Resolving Human Service Delivery on a National Scale

White Paper

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The point of this *White Paper* is to outline characteristics of a ***fully-empowered community on a national scale*** ("FENComs") focused on human service requirements. *Full empowerment* is a condition in which experts and authorities can organize and employ their ideas and programs *as intended and authorized* without technical restrictions and arbitrary barriers of any kind. The object is to leverage the knowledge of communities of practice in related fields to directly support the needs of their intended benefactors, the recipients of human services. This will bring conclusive provision of services and will eliminate waste and associated costs in the process.

Fluidity is the free flow of knowledge to and from experts, authorities, and members of a community making use of available technologies. Fluidity is the *means* by which full empowerment of important service communities on a national level can occur. These concepts are defined and discussed herein along with ideas on how to implement them. Though some considerations are technical in nature and the concept requires use of technology in certain ways, driving issues in the development of *FENComs* as outlined herein relate to non-technical issues.

This *White Paper* is targeted at policy makers and policy administrators at the national level. It is written in the spirit of the great copywriters: *If you are interested in this subject, I cannot give you too much information*. If you have responsibilities in related areas and *are* interested in the subject, however, I will fail to give you enough. We must talk.

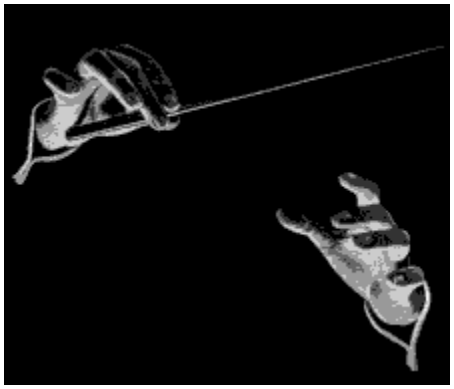


Table of Contents

Need for Improved Human Services

(Complexity times Complexity times Complexity…)

Complex service networks. Complex sets of conditions. Multimodal solution requirements. Persons under duress, many with diminished capacity. Diminished budgets. Shrunken staff.

Recent economic setbacks call attention to a persistent need felt by national governments to empower human service communities in increasingly more effective, more economically-viable ways even as complexity expands. Many conditions conspire to limit options for coordinating and integrating human service activities. The problem set is a challenging one, particularly since those who have human service needs will tend to have diminished capacity brought on by financial challenges, physical, cognitive, or mental health limitations, and undesirable social and family conditions (Rankin and Regan, 2004). Furthermore, the complexity of government services characterized by conflicting and overlapping services and policies can be an impenetrable barrier to people needing services.

A Holistic Approach

A holistic approach to human services is often held up as a viable means of achieving such objectives (Beadle, 2009; Kincaid, 2006). In the United States, such an objective has been referred to as a "no wrong door" approach associated with "one-stop" service centers (U.S. Dept. of Labor, 2000). The point of such programs is to simplify the process at least at the point of interface between government service providers and individuals appealing for help and their representatives.

The holistic approach under consideration is not considered as a means of simplifying service offerings, but to provide more nuanced, more custom offerings. Such a mandate conveys some sense of irony. Complexity of service networks resulted in large part from a commitment to provide differentiated services based on distinct kinds of needs that were otherwise not being served. Now the wheel has turned. National service systems must put on a new face by bringing specialists and generalists together to meet the *ad hoc*, particular needs of individuals. This mandate carries a double challenge – reorienting the structure of client relationships in a period characterized by service-oriented fragmentation – at least as observed in the United States (Tingey, Millington & Schultz, 2009).

The point of contact in such service endeavors is of critical importance as has been acknowledged in legislation in many cases. In the case of one state in

the United States, such workers have been referred to as “generic case managers” (Kincaid, p. 11), a phrase that surely does not convey all that is desired. With all that is at stake, a more appropriate title might be “case management superman [or superwoman].” Nothing less than superhuman powers would be required to bring together valid, complex solutions – all things being equal.

Existing Knowledge

All is not lost, however. The significant commitment over time to research and practice in human services fields around the world supports the hope, even the likelihood that solutions exist to complex problems in specific areas. This is not to say that ongoing research is not needed. This is to say that much, much knowledge goes unused and related opportunities for complex, nuanced services go undetected. The same can be said for social and cultural considerations regarding the well-being of individuals, their families and social networks.

Though solutions exist, a vexing question is whether the human service system can recognize and deliver them when and where they are needed. Let’s get existential for a moment. Where might the knowledge exist in a particular case – a “complex” case. I use asterisks because I have a difficult time considering any situation involving a human being, with virtually infinite combinations of capabilities and capacities to begin with, as being simple in any way and in any context. We will return to this in the discussion about evaluating peoples’ abilities under the CAMEO model.

Forms of Knowledge (The TEE Model)

Some of the appropriate knowledge in a particular case may be in the head of the “superwoman case manager”. “Knowledge in the head” I refer to as ***tacit knowledge***, a widely-used definition (Tingey, 2009). Some of that knowledge may be tacit in the head of the case worker’s supervisor, or maybe another worker in that person’s office. Other applicable tacit knowledge may be in the heads of other government workers in other local, state, or federal offices. Other knowledge may be in the heads of professional service people working in private or public capacities – collectively what I refer to as the person’s ***service group***. Others with personal relationships with the client in question I refer to as his or her ***nurturing group***.

They likely hold a good deal of tacit knowledge that would be of great help, though they may not be aware of that knowledge or do not understand its context.

Some pertinent knowledge to help in a particular case, the person sitting in front of the case worker or perhaps browsing online without the direct assistance of anyone else, surely resides in tacit forms in the heads of educators, researchers, or

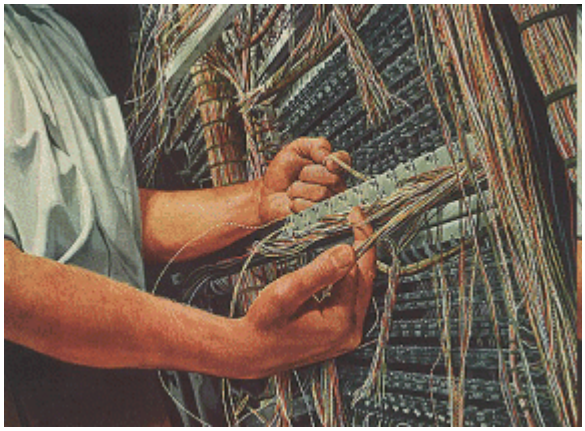
social and physical scientists. Alternatively, critical knowledge may be documented somewhere in a book or a journal article. Such material, what I refer to as ***explicit forms of knowledge***, may be computerized and available via electronic networks – whether or not the case worker and his or her associates know about it and can find it when needed. Much of the knowledge in question likely resides in inert forms in books, journals, and notes on personal computers or on dusty shelves of libraries, offices, and personal studies known only to a few – perhaps even forgotten by living practitioners.

An important distinction with regard to knowledge is that between the "what" of knowledge and the "how" of knowledge (Pressley and McCormick, 1995). Though related, they are not the same. The "how" of knowledge is action-oriented, as in how to get something done. To be done right, to be functional, this process needs to reflect the reality of the situation, however complex. Putting arbitrary caps on the level of acceptable complexity is a fool's errand. Complexity must be embraced in an effort to resolve issues at their core. The process approach I refer to as development of ***expressive forms of knowledge***, borrowing the genetic "expression" connotation. Dell Allen, in his work at Brigham Young University from the 1960s to the mid 1990s, developed a model for simplifying expressive knowledge forms. This innovation paved the way for considering ways of capturing complex knowledge forms in ways, using tree structures that support active, generative processes (Allen, 1983). The result is what I refer to as ***generative taxonomies***. Dr. Allen ultimately published a complete taxonomy of manufacturing processes using this way of thinking (Allen & Alting, 1987), a kind of task that is directly supportive of empowering communities.

Together, I refer to these forms of knowledge, tacit, explicit, and expressive as the ***TEE*** (as in "***tacit, explicit, expressive***" forms of knowledge) with generative taxonomies as the centerpiece for developing expressive knowledge forms (Tingey, 2006/2008, 2009; Tingey & Millington, 2008a, 2008b).

Knowledge in the Abstract – The Key to Complexity

Knowledge from research, even from educational effort, suffers from some degree of separation from its source, the client, and members of the service and nurturing groups. Not to belabor the point, but attempts to break down barriers between research and practice have been notoriously unsuccessful. I refer to "generators" and "perpetuators" of knowledge – researchers and educators – as the ***abstract knowledge group***. By this, I mean that they deal with knowledge in the abstract, typically not having a client



in front of them. Considering issues in the abstract is of critical importance, particularly with respect to complex situations. Unfortunately, it is also very rare.

My observation is that the lack of fluidity has much to do with the limited availability of useful TEE products from abstract knowledge groups. Members of such groups naturally give up when faced with a multitude of barriers between creating abstract models and extending them to those in need in timely form. Their knowledge "products" thus lack specificity and context. Seldom are such knowledge products expressive, and almost never provided in a way that preserves context. Critical assumptions in the comparison of parallel and confounding issues are often not fully evaluated.

Here is an example of what abstract thinkers are typically faced with when considering the complexities brought on by the real world using traditional computer models: "If this, then that, if the other, then a third proposition, unless another factor is the case, meaning that another condition is in effect, but only on Monday afternoons.…". Even in cases where the people involved understand and use computer programming languages, the prevalent "if, then" model is highly tedious and difficult to follow. Context is not preserved very well at all, a significant problem when it comes to logical complexity. As stated by Edward Feigenbaum, a leading computer scientist, with regard to technical "knowledge systems":

> …we couldn't break the knowledge acquisition bottleneck. Knowledge acquisition is too hard. Working with the experts, getting knowledge from them, getting them to articulate their model of the domain is a difficult and time-consuming problem for which we had given the field no tools (Shasha & Lazere, p. 221).

I did not personally participate with Dr. Allen and the Manufacturing Consortium at Brigham Young University (BYU) in the 1980s, but I was aware of their developments in the early 1990s when I first learned of the Allen tree-based approach. In the late 1990s, I entered into a technology contract with BYU, where we brought a Java/Web-based product to market with Idaho National Laboratory (INL). I published a case study with a colleague that encapsulates that experience. I learned a good deal about empowerment from this experience. As outlined by the head engineer on the project:

> As an Industrial Engineer and a Project Manager at [now Idaho National Laboratory, or "INL"], I was assigned to develop and implement [in 1997] a Web-based program to assist maintenance job planners to identify the regulatory requirements for OSHA, EPA, etc., to incorporate into work orders… I am not a software-programmer engineer. I went to [the independent developer's] offices … for two days, received about 30 minutes informal instruction and started work. We also had one of our … programmers at [the company] who assisted me to understand the lingo and translate my desire into programming possibilities. I

> still had to program many of the logic trees. We had the product rolled out on schedule.
>
> After six weeks of use of our JRC, we identified immediate revisions to improve user friendliness… since that time, senior management recognized the potential for the [tree-based] JRC package and … gave new operability requirements for an extensive improvement to the JRC… The regulatory research and process design took four months; the redesign of the … logic trees only took about five man weeks time, performed entirely by myself with occasional consultation with [INL] programmers. Personally I have found the use of the [tree-based] processes to be the easiest part of developing the … process. The commands are not difficult to follow and the built-in logic trees troubleshooting process saves hours if not days to resolve logic mistakes (Paper and Tingey, 2002, pp. 264-265).

I refer to the kind of confidence expressed here as ***modeling/computerization confidence*** (Tingey, 2009). The engineer in question told me at one point that he gained confidence from this experience such that he could computerize in useful form anything his team of engineers, scientists, and administrators could come up with. He said (paraphrased), "I can bring them together, order pizza, lock the door, and tell them we will resolve our process-related differences right now because I *know* that I can put our solutions to work immediately". The groundings for this level of confidence, taming complexity in the abstract, form the basis for full empowerment as discussed later.

Imagining Complex, Organic Flows of Knowledge

Let's take the case of "Ian", a case study in Rankin and Regan (p. 6). Ian is homeless, he has a substance addiction, he has a criminal record and has been incarcerated, he has clinical depression, his family has broken apart, and he has no job. When he comes in contact with the human services community in some way, knowledge from many sources exists as to how to consider each of his problems, though they are serious and challenging. Nonetheless, there are those in the human service community with jurisdiction in Ian's case that have considerable knowledge about substance addiction, in this case, heroin. Coupled with this, there are many valid approaches to Ian's homelessness – possibly better understood in his community and social and humanitarian circles than in the research community, though there may be overlapping issues. The criminal issues convey a set of unique challenges that would likely have relationships with his other problems.

Ideally, one could, at the snap of a finger, cause the appropriate people to appear on Ian's behalf the moment his case came to center stage. Such a group of people could consider the various confounding matters, issue suggestions, and otherwise provide solutions. If called at a moment's notice, however, conclusive answers may be difficult to come by as the parties would likely need to talk a few things out before getting to the point, Ian's problem set. Such issues would likely be better considered in the abstract by appropriate parties before Ian presented himself, allowing such knowledgeable people as members of an abstract knowledge group to sort out priorities and issues before getting to Ian's particular case. Nonetheless, by following such an approach, defensible, if not optimal solutions could be derived that incorporated the knowledge and insight of each of the parties in question without watering down, ignoring, or unduly simplifying considerations in each field.

Next to the ideal, then, would be an environment in which the knowledge itself would flow to Ian, his service group, and his nurturing group. This may or may not be a "close your eyes and imagine" thing for you, but if that is what it takes, I would literally encourage to shut your eyes and consider such an outcome. An event occurs or information is made available with regard to Ian. The nature of his case immediately adjusts based on the best existing knowledge in all relevant areas. Any new decisions or actions in such a scenario would immediately be made available to him and to the appropriate people in his service and nurturing groups. These interactions would be outcome of interactions between people and technology. Such modifications and adjustments would be an ongoing phenomenon. As Ian's conditions were to change, the knowledge-driven environment around him would constantly adjust – bringing him and his service providers and nurturers along. The abstract models in question would be fully responsive to adjustments by appropriate parties as things are learned from Ian's and others' cases. Such an environment as we envision it would need to be cost-effective. Waste from inappropriate actions and the lack of effective measures would largely be eliminated. If such an environment could be self-documenting, such would be all the better.

The process seems very organic – very ecological. I would hope that it would be so. We see the very kind of knowledge and information flows described in the hypothetical case of Ian around us in natural phenomena. The case for complexity is well-served by making some reference to examples in the science of ecology. Tansley, in coining the term ecosystem (1935), was making this very point to his fellow ecologists:

> It is the systems … which, from the point of view of the ecologist, are the basic units of nature on the face of the earth… Actually the systems we isolate mentally are not only included as parts of larger ones, but they also overlap, interlock and interact with one another… Some of the systems are more isolated in nature, more autonomous, than others. They all show organization, which is the inevitable result of the interactions and consequent mutual adjustment of their components. If organization of the possible elements of a system does not result, no system forms or an incipient system breaks up. There is in fact a kind of natural selection of incipient systems, and those which can attain the most stable equilibrium survive the longest. It is in this way that the dynamic equilibrium … is attained. The universal tendency to the evolution of dynamic equilibrium has long been recognized. … The more relatively separate and autonomous the system, the more highly integrated it is, and the greater the stability of its dynamic equilibrium (Tansley, pp. 299-300).

It is not the individual organism that Tansley describes here, but the entire system, the "ecosystem" as he describes it. Such a system in our case would be the entire human service community, including Ian's service group, his nurturing group, and those of all other clients or customers of the designated system. The community as a whole interacts with other communities, or systems, as Tansley puts it – bringing added complexity from the interactions. The dynamic equilibrium referred to considers the entire ecosystem, the whole community, with which the human service community forms a part. The "interactions and consequent mutual adjustment of … components" in the community are those transfers of knowledge and actions that work together to meet the needs of the Ians for whom the community is organized and sustained.

How do such connections and exchanges occur in nature? Knowing this could help us to understand the success achieved by natural systems and biological communities. This we only know imperfectly (Miller, 1978), but understanding of such knowledge flows – how they come together and their content – is certainly warranted in studying the possibilities for complex communities for considering the needs of individuals targeted for assistance in human services. The existence of balanced, functional natural information systems lends credibility to the potential for timely, complex knowledge flow in communities. They point the way to characteristics of such systems. Clearly, undeniably, such natural systems are complex.

Similar conclusions can be made with respect to considering complexity for information processing within individual organisms as with ecological systems. There are many organic systems within our bodies that support massive information processing requirements – not just passive, but active, trouble-seeking agents, as in white blood cells in humans that are directed at specific problems when and where they occur (Distefano, 2004).

There are many obvious barriers to complex, nature-like outcomes in the transfer of knowledge among people, of course – even in the face of improved communications and technologies. Time. Space. Monetary considerations. Changing conditions. Language barriers. Personal will. Knowledge of who to bring into the "room" in the first place. Nonetheless, though seemingly ephemeral and scattered, existing knowledge can only be used as it is brought together where and when it is needed.

Fully-Empowered National Communities (FENComs)

I offer a solution. The object is to "fully" empower participants in the community, service providers, researchers, and others, so that their knowledge is freely available to the community when and where it is needed. Control of technological resources given the complexity of the tasks at hand is an absolute requisite in this process. How this can come about is described in the section *Full Community Empowerment*. I refer to the proposed solution as "fully-empowered national communities" ("FENComs" pron. "fen-coms") in human services.

The idea behind *FENComs* in human services stems is from my doctoral research (2006/2008) and work at the *National Clearinghouse of Rehabilitation Training Materials,* a U.S. Federal program at Utah State University. The fundamental concept is to apply a *Universal Design* (UD) approach to knowledge and information structures (Tingey and Madan, 2010). The purpose of the UD approach to knowledge is to reduce or eliminate any and all barriers that may exist in the collaborative design of solutions by members of human service communities and in the use of such solutions by people in need and their nurturing and service-oriented network of helpers. I refer to such knowledge flows – where intermediated by technology – as *knowledge fluidity*. The point of knowledge fluidity is to empower knowledgeable people to disseminate their knowledge in useful forms that preserve context and make the best use of available technology. Fluidity presupposes a free, cooperative, open community environment, a phenomenon that is demonstrated in many organizations and environments, but not all (Tingey, 2009).

Partial Community Empowerment

There is a considered movement toward identifying and encouraging communities of practice (Aldrich & Ruef, 2006; Wenger, 1998). Though this extends to many fields in our modern industrial world, it is a human characteristic, as knowledge is gained and shared in all societies throughout time (Pinker, 2002; Pressley & McCormick, 1995; Vygotsky, 1978).

With regard to human services on national and international levels, many communities have grown out of extended efforts to support research and education. Mediated and encouraged by technology designed to encourage communication and collaboration by large numbers of people of like minds and interests, many such communities have learned to extend their activities via communication and computerization networks (Castells, 1996, 1997).

The first consideration with regard to a community and its empowerment is that the community be a coherent, persistent social body of some kind. Members must have shared values and norms. To some degree there need be a sharing of resources, at least sufficient to support the needs and objectives of the community and the parallel considerations of its members. Though communities may come together in sudden ways to meet a current need, they may also have emerged from indigenous roots. Empowerment in a generic sense can come from use of technology to extend tacit forms of knowledge to explicit forms. For the most part, this is what Castells is writing about – the use of email, web sites, and other delivery means.

I will provide three examples of communities with some level of empowerment, including some mastery and control over needed technologies. These are: (1) the vocational rehabilitation community in the United States, a government-sponsored initiative with functional objectives; (2) the open source technical community throughout the world, sponsored by individuals, public, and private institutions; and (3) the Whānau Ora initiative in New Zealand focused on human service outcomes in harmony with the Māori culture, another government-sponsored, service-oriented community with deep ethnic and cultural roots.

CASE 1: U.S. Vocational Rehabilitation Community

Existing to some degree since the first war of the U.S. Republic in the 18th Century, vocational rehabilitation as a field of practice got a big boost with the Rehabilitation Act of 1973, since amended several times. This is a group of programs in research, education, and human services directed at assisting people with disabilities to achieve full community inclusion, particularly directed at employment and housing opportunities.

My dissertation (Tingey, 2006/2008) focused on the legitimacy of systems supporting the needs of several institutions in this community. Legitimacy in this sense stands for the degree to which computerized systems helped these organizations to accomplish their collective mission. This could also be construed as meaning, “to what extent is this community empowered by their computer systems?”

In short, the answer was that they were empowered with respect to explicit, static forms of knowledge and extending the transfer of some tacit knowledge through distance education approaches, but not with active, process-oriented knowledge forms. Thus, it can be said that the sector is partially, but not fully empowered.

Systems were oriented toward providing information – documents, email messages, even live and multimedia presentations – but they could not take advantage of computational power of computers to lead people through steps of a process to get something done without "someone" (not an entire "community" of helpers in any case) "on the other end of the line".

This, of course, is empowerment of a kind. Using electronic means of extending knowledge artifacts and communicating are useful ways of extending knowledge. In the regular course of business, however, with a client "in the office" and the lack of time and knowledge of where to look for answers, the systems were ill-suited to supporting the kinds and levels of complexity required within the practice of vocational rehabilitation. The result has been service-level fragmentation in the field (Tingey, Millington, Schultz, 2009).

Attention has been drawn by the federal government to the challenge of communicating important forms of knowledge from research to practice in rehabilitation fields. Knowledge translation (Sudsawad, 2007) is the principal medium through which this is to occur (NIDRR, 2009). Several explicit approaches to organizing and disseminating knowledge have been considered and are being used, including particularly logic models (SEDL, 2008) and document databases (KTPP, 2008b). Knowledge translation efforts make reference to "standards and validation methods" for research and the need to improved dissemination (KTPP, 2005a).

There is a huge context challenge to the KT approach as outlined. Though statements can be found such as "What activities or programs are appropriate to insure research on theories, measures, and methods reaches the primary audiences of researchers and practitioners"?, there is no detailed plan for how this is to occur and under what circumstances (KTPP, 2005b, p. 2). There is no direct evidence that current programs understand or anticipate any level of fluidity or aspire to expressive, process-oriented ways of extending knowledge.

The challenge resides not only when and where knowledge "reaches" researchers and practitioners, but under what circumstances – time and place. Who is to say that the people in question will remember to use the knowledge that has at some point "reached" them? Furthermore, in some circumstances such knowledge may be of benefit to the people in need of it – the people with disabilities and members of their nurturing as well as service group. What is lacking is an effort at capacity building, to establish expressive channels of communication and training and support for all participants in relevant communities in full empowerment activities.

CASE 2: Worldwide Free Software/Open Source Community

The free software/open source community ("FS/OSS") is a fairly recent phenomenon, having emerged since the 1984 organization of the *Free Software Foundation* (Kelty, 2004), which viewed software development with regard to freedoms that software grants or denies, as in "free speech, not free beer" (Stallman, p. 31). Later, others

focused on other connotations of the term, creating a similar group, the open source community, which meant that the underlying text files that could be used to create the software could be seen, modified, and shared (Leach, Nafus & Krieger, 2009).

Though there are distinctions between the “free speech” and “open source code” factions that I will not elaborate on here, they have one core element: They are both direct challenges to the software offerings of commercial providers, Microsoft being a prominent example. Concern was that users were being “locked in” to only function as desired by such software providers, resulting in operating limitations for organizations and individual users from not being able to modify the software in question or obtain alternatives. Concern was also evident in that the lack of freedom in software alternatives resulted in the levying of high fees with little valid rationale (Fang & Neufeld, 2009).

The FS/OSS movement has accomplished some admirable feats, in spite of the fact that a large majority of projects “fizzle out” from lack of sustained activity by participants (Chengalur-Smith & Sidorova, 2003). The most famous of these are the Linux operating system and the Apache family of Internet tools, both of which are dominant technologies in wide usage that present lasting challenges to commercial alternatives. Apache, for example, though free and open, supports approximately seventy percent of all Web sites on the Internet. Relationships between nonrestrictiveness of licensing and sponsorship – particularly by a nonmarket-oriented partner – has been found with success in FS/OSS activities (Stewart, Ammeter & Maruping, 2006). A flexible license that grants freedom and a partner without a direct commercial interest in the resulting project tend to attract volunteers to the cause. Personal motivations of participants center on identification in the community as a valued partner on the projects, on pragmatic motives to improve their own software, and by tolerance for the time invested in the project (Hertel, Niedner & Herrmann, 2003).

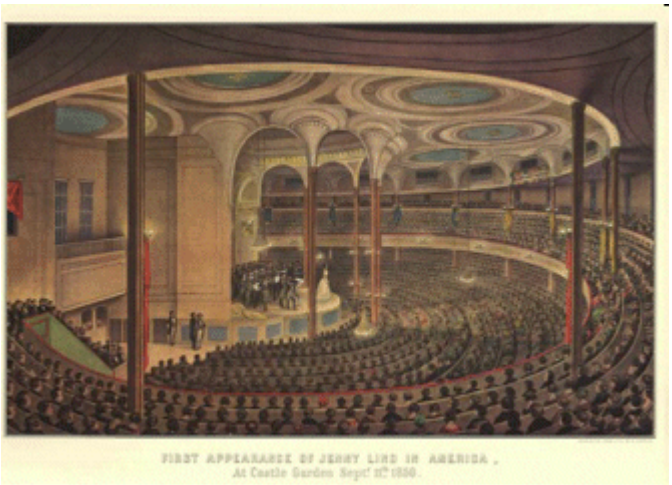
From our perspective, we can see solidarity and commitment to the community to be sure in strong FS/OSS projects, but there is empowerment, not only with regard to commitment of tacit and explicit forms of knowledge, but with expressive, or action-oriented forms. These are highly skilled software programmers. Full empowerment, such as I describe in the subsequent section, is enjoyed by these parties, as they can use traditional computer programming languages to design process-oriented knowledge forms in their areas of knowledge. The existence of this community and its myriad of projects provide evidence of the potential for fully-empowered communities in other sectors.

CASE 3: New Zealand Whānau Ora Initiative

The Whānau Ora Initiative in New Zealand is a means of reasserting Māori culture in a human services environment, promoting wellness, health, and resilience (Taskforce for Whānau-Centred Initiatives, 2010). Though traditionally tied to the land and local, familial relationships, the Māori culture and its commitment to family

structures, longstanding behavior patterns, and mutual assistance, has shown to have an abiding effect on its people.

The Initiative is intended as a means of reinforcing such important cultural elements through integration of government efforts with a rich level of interaction with leaders in the Māori community in New Zealand and elsewhere. Related programs will support “whānau”, or Māori -oriented outcomes in “housing, employment, income, education, health, transport, cultural knowledge and connectedness, family relationships, and safety” (Taskforce…, p. 21). The system will serve to negotiate outcomes with providers, keep records, measure outcomes, and establish expectations for accountability.



This is an activity that is rich in community. Not only will there be needed interactions on the national level involving high level interaction with leaders within the Māori culture, significant levels of communication among Māori tribes and families will be required and cross-communications with service providers and others will be needed. The program makes special mention of the importance of integration and collaboration with educational, sporting, recreational, cultural, and health agencies, where close linkages will be needed based on a complex nature of relationships (Taskforce…, p. 26).

Converting tacit knowledge to explicit forms – characterized in this *White Paper* as partial empowerment, will assuredly help achieve these objectives. As is mentioned in the Taskforce Report, youthful Māori have made use of social network software on the Internet, such as *Facebook*, to learn of family relationships and deepen their understanding of their native culture.

Of course, the Internet imposes multiple effects on members of this community as they do others. Some of these serving to justify the *Whānau Ora Initiative* in the first place. As stated by Castells:

> When the Net switches off the Self, the Self, individual or collective, constructs its meaning without global, instrumental reference: the process of disconnection becomes reciprocal, after the refusal by the excluded of the one-sided logic of structural domination and social exclusion (1996, p. 25).

Extended use of traditional, explicit, Internet tools supports at least partial empowerment within the Māori community and appropriate service provider and

social organizations. Web sites dedicated to providing explicit forms of information will be very useful, as will sites dedicated to communication and collaboration among Māori that make use of messaging and data sharing. Useful sites for tracing genealogies, for example, organized based on Māori priorities and structures, could serve to support the kinds of interactions encouraged by the *Whānau Ora Initiative*.

To the extent that challenges of time and space are a factor (Taskforce…, 18), these technologies have proven their merit throughout the world. In fact, as outlined by Castells, their use is ***mandatory*** to support general awareness:

> What characterizes the new system of communication, based in the digitized, networked integration of multiple communication modes, is its inclusiveness and comprehensiveness of all cultural expressions. Because of its existence, all kinds of messages in the new type of society work in a binary mode: presence/absence in the multimedia communication system. Only presence in this integrated system permits communicability and socialization of the message. All other messages are reduced to individual imagination or to increasingly marginalized face-to-face subcultures. From society's perspective, electronically-based communication (typographical, audiovisual, or computer-mediated) ***is*** communication (Castells, 1996, 374).

The message, thus, must be present on the network in order to make the case. Being on the Internet alone will not resolve the challenges to be addressed by the *Whānau Ora Initiative*. A "thicker context" will be required – in both cultural compliance and "coherent service delivery" (p. 19). Static, traditional Web-based tools and resources alone will not be sufficient.

> *But the price to pay for inclusion in the system it to adapt to its logic, to its language, to its points of entry, to its encoding and decoding*. This is why it is so critical for different kinds of social effects that there should be the development of a multimodal, horizontal network of communication, of Internet type, instead of a centrally dispatched multimedia system, as in the video-on-demand configuration. *The setting of barriers to entry into this communication system, and the creation of passwords for the circulation and diffusion of message throughout the system, are critical cultural battles for the new society, the outcome of which predetermines the fate of symbolically mediated conflicts to be fought in this new historical environment*. Who are the interacting and who are the interacted in the new system…largely frames the system of domination and the processes of liberation in the informational society.
>
> The inclusion of most cultural expressions within the integrated communication system based in digitized electronic production, distribution, and exchange of signals, has major consequences for ***social forms and processes***. On the one hand, it weakens considerable the symbolic power of traditional senders external to the system, transmitting through historically encoded social habits: religion,

> morality, authority, traditional values, political ideology. Not that they disappear, but they are weakened unless they recode themselves in the new system, where ***their power becomes multiplied by the electronic materialization of spiritually transmitted habits***… (Castells, 1996, 374-375).

Thus, partial empowerment may not be enough. Full empowerment issues with regard to the Māori and the *Whānau Ora Initiative* are considered on page 16.

Full Community Empowerment

Castells' described full empowerment almost casually, as if it existed in any case where computer networks were employed.

> The network morphology is also a source of dramatic reorganization of power relationships. Switches connecting the networks … are the privileged instruments of power. Thus the switchers are the power holders. Since networks are multiple, the interoperating codes and switches between networks become the fundamental sources in shaping, guiding, and misguiding societies (Castells, 1996, p. 471).

Is Castells describing actual technical switches – electronic routers – as supplied by *Cisco Systems, Juniper,* or *HP/3Com*? Computer networking switches? I think not. The power of the Internet is that all switches and machines are linked in some form. The point is, as stated by Castells, the difference between empowerment and *full* empowerment lies in the ability to control the conscious flow of activity of large numbers of people as they use the community network.

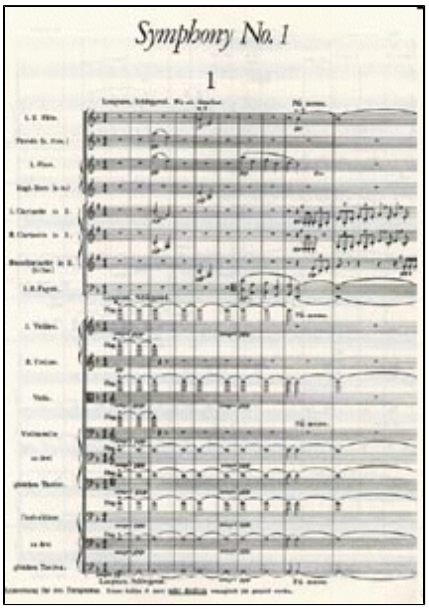
One aspect of Castells' characterization of switches as instruments of power in a networked world is clear. Ultimate network power is not found in the ability to post a document. That isn't much of a "switch". If a person were to read what you posted, you would thus have the power to direct the logical flow *inside his or her head*, at least to the degree that that person concentrated on what you wrote. As Pappy O'Daniel says, however, in *Oh, Brother, Where Art Thou*, "we ain't a one-en-a-timin' here, we'z a mas comunicatin' here". Directing the attention of all in desirable ways is the point of the exercise. As Peter Drucker (2000) indicated:

> What is important is not the tools. It is the concepts behind them. They convert what were always seen as discrete techniques to be use in isolation and for separate purposes into one integrated information system… This is a new and radically different view of the meaning and purpose of information: as a measurement on which to base future action rather than as a postmortem and a record of what has already happened.
>
> The command-and-control organization that first emerged in the 1870s might be compared to an organism held together by its shell. The [organization] that is

> now emerging is being designed around a skeleton: *information*, both the [organization]'s new integrating system and its articulation (p. 62).

Full empowerment of community members means that there are no cognitive limits to where community members direct the system. Castles in the sky? Yes, if the theory and practice take you there and the trip is defensible and desirable to appropriate peers in the community. No limits or partitions can be broached in such an environment. No computer updates. No devices. No acronym-laced developments or surprises. No fear. No uncertainty. No doubt. The abstract knowledge group in particular, armed with modeling/computerization confidence, is in command of the flow of knowledge in collaboration with representative service and nurturing group interests.

Increasing the valid flow of knowledge among human service professionals will surely change the composition of that knowledge. The potential exists with full empowerment for crafting more nuanced solutions, considering the complexities of science and practice that surely do not present themselves in the heat of the moment – with an "Ian" in the room or on the phone.



Conclusiveness and Abstract Knowledge

Conclusiveness is the jewel of full empowerment. In a fully-developed and maintained system, it represents an ability to be sure of correct and beneficial outcomes in a consistent way in environments of complexity, scale, and change. Without attempting to teach at this point the basic concepts behind generative taxonomies, suffice it to say that each juncture in a tree structure represents a ***frame***, a situation. Conclusiveness presumes the existence of perhaps thousands of frames in a professional setting, each supporting higher levels of fluidity. Each frame would need to have been set up and would need to be maintained in a continuous, fluid fashion by networks of professionals and practitioners formed into communities of practice. These frames are linked by means of the trees themselves. To the degree that the individual frames reflect reality, the system and its outcomes represent conclusivity.

Two related concepts then support conclusivity. Though simple, they provide a way of conquering complexity. The first of these is ***context targeting***. The second is ***semantic pull***. Both are described in more detail in *Methods-Based Management* (Tingey, 2009).

Context Targeting

The context targeting phenomenon makes use of the tree model to establish and record complex contextual arrangements by asking qualifying questions in a tree-oriented structure that presents to the user only relevant questions in an increasingly detailed, directed fashion. Using this technique, knowledge designers can have very detailed, specific objectives in mind as to knowledge dissemination, eliminating all unnecessary or irrelevant concepts and issues. Meaningful "keys" as determined by the design group are picked up along the way – possibly stored – so that the context of the session can readily be recovered.

Semantic Pull

Semantic pull makes use of keys earlier in a session or in prior sessions to automatically traverse trees to arrive at highly customized, granular results. It is similar to a data search, but with much richer results, resulting from any number of contextual elements, or keys. The net effect is that answers are effectively pulled from the system and any connected elements from the Internet.

Prospects for CASE 1: U.S. Vocational Rehabilitation Community

Dissemination of rehabilitation-oriented knowledge needn't be a large barrier if all participants in the process learn to master expressive forms of knowledge. This is to say, if the knowledge translation program were to incorporate fluidity and conclusiveness as norms. If the research and education practice were to include the design of expressive knowledge forms as a part of the research documentation process, community members could make appropriate processes available to the field by sharing underlying definitions with each other.

By linking trees and maintaining currency in their respective areas of responsibility, participants in such an environment could always provide un-to-date information to all system participants in the context in which the data is needed. To accomplish this, a considerable effort in capacity building among the professionals in related research and practice communities – and other interested parties – would be beneficial in leveraging existing knowledge and much existing technology.

Prospects for CASE 2: Worldwide Free Software/Open Source Community

Fluidity would seem to resonate with the objectives of proponents of software as a means of enhancing the freedom of users. Perhaps they could be recruited into an effort to improve software applications that make use of fluidity models.

As to software being free of charge, that is a more complex proposition. Fluidity-related applications could be available in a variety of configurations, including free and for a charge. The content of underlying processes, as well, could combine free and for-charge versions. Interestingly, this content would entirely be represented in data, resulting in software "applications" that were entirely made up of data, with no traditional software code required as long as the expressive knowledge model were used. Payment systems could well be designed to incorporate both models

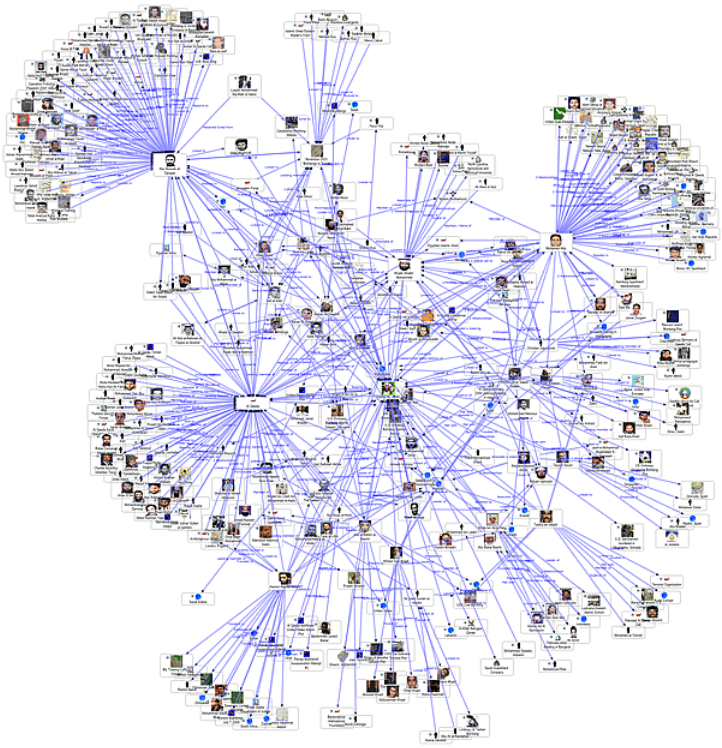
where considered appropriate by providers and others based on commercial and clinical considerations.

There may be resistance to the idea of full empowerment of communities by members of the open source community as there has been in the past with commercial providers.

Prospects for CASE 3: New Zealand Whānau Ora Initiative

Given the importance of context in the culture of the Māori and the need to support complexity in human services in general, capacity building among community participants in the *Whānau Ora Initiative*, capacity building efforts promoting fluidity would be timely and useful. Castells makes interesting comments about the prospects for empowerment of this kind:

> Under informationalism, the generation of wealth, the exercise, of power, and the creation of cultural codes came to depend on the technological capacity of societies and individuals, with information technology as the core of this capacity. ***Information technology became the indispensable tool for the effective implementation of processes of socio-economic restructuring***. Particularly important was its role in allowing the development of networking as a dynamic, self-expanding form of organization of human activity. The prevailing, networking logic transforms all domains of social and economic life (Castells, 1998, pp. 336-337).



The *Initiative* has a broad mandate, striving for "access to societal institutions and opportunities at home and abroad" (Taskforce…, p. 4). With full empowerment, the preferences of natural leaders among the Māori, within the "whānau, hapū and iwi" [family structures] (Taskforce…, p. 19) can be called upon to develop a sophisticated environment in which Māori culture is reflected in great detail. ***Genealogical structures (which are, after all, trees) can be integrated with codes of conduct in the context of desired behaviors and intergenerational values (p. 26) as well as well as coherent service delivery (p. 19) from Māori and non- Māori providers***. Supporting complex contracting arrangements can be supported through applying context targeting and semantic pull – both in clinical and billing tasks (p. 27).

As Castells further describes, the capacity for integration between social and other factors using technology is substantial:

> Because informationalism is based on the technology of knowledge and information, there is an especially close linkage between culture and productive forces, between spirit and matter, in the informational mode of development. It follows that we should expect the emergence of historically new forms of social interaction, social control, and social change (1996, p. 18).

The commitment of the community to correct outcomes, given these critical areas of knowledge, is important in order to continually improve such a system. The advantage here, with full empowerment, is the ability to control various appropriate technologies without a need to become technologists.

> What characterizes the current technological revolution is not the centrality of knowledge and information, but the application of such knowledge and information to knowledge generation and information processing/communication devices, in a cumulative feedback loop between innovation and the uses of innovation… Users and doers and doers may become the same (1996, p. 32).

Of course, the question must be asked as to the desirability of computerizing important social processes and structures. Security of such information may be a matter of concern. Protection of intellectual property may also be a consideration. Castells considers the requirements of an environment where tacit knowledge is thus shared. Though he makes reference to a “firm” and a “company”, the issues are largely the same with regard to sharing valuable knowledge in a community setting.

> In an economic system where innovation is critical, the organizational ability to increase its sources from all forms of knowledge becomes the foundation of the innovative firm. This organizational process, however, requires the full participation of workers in the innovation process, so that they do not keep their tacit knowledge solely for their own benefit. It also requires stability of the labor force in the company, because only then does it become rational for the individual to transfer his/her knowledge to the company, and for the company to diffuse explicit knowledge among its workers (1996, p. 160).

What I would propose in this light is for the *Whānau Ora Trust* to control server machines for the main – or to contract for hosting services from a trusted source. In the design environment, access to trees can be limited to certain users so that they cannot have access to the work of others. Some program enhancement is needed to accomplish additional security and access features, but the issues are quite self-contained. I have written about substantial security improvements that can result from use of the generative taxonomy model (Tingey, 2009).

One additional suggestion would be to use Māori terms and phrases for the underlying keys in the system. This would allow for more precise usage of the Māori language and extend the design process to individuals that are more comfortable with Māori than English or other languages.

Full empowerment within the *Whānau Ora Initiative* would enhance options for integration of the general community of providers, support of the requirements of small and medium enterprises that may be accepted into the community, and provide a standardized platform for negotiating, collecting, and continually evaluating outcomes and measures. On the design side, this would encourage greater connectedness. For users of the system the flow of the system, as made possible through full empowerment of community leaders and providers, would also bring a higher degree of integration and connectedness (Taskforce…, p. 46).

The end result would be achievement of the holistic objective of the program. An individual working with the combined system, as a result of fluidity and full empowerment, would enjoy an expansion of his or her skills and abilities (Taskforce…, p. 46), making it unnecessary to bring large numbers of people together except where specifically required by whānau tradition, medical or scientific necessity, or other necessary purpose.

Prospects: Other National Communities

Helping to support the human service needs of individuals, families, and communities in a national setting is not a new proposition. Such services are a fundamental rationale for government based on many political and philosophical perspectives throughout the modern era as well as in ancient times. Persons experienced in the various aspects of human service issues can likely collaborate, but complexity on all fronts can limit the effectiveness of in-person assistance alone. In the face of significant efforts on all levels to establish more conclusive approaches to the needs of persons and families, such solutions fail to present themselves. There are many reasons for this, not the least of which is the availability of only limited resources. Empowerment of participants within human service communities supersedes financial and resource limitations alone, however. There are cognitive and collaborative limitations that constrict communications among researchers, providers, persons needed services, and their nurturing and support groups. Of course, there are also typically

institutional barriers to communication and collaboration, though these can at times be traced to cognitive barriers and incompatible systems structures.

Prospects: International Communities

Many kinds of knowledge know no borders, of course. Context is of critical importance within administrative regions and ethnic and cultural differences are substantial around the world – what constitutes the law and established practice in one region can be totally inappropriate elsewhere. Nonetheless, scientific realities apply in many categories related to human services and health. Across-border collaboration through integrated tree links between communities can prove beneficial to designers as well as users of knowledge. As national systems are developed, international collaboration becomes more and more beneficial.

National Level of Activity

Although I am a fervent believer in the work of Castells and the importance of his message, he does miss this point when it comes to empowerment. True empowerment of non-technical communities has yet to occur, though he seems to have already announced their arrival. We have yet to see the kinds of beneficial effects as will occur with full empowerment of community leaders and members. Though much of what Castells has said is valid and true, technology has not been shown to support complexity and nuanced response to the needs of individuals and of organizations. Must disempowerment has resulted from the expansion of the kinds of information technologies as have been directed at organizations in particular.

My twenty years of experience in the promotion of fully-empowered communities have brought me to a firm understanding that the process requires support and collaboration at the national government level.
There are two reasons for this.

1. ***Technology integration*** necessary to provide for full empowerment of subject matter experts and authorities **must have unquestioned support**.
2. ***Organizational and cultural challenges*** to empowerment of this kind ***are substantial***. There is no direct precedent for these kinds of organizational and community breakthroughs in the current environment in any culture.

My doctoral studies and subsequent research over the past ten years – more than just my dissertation – have centered on these two issues. They are interrelated, but

they represent different kinds of problems with different groundings. I have experienced successes and failures on both counts and am aware of Dell Allen's similar successes and failures in his earlier efforts.

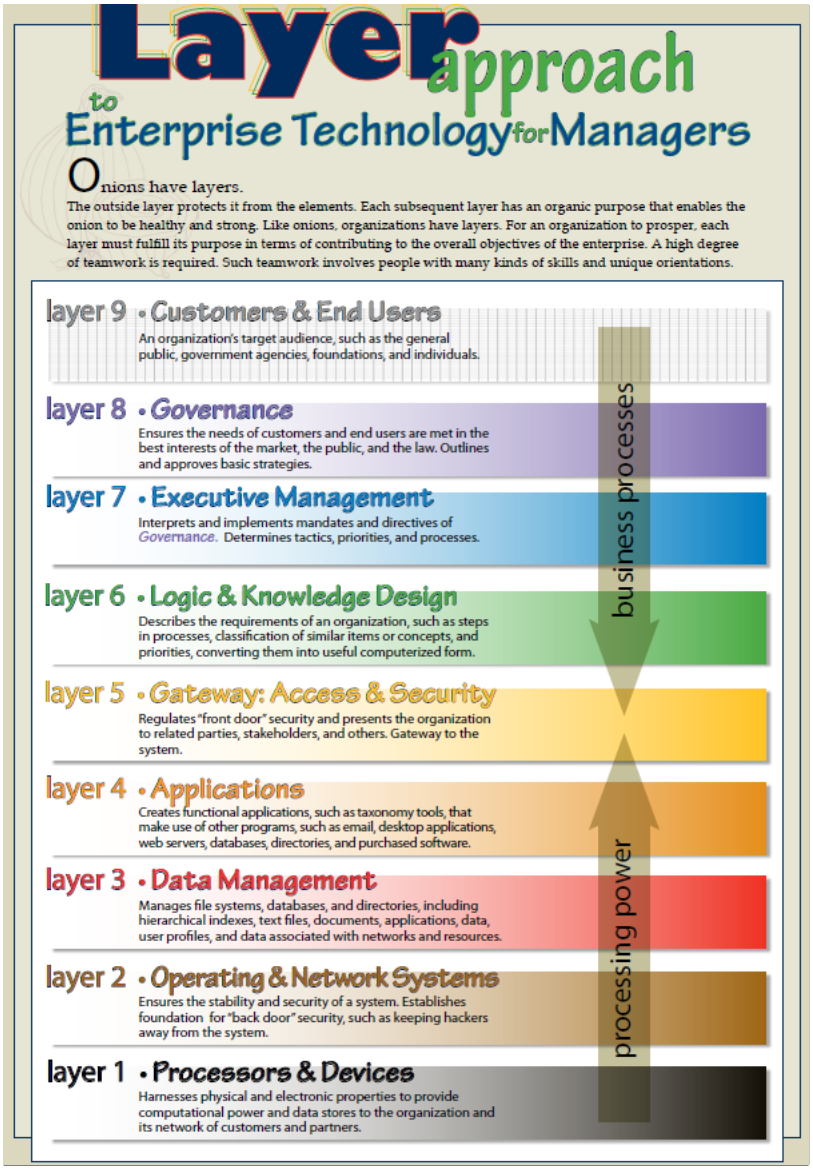
The Layered Model

Over this period, I have developed an implementation model that ties these two issues together in a manner that can be understood by organization and community leaders. The model has proven to be useful in an organizational setting. I have taken care to be respectful of individuals and aware of professional and technical requirements in development and documentation of the model. I will explain the model at this point so that it can be used in discussion of the two main implementation challenges to be faced in the process of achieving full empowerment of human service communities.

Understanding Layers as the Basis for Community System

As can be seen in the following *Figure*, the Layer Approach is a vertical model with two directional arrows – one point down and the other up. The down-pointing arrow represents what I have called "business processes", a common reference to the logical requirements of the organization or community. The point here is that business processes as designed to meet the needs of customers and end users are the activities that legitimate the entire community and its various organizations. The arrow pointing up represents the processing power of available technology. The point of the exercise is to maximize the use of available processing power to meet the needs of the customers/end users.

The nine layers in question represent communities and available resources at each level to match functionality with the objectives of the firm/community as outlined by authorities at Layer 8, the *Governance Layer*. Borrowing from a tradition of the U.S. Navy to color code aircraft carrier personnel, each of the layers is color coordinated to clarify any implementation issue and readily identify it. Issues are to be assigned to the appropriate layer and dealt with personnel that are qualified to function in related areas using technologies that apply to that layer. Each is considered in the *Figure* and in the next section.



9. Objective: customer/client gets ***exactly*** what wants/needs

8. Governors ***set the agenda*** and ***make appropriate technology available*** (HPT)

7. ***Conclusive plans*** organized with modeling/ computerization confidence

6. ***Exists for documents, not processes***
capacity-building needed

5. Web-based tools | gateway to system look & feel | front door security

4. Basic applications | some "hard coded" functionality (ERP)

3. Databases & directories | fluidity & complexity require simplicity (Big E, little e)

2. Basically Linux/UNIX vs. Windows Apple is in UNIX camp

1. This layer is quite stable commercially 32 vs 64 bit | cloud computing

Figure. Layered approach to technology for enterprises/communities

Specific Recommendations for Managing Layers

Layer issues, of course, can be considered either in a "bottom up" or a "top down" manner. I have chosen the latter, as provides for a more direct focus on the needs of the enterprise or community.

Layer 9 – Customers and End Users. The point of the system, the community, is to meet the needs of these people as easily and effortlessly as possible. Everything else is subordinate to this objective. All research, all development, all decision and design activity should keep this dictum in mind. They shouldn't be passed from "pillar to post" and force into the problem sets of providers and their agents. I have done a good deal of work in this area, learning of existing models and bringing existing models together. This work is memorialized in *Dual Control* (Tingey, 1999/2008) and *Methods-Based Management* (Tingey, 2009). I am working on an additional book, *The Angels Are in the Details* (in process) that covers additional information in this regard.

Layer 8 – Governance. With some colleagues, I engaged in a research project with regard to enterprise computing requirements in which we coined the phrase "High-Profile Technology" or "HPT" (Paper, Tingey & Mok, 2003). HPT, as it turns out, is an extremely powerful concept, but it conveys a paradox. The governors of an organization must set the environment for all things in the organization – direction and guidance above all. As to technical matters, such individuals either know "too little" or "too much" about technology. If they know too little, they tend to defer to the others in technical matters. Those that know "too much" have knowledge of the historical "non empowerment" model, which holds sway, but which is not supported in any way in the science or practice.

This is a vexing challenge. Though there is unquestionably strong science in the lower technology layers – Layer 1 in particular – the concept of organizational and community empowerment via computerization as is prevalent in the market and the relevant literatures is based on an untested assumption – the logic representation need be complex *per se*. What follows in the established practice is that such complexity relegates logic and knowledge management to technicians, not subject matter experts and other non-technicians. In twenty years of searching, I have found no support for this proposition. I have found about ten references to related concepts, in passing, but no investigative programs, no studies even addressing the issue, and no product development efforts with this goal in mind.

In fact, I made three attempts to get a study published on the subject with a leading information systems journal, a major management journal, and a major organizational theory journal. None would even review the work. Each pointed to one or another of the other disciplines as a more appropriate vehicle for such a study (Tingey, 2009).

Castells failed to capture the essence of this dilemma, though he did make reference to some aspects of the problem. A board of directors, all things being equal, is largely held captive by popularity. Given that the prevailing model for organizational computerization does not incorporate the concept of fluidity and full empowerment, the Layer 6 issue, non-technician directors must take a leap of faith to counter the will of technically-savvy directors that are misinformed. This is a major reason that I believe that support at the national level is needed at this stage. Directors need to have viable assistance in declaring approaches such in order to achieve full empowerment. HPT as per the market assumes *dis*empowerment of management. Please see the section *History Leading to Development of the Layer Model* for examples of such problems from my experience.

Layer 7 – Executive Management. The lack of fluidity in the several decades of computer usage has resulted in a denatured form of management that cannot presume to break through the digital barrier. As discussed earlier in this *White Paper*, such managers will not have had experience in the digital expression of their ideas. They will find it very difficult to justify extensive abstract reasoning with regard to the operations of their organizations and communities. In their experience, they will have seen such work regularly watered down and simplified or arbitrarily changed without reason.

Of course, all managers face the option of learning to program and to use other logic design tools. The problem with such a strategy to gain control of Castells' "switches" is two-fold.

1. The time required to learn such models – measured in years – is such that once you have learned them, you have lost your "edge" in your fundamental areas of knowledge.

2. Computer programming models create poor representations of human knowledge. Context is not well-preserved, as outlined earlier. There is little semantic power in the resulting product, making integration with other applications and processes problematic.

Such programming languages function well in a machine-to-machine environment, but where human logic is involved, they become cumbersome and counter-productive (Gabriel, 1991, 1996; Petzold, 1999).

The disempowerment of management – particularly problematic in our networked era – has levied significant burdens on organizations that contribute to our current economic malaise. Organizations and communities behave in very sub-part ways that do not reflect knowledge that is readily available. The problem is, in our networked, the switches of power are not in the hands of the appropriate people – experts, managers, and the like – they are in the hands of computer programmers and individuals in organizations and communities that do not have the perspective,

the training, or the legitimate authority to make the decisions in question. Make such switches are simply embedded in compiled computer applications and organizations are unaware of them or unable to correct them.

I met Scott Adams, the creator of the Dilbert cartoon strip, in a week-long technical training session in Menlo Park in 1988. He was funny. He is not funny now. Creative, yes. A great chronicler of our current condition, yes. The problem is that our current condition is fake; it is unneeded. In large part, it is an artifact of this unusual era in which technology runs out of control. Systems force simplistic, misleading, often unwanted solution onto the people of an organization and its related communities and into the public realm. Knowing this, managers are forced to stand on the side without the power to correct the problems created by their own systems. This has a destabilizing effect on the entire organization or community – resulting in the "Dilbert world".

What they need is modeling/computerization confidence, which will compel them to create conclusive solutions based on a through process of abstract thought. Resolving fluidity issues on their own, they can grow to collaborate with others to truly make use of their technologies and networks.

Layer 6 – Logic & Knowledge Design. This layer does exist, though in limited form. People can post documents. They can use email. Many have learned to use to tools to extend their tacit knowledge – conferencing software and the like. Spreadsheets, a 1979 innovation, continue to provide an important bridge between the people of an organization and their data.

There is no tradition of expressive knowledge design, however. This is a substantial problem, one that I have labored over for many years. I have answers to the challenge. They are well-grounded and have shown to work, coming from a wealth of sources. In fact, I make the case in *Methods-Based Management* (Tingey, 2009) that they constitute the foundation for that elusive "scientific approach to management". Comments from this section are principally from that work.

The roots to scientific management are found in the ways that information is processed. This is as true of organizational management as it is to biology. In fact, organizational study is clearly a subdivision of ecological study, though this is not broadly understood. All living things organize in interesting ways. In fact, we should study them, not just to preserve them, but to understand and emulate them. The fact is, they embody the features that we desire, benefitting from rich flows of information on a scale that is overwhelming to us. Typically, we do not make the connection. Our approach to systems is to simplify – largely in tune with our approach to science. We simplify. Factor analysis, for example, is a way of taking a dense set of data and simplifying it down to a few aggregated concepts. That has some benefit. We have carried such analysis on too far. We should try to learn to

understand complexity. I have joined and participated in the International *Network for Social Network Analysis* for this reason.

Still, more is needed to stimulate and support the development of Layer 6. That is the example of music – the entire music production model and related cultures and expectation levels. There is a section devoted to this later in the *White Paper*.

Layer 5 – Gateway: Access & Security. I will not belabor the point with this layer. I write about the difference between "front door" security and "back door" security. We have unnecessary security issues because we do not distinguish between the two. Management should be able to determine who comes through the front door (adjudicated by trees and fluidity). The system should be tight as a drum otherwise – minimal ports, maximal encryption, etc. Much of the security problem is in a tradition of "looseness" between the layers brought on by vendors that attempt to "run the table" by providing layers one through five as a "packaged deal". They ultimately cannot do it (given the unique requirements of the particular community or organization), so the system starts getting holes punched in it to meet other perceived needs. This introduces security risks.

Layer 5 is also the place to consider tasteful, functional web sites and design issues.

Layer 4 – Applications. Layer four is a highly-charged battle ground. Though there are issues with respect to fluidity from other technical layers (one to five in particular), this is the most critical technical layer where fluidity is concerned. For one thing, there needs to be an application environment at layer four that that will support the design and use of trees.

The usefulness of some of the applications is without question. For example, email has become standard equipment. Desktop applications are widely proven. Multimedia applications are beneficial, as are generic work environments that are designed for certain kinds of work, including education, entertainment, collaboration, and the various commercial functions – prospecting, sales, production, distribution, accounting, human resources, administration, etc. The latter have become known as enterprise requirements planning (ERP) packages.

The question with regard to full empowerment and fluidity is the degree to which functionality is to be provided at layer four as opposed to layer 6. Given the objective of full empowerment, the trend is to move functionality to layer 6 from layer 4. The fact is, where complexity is evident, layer 4 will not suffice in the first place. ERP installations do not ascribe to the kind of complexity and richness that full empowerment would provide (Grant, Harley & Wright, 2006). The object is to promote an environment in which layer 4 configurations do not constrict or limit functionality at layer 6.

In this, we are discussing power. Not just computer processing power, but manifestation of organizational power in general. To the extent that complexity, richness, and conclusiveness are lost at layer 6, the mission of the organization and its communities is constricted. To overcome such an outcome, all of the forces for fluidity must be brought to bear on issues with respect to layer 4 and, in association, level 3, which is related in this sense. The fundamental challenge is that many ERP implementations have traditionally been made at the governance layer, examples of High Profile Technology that have had a negative impact on fluidity – empowerment of internal information technologists functioning at the various layers as well as management has thus suffered (Light & Wagner, 2006).

I do not intend to provide a full review of ERP issues at this point, nor provide a complete history of that phenomenon vis-à-vis the idea of full community empowerment. Suffice it to say that they represent the opposite ends of the spectrum, philosophically-speaking (Wailgum, 2009). The ERP approach is intended to give an organization a complete solution, though without the particular details of how you do business. In some cases, ERP systems literally deny client organizations the ability to modify software code or access the underlying database directly.

The generative taxonomy approach is to provide an environment for a community of collaborators from a variety of organizations to design a system that will do exactly what is wanted without imposing *any* processes or procedures on you. Though philosophically different, the two concepts are not altogether incompatible – with one caveat. As outlined in the section on layer three, the data layer, ERP systems tend to make use of very complex data structures. In this, I mean *very* complex data structures – hundreds and in some cases thousands of data tables. This alone can make fluidity difficult to achieve.

Largely due to market limitations and the reaction of important organizations to limited commercial responsiveness to the needs of organizations, we live in a period characterized by many software options that do not levy a direct cost, free or open source software – as discussed earlier. Use of such software can be very beneficial in the development of a system characterized by fluidity and full empowerment. The generative taxonomy software that I use, for example, is Java-based software package that I have been overseeing development of for years. Open source ERP or enterprise software packages that support generic transactions and other basic systems requirements are available. Use of open source solutions, such as Apache and any other community-based software projects can be very helpful. Support continued development of the generative taxonomy software is important. Such a project will need to be integrated into a full empowerment program as outlined herein.

At the National Clearinghouse of Rehabilitation Training Materials at Utah State University, I architected and built – and now manage a seven-server infrastructure

in a virtual environment that incorporates the basic application software philosophies outlined in this section.

Layer 3 – Data Management. I have put a good deal of effort into configurations and issues related to this layer. The point is to use the best available technology to deal with the tree major data structures:

1. Relational data to support most of what applications do.
2. Directory-based data to support information about people and their access rights.
3. File system data that can be used to house individual files and other forms of static data.

Two leading researchers laid out the groundwork for this. The first is Sorter (1969), who started the event accounting literature. The second is Codd (1970). Sorter stated that there are “many and varied uses of accounting data” and it is “impossible to specify input values that are optimal for the wide range of possible uses” and that “for each specified use different users utilize a wide range of different decision models, that they have so far been unable to describe, define, or specify”. He indicates that traditional systems have been “unnecessarily restrictive”. Sorter’s reference to “unknown and perhaps unknowable decision models” (Sorter, p. 13) is in line with the concept of full empowerment. How could a database architect anticipate the knowledge products of individuals from many fields, with untold levels of knowledge and understanding?

File systems are hierarchical indexes designed to assist us to organize and to understand how data on a computer’s hard drives is arranged. Data isn't actually organized according to how the file system looks, but file systems are handy indexes to actual locations which are arranged and partitioned at a level that users are not expected to understand or care about. By organizing and following tree-based structures, users and systems administrators can save a good deal of time and manage data in the form of text files, formatted documents, and functional applications. Data stored in file systems are typically explicit in nature, each body of work housed in separate files. File system storage typically does not benefit from indexing and structuring that would support high volume and complex computation.

Databases provide means of organizing numbers, text, and symbolic data in a variety of formats, including multimedia assets and documents. The object of database use is to support high levels of activity with sophisticated indexing and computation. There is a constant tug-of-war in the database world between clarity and complexity in support of these functions. An important objective of the task is to provide for dual use of data where possible to support processes that correspond with the taxonomies and security structures of the firm, but that are beyond the

scope of database design. Though originators of relational database models intended for clarity to result from use of their concepts, we now experience database structures of breathtaking complexity – with hundreds, even thousands of tables or data arrays that incorporate complexity, but with unfathomable structural bulk. This overwhelming complexity was not foreseen by Codd, who said, “Future users of large data banks must be protected from having to know how the data is organized in the machine (the internal representation).” Databases make use of query languages to access data. The most popular of these is a standard called Structured Query Language, or SQL.

In fact, at one time, I submitted a patent application for an enterprise database structure in harmony with the generative taxonomy approach. The patent was not later pursued for reasons other than its potential validity. The patent incorporated a very simple data structure that could be used to support any level of complexity (Tingey, 2002/2004). I designed them to support the objectives outlined by both Sorter and Codd. I refer to this work as the “Big E, little e” event accounting approach. The data structures incorporate generative taxonomy (tree) structures as well as traditional ERP functions.

Directories also play a part in the data structures of an organization. Specifically, they record profiles of users and other data, mostly associated with networks and control of resources. While database data essentially points “up” to the needs of the enterprise, directory data points “down” to encryption and control of system resources. Directories are critically important to employing both “front door” and “back door” security. The LDAP standard for directories, developed at the University of Michigan with federal funding, is a fundamental element of Grid Computing, the next generation Internet/ supercomputer standard being developed with major sponsorship by NSF and IBM. Google, Yahoo, and Amazon have significant commitments in this area as well, providing computational capacity as well as database and directory resources on a grand scale. This development is widely referred to, as mentioned earlier, as “cloud computing”.

Layer 2 – Operating and Network Systems. The options here, other than for mainframe usage, are Linux and Windows. My experience is that Windows has more “hooks” into other layers that may compromise the integrity of each layer. My preference is to use Linux, given its openness and robustness that it inherited from UNIX, which I used with my software company through the 1990s. The same options are typically available with cloud services.

Layer 1 – Processors and Devices. Though I hold science in question as applied to the logic needs of organizations and individuals, there is little question that science as applied to the functions of computers and other electronic devices is well-defined. Nonetheless, the acquisition and use of hardware platforms is not without some challenges. For servers, though, the availability of 64 bit systems that support both Linux and Window provides good, stable options. The key is to have sufficient

resources and a stable environment that does not compromise the functionality of the other layers.

History Leading to Development of the Layer Model

I have included a short history of my activities as an enterprise software entrepreneur in the 1990s to provide perspective with regard to the layers model. For most of the 1990s, I oversaw the activities of a software development firm that I founded early in the decade. I learned of the activities of Dell Allen early in that time-frame and although the main thrust of the business was only partially related, I spent a good deal of effort to learn of the implications of what I now call fluidity and to introduce related concepts into my work. As I grew to understand an additional concept, I wrote a white paper on the subject and circulated it to a small group of people. Once I had written nine of them, I decided to publish them as a book. I subsequently revised the book and added reference links and study questions for each chapter. The book is referred to as *Dual Control* (Tingey, 1999/2008).

In 1997, I took out a technology license with Brigham Young University (BYU) for what they referred to as DCLASS, the basis for software that Dell Allen and others had developed there – the tree-based knowledge model. Then, I engaged in the project with Idaho National Laboratory (INL) referred to on pages 5 and 6 in this document. Encouraged by the success of that project, I entered into a joint venture with INL to extend the software to commercial firms – both with the application they had developed for work order management using the trees and with the trees themselves.

I started marketing the products locally to other national laboratories and large environmental firms that conceivably could use the INL product. When I talked with management of such companies about “empowerment” issues, they immediately referred the issue to their computer departments. The general response there to the idea of fluidity was typically open-mouthed shock. *How could [I] presume to think that their people could design their own systems?* The response was a combination of disbelief and fear. *If they can design their own system, why do they need me?*

My response was that if they could design applications that were more relevant, they would use their systems more. Hence, they would need to put more resources into their computer infrastructure. It was not a winning argument. By the same token, the managers did not want to be empowered. In their minds, empowerment meant becoming technicians – becoming computer “geeks”. This also was not a winning argument.

My response was to elevate the conversation from rank-and-file computer technicians to business development departments of major information technology companies. Having a finance background, I contracted with an investment bank in New York, which helped me to promote the innovation to the thirty-five largest information technology companies in the world – all famous firms. In 1998 and early

1999, for six months, we marketed the software very aggressively, the investment banking representative and I. We sent materials. We provided demonstration CDs. We talked on the phone. Our object was to arrange demonstrations to show how fluidity works and to describe its benefits (of course, I hadn't come up with that name yet, but we described it using terms that were pretty clear). I did everything I could to trace down contacts from Dell Allen's activity at BYU, but only found one who was insightful and helpful. He announced his retirement, though, soon after we had established contact.

After all of that effort, we got basically no response. None of the major information technology business development managers wanted to meet with us. They similarly did not want proof of concept. I flew from Utah to Boston to meet with one group, but once I got there, it was clear that they only agreed to meet as a favor for the bank representative.

About the same time, we found ourselves competing more directly on our principal product line with a new phenomenon called *Enterprise Resource* Planning (ERP) software companies. They were promoting their software with the idea of resolving the Year 200 problem as well as providing a fully integrated database environment supported by a very complex set of personal computer software. The idea was also to get out of using character-based computer terminals in favor of graphical personal computers.

We found the point of this phenomenon to be quite the opposite from our efforts at introducing fluidity and empowerment to organizations. We were talking about empowerment of managers and of experts. Under the prevalent ERP model, *even the computer departments of companies became disempowered*. The systems were not to be modified or customized in any way. They were so complex as to be beyond the understanding of any one individual. One contact of mine at a large university, an individual with decades of experience and multiple academic degrees in accounting and systems, indicated that after having attended six months of training courses for a large ERP system "he was starting to understand it". I remember thinking, "What could possibly justify a level of complexity that would be beyond the comprehension of someone with such a background? It certainly couldn't come from the business model."

We were caught sailing directly into a headwind spurred on by the hubris of the technology community. Our main regional competition for our enterprise system software/ERP standpoint was with PeopleSoft, now part of Oracle, and SAP. We thought we had made major inroads with our system and a major local university until the head purchasing manager of the school opened a large binder in front of me and told me to look at why they were going with one of the ERP systems even though they knew that proper functionality did not yet exist. I found myself looking at the software company's stock price chart.

This state of affairs is what brought me to the university for doctoral studies and research experience.

Building the Elusive "Green" Layer Six – the Seedbed for Full Empowerment

The search for fluidity is a fundamental act of affirmation for an organization and a community. On top of the level of concentration and mental work required by abstract thought and the newness of the process, there is little question but that many providers of computing technologies in the current environment are not pleased with the prospect of empowered users as contemplated in this paper.

The Nature of the Work

Thinking in the abstract is difficult. Fortunately there are tools, largely qualitative research tools, to help in this regard. There is no way to get around the fact, however, that it is difficult work. Designing tree-based structures, though based on an understanding of only five concepts, guides people through a comprehensive thought process that actually helps them to understand the subjects at hand better. For example, I did a nine-month project to design trees in an area that I understood well and I discovered many opportunities that had not been thought of before – by me or anyone else. This is due to the didactic way in which generative taxonomy development walks you through the thought process.

Such projects should be viewed as comparable to building a building – as the projects are not dissimilar in the required time frame to accomplish truly meaningful outcomes and in the need for patience as the work project takes shape. Similar to the building, though, once a domain of knowledge has been fully mapped out (one of the major findings from Dell Allen's work is that no taxonomy is infinite), a fantastic slice of knowledge and practice is available that can be maintained with a minimum of effort.

I use music and the music production model as an example of how full empowerment can be achieved. There are many parallels between music production and the use of trees to achieve conclusiveness. What composers do is similar. Performers – and how they collaborate and cooperate – is very similar. The function of musical notation – and the scientific groundings of the musical model upon which notation is based – is very similar. I haven't included the basic proof of trees here, but it is very straightforward, based as it is on Aristotle's "if p, then q" structure.

I have put information on the musical model vis-à-vis fluidity efforts on line: http://profundities.info/DualControl.

Balance between Process and Prerogative

There are related issues in achieving a balance between tree-based models – where issues are considered and documented in the abstract – and actual provision of services – where there is a client in the room or online that needs direct help. I refer to the tree approach as the "process" approach. The prerogative approach is considered in this section. Some balance between the two is desirable, of course.

Establishing an environment capable of supporting fluidity and full empowerment depends on maintenance of a crucial balance between forces of the here and now and preplanned considerations in the abstract. Perhaps the client is alone using a form of technology or is in the presence of one or more members of his or her nurturing or service groups. Perhaps they are considering the client's case where he or she is not present. Either way, current concerns must be combined with abstract knowledge for maximal outcomes to be achieved. Either environment can impose complexity on the other, but should do so gently so that the other can reasonably consider the options and provide valuable information to be considered by the other group. Ultimately, a general balance or equilibrium between the two can be achieved in each context that is capable of supporting current concerns while embracing important changes.

Research in conjunction with members of a human services agency uncovered a critically important concept, one that I consider paramount to the successful development of fully-empowered communities of practice (Tingey, Millington, and Graham, 2007). Absent a studied understanding of this condition coupled with an effective means of balancing related issues, empowerment of a community of practice is severely hampered if not impossible (Tingey, 2009).

In spite Castells' (1996) declaration of the conquest by electronically-mediated networks of all else, much of the work of organizations, including human service organizations, is managed geographically. In part, this is the case due to the extended geography that exists in most regimes. Though communications technologies – telephones, computer networks, etc. – have substantially reduced limitations of space and time as described by Castells, human service organizations tend to continue to be organized geographically. Programs have been designed to provide professional opportunities to service workers based on certain academic and certification credentials, building their stores of tacit knowledge. Hired to work in geographically dispersed settings, they have

traditionally been supervised locally and local offices establish their own protocols and preferences.

Though human service workers' efforts to continue to educate themselves are supported – indeed, for certification, continued training is required – much of the work is locally directed and evaluated. Individuals in authoritative positions functioning in such structures are not necessarily open to the idea of outside influences in the ways that their subordinates function in "their" offices. This is a leadership issue, a human resources issue, a generational issue, a life-or-death consideration with regard to empowerment of a community.

We found that though senior regional administrators were open to the idea of community empowerment and more effective use of technology, they enjoyed their positions of power and found great satisfaction with their ability to exercise personal, or executive, prerogative in their geographic regions. They were suspicious of the idea of general processes that would be driven by the nature of a person's problem, be it medical, cognitive, social, or otherwise. Simplification of a person's conditions was the norm. In this sense, complexity *per se* was considered to be the problem.

Clearly, a program to enlist the understanding and support of regional leaders of community empowerment plans is warranted. Depending on the nature of the community in question and the kind of challenges faced in meeting its objectives, the problem may or may not present itself. The *Methods-Based Management (*2009) approach is designed to consider and to provide scientifically-grounded methods to achieve such objectives including consideration of a "dual control" model to help find a balance between prerogative and process (Tingey, 1999/2008), but I will not consider them in greater detail at this time. I will not elaborate on the issue here, but I do in the book.

Nature of FENCom Proposition for Human Services

Discussion of Objectives and Resources

I am interested in and available for consultation and project development in this area. Projects could include capacity building efforts, software development, and additional systems integration activities. Additional research efforts would also be appropriate.

The Abilities Project

Stimulated by work by Dell Allen, I am collaborating with him and others to rectify a vexing challenged that lies at the heart of human services, the understanding and assessment of an individual's abilities. We are referring to the project as the Allen, Tingey, Farnes, Millington (ATFM) Abilities Model (Tingey, Kundu, 2010). We are in the process of evaluating existing abilities research to establish a comprehensive

model, associated with assessment instruments. This work could be a part of a comprehensive support module. Currently it identifies approximately 200 abilities in seven categories.

The CAMEO Project

The CAMEO Project stands for *Comprehensive Approach for Maximizing Employment Outcomes*. The model is designed to make use of and to complement the ATFM Abilities Model. As outlined in the U.S. Rehabilitation Act of 1973, the CAMEO approach is intended as a means of maximizing employment outcomes for all, including those with identifiable employment-related disabilities (Tingey, Kundu, 2010).

Music as Enabling Mechanism

Given the dual challenges in developing a fully-empowered community – the difficulty of the work and the lack of a history in fluidity and full empowerment – an active musical activity in support of tree design efforts is important. Many concerts should be available – no matter the genre. Discussion with the musicians is helpful. The same goes for interactions with composers, conductors and others. The musical performance model provides conclusive proof that people can collaborate on a much higher level than is typical in our day. It is also an example of how such organizational cooperation can be achieved.

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