

*EarthCube Governance Whitepaper:
Realizing expectable returns on EarthCube investments in community building and democratic gov-
ernance.*

Bruce Caron, PhD

bruce@nmri.org

New Media Research Institute, Santa Barbara, CA

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What follows is a white paper pressed mainly from some years of reflections on the Cybersocialstructure blog (<http://cybersocialstructure.org>).

1. The “goods” of community-based governance

One of the first conversations I have with people who have been tasked to build or manage a virtual organization centers on the cost/benefit issues of democratic governance. Given the usual shortage of funding and time, they have real concerns about the effort required to build a community-based governance system. These concerns are usually layered on top of the more general concern that the community (or rather, certain activists within the community) may use the governance system to push the organization's goals toward their own interests.

Certainly, democratic governance increases the overhead (in terms of time and effort) spent on governance. Top-down decision making can be quite efficient up to the point where it tends to fail rather abruptly. Democratic governance is also more prone to being gamed by people with time and interest to do so. This is where the community comes in to play. When you build in enough democracy to give the community the opportunity to really govern, it will tend to resist the efforts of certain individuals to subvert this opportunity. This is one of the goods that democracy delivers to your VO. An excellent example of successful democratic governance is the Federation of Earth Science Information Partners (ESIPFed.org); funded originally by NASA, its members spent several months creating a constitution and bylaws and then voting themselves into a position of owning the governance and the activities that the association promoted. After more than a decade, ESIP is going strong and still run democratically through voting by the entire membership.

What are the goods that democracy provides for EarthCube? What does this do that EarthCube cannot do without committing to this type of governance? There are two types of goods (positive, valuable results) that democracy creates within any VO. The first type are community building goods. Democracy is central to your ability to build a community for your VO. The second type are decision support goods. These help align your decision making effort with the goals and vision of the community, and improve buy-in by the community.

The main community-building good you achieve by promoting democratic governance is inclusiveness. The divide between the funded VO team and its larger collection of stakeholders disappears. Governance provides the means for a wide variety of voices to be recognized. This encourages more participation (and more participants) building the size and the depth of community for your VO. The next community-building good is that of popular control. Popular control over your VO establishes the means for the community to have a say not only as an afterthought (e.g., a survey), but on matters as central as budgets and goals. The community is given real ownership over the VO's efforts. This is the hallmark of any authentically “community-based” or “community-led” VO. Until your VO has achieved this level of community governance, your efforts to build a community will be met by a wall of indifference. Developing the means for community-based control of your VO breaks down this wall and builds the foundation for real community growth.

Decision support goods can also be expected from your democratic governance efforts. Once the community is fully involved you receive the benefits of their considered judgements. The whole point of your VO is to engage with larger numbers of people with expertise. Why not put this expertise to good use? Give intelligent people the reason to and means to reach a considered judgement on an issue of importance to your VO and they will work diligently in this effort. The second decision support good your VO gets is new leadership. Those in the community who have expertise, time, and interest will step up to take positions of authority/responsibility for the work that the community is contributing to the goals of the VO. Find the means to reward these leaders (give them resources to manage and build their reputations within the community) and they will become the levers to take your VO to the next level.

Of course, not all democratic governance efforts are equal. Your VO will need to work to maintain transparency in the governance activities, in part by making the staff fully accountable to the community. Your VO's governance system will need mechanisms to be modified so that it can learn to be more efficient over time.

Using democratic governance to build community is probably the best solution for crafting a virtual organization that can survive its initial funding. There are no half-way democratic forms that will deliver the same goods. And if you decide to forego democracy, or delay democracy while you build your technology, there will likely be a day when the funds run out and you will turn to the “community” and ask them for their support. Good luck with that.

Some background on community building may be useful here. The role of *community* may be the most important and least understood aspect of developing and sustaining technology knowledge sharing activities. Community is two things at the same time. This is the source of no little confusion. First, community represents a social container—it describes the cohort, defines the membership for a group. When one mentions the “Earth science community,” this means there is a population cohort one can point to as a well-defined group. Second, and more interesting here, community also describes a *quality* of interaction within this group, a shared sense of belonging and trust. The *amount* of community in a group determines the level at which individuals will voluntarily support the goals of the group. This second meaning of the term “community” is what people are talking about when they propose to “build community”. Building more “community” into an organization or group gives each member a greater *stake* in the collective goal. A strong sense of this term would require that the group exhibit some intentional organization as a com-

munity and a demonstrable sense of belonging by its members. This “community-sense” meaning describes the emotional aspect that transforms a cohort into something else: into a community.

Community-sense is what Wenger calls the “community element” of what he termed a “community of practice” (Wenger *et al* 2002). The literature on communities of practice (e.g., Wenger *et al* 2002, Lave and Wenger 1991, Wenger 1998, Saint-Onge and Wallace 2003, Hildreth and Kimble 2004, Brown and Duguid 1991) describes how community-sense can be used by a corporation to capture tacit knowledge resources. Rhoten (2003) notes the value of such communities for interdisciplinary work done at universities. Community-sense is also the engine for social capital (Putnam 2000), for shared trust (Fukuyama 1995), shared identity (Marcus 1992), shared intimacy (e.g., friendship) (Giddens 1991), and reputation (Rheingold 2002). On a grander scale, Anderson (1983) uses an “imagined” community to describe national societies, while the Drucker Foundation (Hesselbein, *et al*, 1998) posits that community-sense is the answer to many current social problems.

There is also a more recent and growing literature on community (Koh, *et al* 2002, Smith and Kollock 1999), and community-sense (Blanchard and Marcus 2002) for virtual organizations, on-line networks (Cosley *et al* 2005, Butler *et al* 2007), and weblogs (Broß, Sack and Meinel 2007). Most of these apply some aspect of knowledge management (Finholt, Sproull and Keisler 2002) or social science (e.g., motivation research (Cosley 2005), emotions (Tanner 2005)). The proposed NASA Earth Science Drupal community represents a new, emerging type of community, which might be called a “community of purpose.” Such communities can include virtual organizations enabled by online social networking software and reputation services. These communities are highly democratic, support intentional culture (Caron 2005) and are purpose driven (Hsieh 2010). Clay Shirky (2008) points to slashdot.org as one example.

After some reflections on governance and community building, I will return to discuss the return on investment that EarthCube might expect from these.

2. A look at governance from the member’s perspective.

It is one thing **not** to get paid, that’s part of the deal when you volunteer. You’re getting paid anyhow to work on the projects for which you’ve been contracted by your home institution. If you work in a government lab, or a university, a non-profit, or a commercial lab, your own deliverables come first. In the world of academic research, however, there’s always some reason to look outside your current project to the next project or the next technology that might leverage (or squash) your current work. So, you join the listserves and the professional societies and you pay close attention to the larger picture. That’s why you went to the workshop for this new project that is pushing the envelope on some piece of earth-data technology or standards close to your interests.

At the workshop you were invited to join the “distributed, community-based” research effort. Now there’s an email from someone you don’t remember asking if you can do this or that (can you evaluate the wording on this standard? can you join a teleconference next Thursday?) and you have to decide if the email gets trashed or answered.

When you volunteer to serve on a committee of a virtual organization (VO), your time is still valuable to you and your organization. The last thing you want to do is somebody else’s work for free. What reasons did the VO give for asking you to participate? If you can’t remember, the email will go in the trash. Who made the decision to create this standard? If you can’t find out, the

email will go in the trash. You don't mind volunteering, but you need to know how your contribution will be considered and acknowledged. If your child's school asked you to come over on the weekend to help paint the new computer lab, you'd expect the same.

If the virtual organization is going to call you a peer, they should mean this. If you are working among equals, you should have equal access to information about the decision making process and equal input into its practices. If they do the telling and you do the work, your volunteer enthusiasm won't last long.

Adding another listserv, WIKI, or content management system to the mix just ups the overhead without answering the question: what does it mean to be a peer in this peer-based VO? If the answer to this is not provided up front and then maintained with rigor, then your VO is under-governed and you will not have many reasons to pay attention to its demands.

3. Governance must come first

Before they invited you to come to the workshop, the VO should have set up a governance structure that gives you stature in the organization and information on demand. This doesn't mean you can demand access to resources. You can't just cut yourself in for a piece of the grant. But you should be able to follow how the advice you give, or the work you do is used by the core team, and you deserve attribution for your efforts.

All of this can be done through the software services the VO sets up for communication, and the democratic governance practices it adheres to when working with volunteers. Note: the VO might have other practices it uses to demand work from its paid core. Governance and project management practices work together but are not identical. A common mistake is to set up the project management practices and delay governance activities until later. Later is too late.

4. A look at governance from the PI's perspective

You've just gotten a multi-year grant to create a "community-based, collaborative" research VO. Congratulations. Do you know how to recognize "community" within the population you have targeted to collaborate in this effort? Do you know how much and what type of community is sufficient to support your "community-based" effort? If you need to build community, do you know how to do this and when to start? What does it mean to be a "peer" in your peer-based organization? Who gets to initiate teleconferences? How are opinions and criticism handled? What active feedback do you collect? Who gets to see this? In what ways can your peers self-identify with your organization?

At the center of your project, you as PI, and the CoIs, and staff are tasked (and paid) to do work. How much extra (unpaid) work is required to actually move the project along? How are the other people of the organization (advisory committees, workshop participants, developer community members) attached to the work of the core? Why should they contribute their time and expertise?

Your cyberinfrastructure VO has a stated goal of creating a sustainable software service layer to support virtual collaboratories. You need to choose from among four possible software standards to start this effort. How do you make this choice? Why should the final user community agree with you? And what makes that user population a "community"?

5. A look at governance from the funding agency's perspective: ROI

Investments in community building should yield returns that are greater than similar investments in individual efforts. These returns are those available only through community activities, or they may be similar to the returns of individual activities, but multiplied by the presence of community. A well-governed community of purpose will foster active collaboration, data and resource sharing, and broad and diverse participation across institutional and disciplinary boundaries. Active collaboration demands its members' time and attention, trust and sincerity: the same type of involvement that the expert is expected to bring to her home institution. Malone, Laubacher, and Dellarocas (2009) argue that there are three "genetic" motivations for building "collective intelligence": money, love, and glory. Collective intelligence is the first-order deliverable of knowledge sharing. When people share knowledge they create a collective ability to wield this. EarthCube does not have money to offer every community member, and so, other motivations come into play.

In the EarthCube context, "love" is the emotional aspect of creating active engagement with work: work that is self-motivated, or that offers value to a peer group, or that solves puzzles, or that helps a friend or the community (Malone, Laubacher, and Dellarocas 2009). Most theories of engagement point to the *autotelic* (internally motivated) aspect of this engagement (Mitchell 1988, Giamatti 1989, Csikszentmihalyi 1991). Through the use of the online social networking and group collaboration tools, careful attention to proper governance (giving ownership of the network to the community), and the seeding of opportunities for helping and being helped, EarthCube can foster autotelic, active engagement in the tasks being requested from community volunteers. In the EarthCube context, "glory" means reputation. EarthCube could use a broad range of online reputation markers (built into software collaboration services) and community-based opportunities to incentivize individual contributions. Leadership will be acknowledged and skills will also be recognized.

So, what is the predictable ROI for EarthCube supporting successful community building efforts? Why should the NSF take the trouble to build community-based governance? The ROI for investing in community includes the impact of community-based motivations for active knowledge sharing and the expanded scope of work made possible through the community's collective intelligence. The whole becomes greater than its parts. At some point, community can accomplish work that could not be effectively funded in any other way. Wikipedia is the typical example of this. Simply put, EarthCube can expect that community members will be more capable of knowing how to wield collective intelligence effectively to deliver Earth science data and information and to be more motivated to share their resources. At the same time, community members will enjoy new motivations and rewards that add satisfaction to the task of volunteering for EarthCube activities.

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