is the way that it contextualizes interactions, informational environments, and ICTs.

Within this framework, a social actor is understood to be an entity whose interactions are simultaneously enabled and constrained by the socio-technical affiliations and environments of an organization, its members and its institutions. Social actors, like research scientists, often have conflicting and ambiguous requirements about the activities they perform, and the socially legitimate ways in which to perform their work. This view also acknowledges that globalizing phenomena strongly influence organizational networked relationships.

Developing a Collaboration Infrastructure for Globalization Researchers

The authors have designed a model study intended to illustrate how the GAPP matrix could be useful in a specific research collaborative effort, and to investigate how it might be enhanced.

The subject area chosen revolved around an interdisciplinary group of scientists in subtropical fisheries in the Pacific. The proposal is that this "FAPP" (Fisheries Atlas and Portal Project) would encourage collaboration among such widely differing disciplines as biology, economics, marine ecology, oceanography, politics and sociology, and enable researchers to share data that they have developed within their own discipline, in order to better understand the global issues of fisheries. (See Figure 3) For example, tuna is consistently Japan's most popular seafood. The diffusion of culinary culture around the globe, epitomized by the worldwide popularity of sushi, makes the tuna trade a primary example of international business, involv-

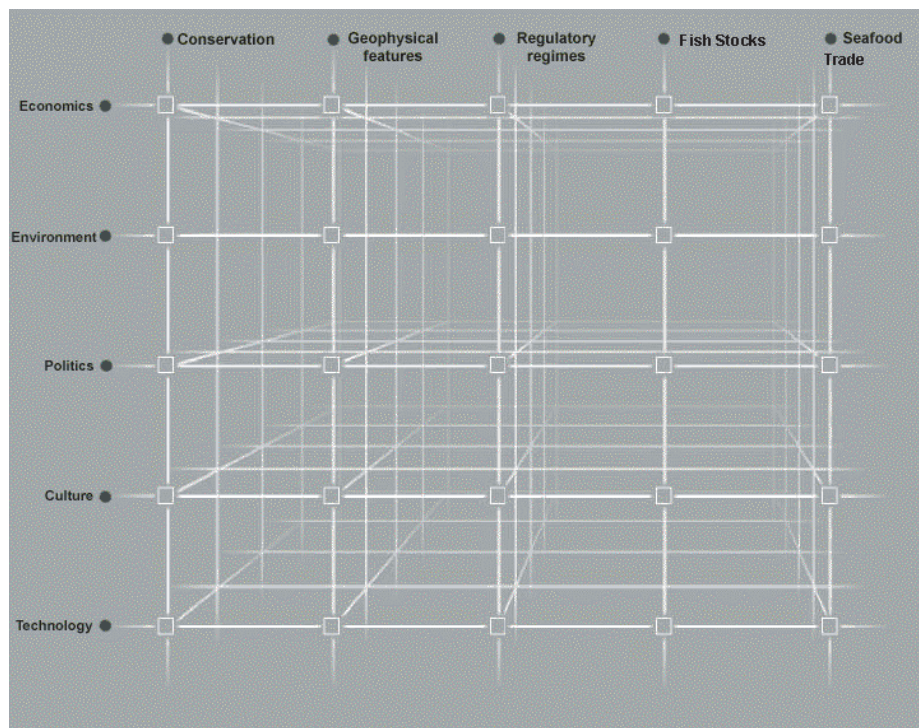


Figure 3 Outline of A Fisheries Matrix

ing intense global competition and thorny environmental regulations. Within the GAPP matrix, the tuna market as one exemplary variable of seafood trade could be examined through the effects of fish products, trade policies, diet culture, climate change, and fishing technology, while at the same time taking into account the changes in migratory stocks, allowable catch, inshore/offshore features, and protection zones.

In the study, a project-based understanding of systems integration guides an examination of the "data sharing" activities of the "scientists" and "policymakers" by focusing attention on use, design, collaboration and enrollment. The "scientists" in this study are collective social actors, including scientists, their graduate students, post-doctoral researchers, lab technicians, administrative assistants, and possibly other project personnel. Similarly, "policymakers" are taken to represent the professional individuals as well as the larger organizations with which scientists are affiliated, for example, experts from the Pacific Islands Fisheries Science Center, the Western Pacific Regional Fishery Management Council, and the State of Hawaii Division of Aquatic Resources. "Data sharing" among these social actors is taken to mean exchanging data sets in ways that will allow for interdisciplinary analysis and comparisons of the data at specific intersections of interest.

To gauge the efficacy of the collaboration and data sharing efforts of interdisciplinary scientists, the study would measure and analyze the following four related activities:

- *Use:* Collaborators would be interviewed before, during and after data sharing interactions (whether these incorporate the GAPP or not) to ascertain what prompts use, including what they were doing when they used it, and why they didn't use it when they thought they would, or said they would.
- *Design:* The idea would be to refine the GAPP "in-use," which essentially involves making changes to the information and communication technologies (ICTs), as well as the collaborative interactions that incorporate them.
- *Collaboration:* We would adopt the

approach suggested by Gutek (1995; 2000) to typify interactions (and interaction changes) along a continuum from relationships to encounters. For example, the collaborating group on subtropical fisheries would be asked to identify a goal for their data sharing, and to start collecting information about the collaboration process and its outcomes. This data collection involves periodic interviewing of the scientists, and also includes artifacts like joint papers. Attention is paid to any unexpected outcomes - especially novel insights or breakthrough discoveries that the data sharing processes precipitate.

- *Enrollment:* In order to ascertain how and why the "next" scientist or policymaker uses the GAPP to share new or existing data, we would attempt to examine the processes of enrollment and translation that take place (Latour 1987), as well as actual use. We aim to study any changes that are made or requested by these collaborators.

Such a study could be expected to require changes to the GAPP, such as integration with an existing system, or the addition of new components that can be purchased or acquired from another source for a desired data presentation or analysis. Most importantly, the authors seek to better understand the process of design-in-use within collaborative interactions since we know from prior research that this process is critical to well-used systems of shared data.

Does Collaborative Research Have a Future?

The fisheries study outlined above is a conventional approach – develop a model and test it with a "real world" situation. One of the problems with this approach is that it tends to replicate the circular process previously identified as a basic flaw of laboratories, limiting ready access to network technology to groups already deemed technically sophisticated, and thus restricting laboratories to a relatively small number of users. Is there a way of breaking out of this bind? Can the authors deepen their

understanding of the GAPP matrix and the social actor model in ways that could inform the field about what it takes to create, develop and maintain collaboratories for data sharing among networked researchers and analysts from different disciplines?

The GAPP at present consists of a prototype that can be viewed at www.dropzonemediagroup.com/gapp/prototype/main.html. The next stage of development would be to apply the GAPP to an area of research requiring collaboration, and "road test" it. In addition to the Fisheries Atlas and Portal Project described above, another suggestion is to apply it to global tourism, in a Tourism Atlas and Portal Project (TAPP.) However these proposals quickly draw attention to another stumbling block in the way of collaborative globalization research, issues of multinational and multidisciplinary data sharing, including incompatible data sets, and the predictably divergent expectations of different groups of collaborators on the international stage.

The authors see the need for an ongoing effort to develop an understanding the nature of the collaborative process, and of the participants in it. Studies by Lamb and others of how the social actor model work in practice have led to some interesting observations. The most obvious is that the problems faced in any collaborative situation can easily be replicated in a virtual setting: for example, having an uneven information flow, as the exchange of views and opinions may be "led" by an authority figure(s); hesitation or difficulty in participation for personal or cultural reasons; disjointed discussion and an inability to arrive at a mutually satisfactory sense of closure.

The inadequacies of the attempts to set up collaboratories in the 1990s can be attributed in its most fundamental sense to an emphasis on the *structure* of collaboration, at the expense of understanding the needs and wishes of the people who were supposed to use them. What motivates people to collaborate in research work, and what are the disincentives to such cooperation? As the contents of structural elements can be changed when people start to ignore them, replace them, or reproduce them

differently, the issue for the GAPP team is, how to influence that change in a positive way?

To use Giddens' language, it is necessary to find ways to build shared understanding (signification) by developing both authoritative resources (extended over persons), and allocative resources (extended over objects or material phenomena). As pointed out by Twining (1999) while collaboratories had been conceived of as a new way of using computerized networks, they in fact reflected traditional ways of doing science, especially "hard" science. Like the laboratory, the collaboratory is a "place to go" to do aspects of traditional science, namely experiments. "Scientists must still 'go' elsewhere (even if electronically) to conduct literature searches, they must still relate their experiment and results to a disconnected and scattered body of knowledge, and they must still write and publish their findings elsewhere, they must still manually search and retrieve relevant and pertinent information to support their work, for themselves."

Twining's call for a holistic, integrated virtual information environment capable of supporting new ways of doing science resonates with the GAPP team. Collaboration is about people acting together. Collaboration needs technology frameworks that support adaptive, open, ad hoc interactions, and that recognizes the individual as much as the group in which he or she functions.

Early work on collaboratories was characterized by naivety, if not superficiality. A casual acceptance that the idea of collaboration was of and in itself worthwhile had glossed over a deeper consideration of what was at stake when people work together, in particular on the international scale. What are the assumptions that underpin the idea of collaboration? What are the shared beliefs, values, attitudes, institutions, and behavior patterns that characterize the members of a community or organization, and that inform their approach to collaborating? Collaboration is both inherently relational and inherently cultural, since we all are part of various and sometimes overlapping groups with specific cultures.

For someone born into a society with

roots in Confucian thinking, it is likely that cooperation has a specific context, that of the family, that often has difficulty in being applied to a larger social situation. For someone with a Western background, cooperation may run in straight lines, so that a trio working together can be described as A linking to B linking to C linking to A, and so on. In the Arab imagination those relationships could be much more fluid, organic and 'noisy', with the possibility of all communicating together (an "arabesque"), while someone with an Asian background would unconsciously allow for silence, the unsaid, as being a vitally important part of communication.

In short, there is no universal understanding of the idea of collaboration. Rather, collaborative practices are situated in their own socially constructed cultural contexts. Cultural difference should not be seen just as a veneer; culture is fully constitutive of what makes for successful or unsuccessful collaboration.

In "Metaphors and Meaning: An Intercultural Analysis of the Concept of Teamwork", Gibson and Zellmer-Bruhn tracked the different understandings of the concept of teamwork across national and organizational cultures, based on interviews in four different geographic locations of six multinational corporations. The study demonstrated clearly that people around the globe hold different definitions of teamwork, as indicated by the five different metaphors for teamwork (military, sports, community, family, and associates) derived from the language team members used during interviews. Furthermore, concluded the study, this variance is systematic across nations and organizations, with several predictable differences based on values, orientations, and practices. If the national context is individualistic, for example, then sports or associates metaphors are likely to resonate. If the organization emphasizes tight control, then a military or family metaphor is likely to resonate. Because they represent mappings from a source domain (e.g., military) to a target domain (e.g., the work team), these metaphors carry with them expectations for how teams will be managed and how team processes will unfold. For example,

employees who use the military metaphor are likely to have strong expectations about clarity of objectives and performance indicators.

The ultimate question revolves around the need for collaboratories, or rather the impetus to reify collaboration. Might there be other ways to organize ourselves? At least there is a need for deeper consideration of how best people might work together.

By trial and error, answers may emerge, such as consciously working on developing a consensus on goals and outcomes and developing overt psychological and cultural sensitivity to the needs of others. By acknowledging the artificiality of the whole idea of collaboration, it is hoped that new metaphors may emerge for structuring a context where discussion can flourish, views be freely exchanged and reflective thinking encouraged.

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Notes

1. Steward Brand, *The Media Lab: Inventing the Future at MIT* (NY: Viking Press, 1987).
2. See Castells 2000a and David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (London: Blackwell Publishers, 1990).
3. See Nicholas Negroponte, *Being Digital* (New York: Knopf, 1995) and Bill Gates, Nathan Myhrvold, William H. Gates, Peter M. Rinearson, *The Road Ahead* (New York: Penguin, 1996).
4. Marshal McLuhan, *Understanding Media: The Extensions of Man* (Cambridge: MIT Press, 1994).
5. Castells describes the Network Society in this way: "...As a historical trend, dominant functions and processes in the information age are increasingly organized around networks.

Networks constitute the new social morphology of our societies, and the diffusion of networking logic substantially modifies the operations and outcomes in processes of production, experience, power, and culture." *The Rise of the Network Society*, M. Castells, Blackwell, 1996, p. 469.

6. William A. Wulf, "The national collaboratory - a white paper," the unpublished report of an invitational workshop held at the Rockefeller University, March 17-18, 1989.
7. J. Twining, *A naturalistic inquiry into the collaboratory: in search of understanding for prospective participants*. Unpublished dissertation. Texas Woman's University, Denton, Texas, 1999. Twining 1999
8. Finholt, 2002
9. Thomas Finholt, Slide presentation: *Collaboratory experience: 1993 to 2003*. School of Information, University of Michigan, <http://nbcv.sdsc.edu/CollaboratoryPresentations.htm>.
10. Star and Ruhleder, 1994.
11. Kling, R., McKim, G. and King, A. (2003). A bit more to it: *Journal of the American Society for Information Science and Technology*, 54 (1): 47-67.
12. By coincidence the A.T. Kearney management consultancy developed a Globalization Index at the same time, later joining forces with FOREIGN POLICY Magazine to distribute its findings. However, the *Globalization Index* tends to a narrow, unproblematicized treatment based on a few statistical criteria (<http://www.foreign-policy.com/wwwboard/g-index.php>).
13. See Arjun Appadurai, *Modernity at Large: Cultural Dimensions of Globalization* (Minneapolis: University of Minnesota Press, 1996).
14. For a rethinking of late-modern spatiality, see Henri Lefebvre, *La Production de L'Espace* (Paris: Anthropos, 1974) and Edward W. Soja, *Postmodern Geographies: The Reassertion of Space in Critical Social Theory* (New York: Verso, 1989).
15. To understand the necessity of historically locating the processes of globalization as knowledge and governmental structures, see Michel Foucault, "Governmentality," *The Foucault Effect: Studies in Governmentality*, ed. Graham Burchell, Colin Gordon and Peter Miller (Chicago: University of Chicago

Press, 1991).

16. Achille Mbembe, *On the Postcolony*, ed. Lynn Hunt, trans. Steven Rendall, *Studies on the History of Society and Culture*, vol. 41 (Berkeley: University of California Press, 2001), 14.
17. For a discussion of "pluritopic hermeneutics," see Walter Mignolo, *The Darker Side of the Renaissance: Literacy, Territoriality, and Colonization* (Ann Arbor: University of Michigan Press, 1997).

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