Open Scientist Handbook • OSH

Open Science needs Online Double-Loop Organizations

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First let's look at community

All of the organizations, the teams, and the networks of science work inside an envelope of community. Community is the container for organizational culture. Commons are governed by and for their community. Learned societies foster community. Agencies fund community (sometimes). So getting a handle on community is a good first step.

The role of community may be the most important, and least understood, aspect of developing and sustaining knowledge-sharing activities. It would not be an understatement to claim that knowledge sharing rests as much on community as it does on technology. To understand why this is so, it is important to understand that community is two things at the same time:

Firstly: community represents a social/cultural container, it describes the cohort, and defines the membership for a group. This is the main way “community” is used and misused.

Note: “community” is not a convenient euphemism for “database.”

Secondly: community also describes the qualities of cultural 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 sense 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.

To make things clear, let's agree on terminology for the following section. The term “community” will be used to describe the social container and “community-sense” to describe the quality of shared belonging and trust within the group. A community is a group where the members share community-sense. A “weak” community is a community where the community-sense is low and a “strong” community is one where community-sense is high.

Community Sense

“Community-sense” is also a term used in social psychology (McMillan and Chavis 1986; Chipeur and Pretty 1999). Community-sense is what Wenger calls the “community element” of a community of practice (Wenger et al. 2002). On the sociology side, community-sense also implies membership and consequent obligations, practical and moral. Community-sense provides the impetus for the informal community sanctions that help prevent “free-riders” from benefiting from the work of the community (Thompson 1993). Community-sense “cascades meaning” (See: teamwork, below) across the community by enabling internal goods: virtues that are expressed through normative practices at various organizational levels (Buckingham and Goodall 2019). Communities are societies that can say “People here do things like this. Come on and join us if you can agree.”

Community-sense is 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. Caron (2003) also notes that communities may not be universally positive in their social consequences (remember Jonestown).

There is also a growing literature on community (Koh, et al. 2002, Smith and Kollock 1999), and community-sense (Blanchard and Marcus 2002) for virtual organizations, online 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)).

Teamwork

Much of the literature on effective *teamwork* also points to shared values and meaning. Community and community-sense act at different levels at the same time in your organization. Your university campus has (one can hope) intentional community-building efforts to promote shared meanings across all of its groups. At this level the meanings/values may be global and broad: “advancing knowledge,” “promoting public literacy,” “enabling the next generation of scientists.” These help to elevate the amount of shared meaning across the organization. You are all in this together. These meanings cascade through the levels of your organization, with each level privileging practices most meaning-full for their work. The main locus of culture and culture sense for you is not the whole organization—although this top layer is important over time—rather it is the group you interact with daily: your team, your lab, your department. Here is where community valorizes (or not) practices of kindness, courage, honesty, and justice (MacIntyre 1984).

“If one wishes to distinguish leadership from management or administration, one can argue that leadership creates and changes cultures, while management and administration act within a culture” (Schein 2010).

Double-loop Governance is the launchpad for open science collaboration

Double-Loop Governance

Supports a Liquid Network Environment

[Steven Johnson](#) [Accessed 1/15/2020], uses the metaphor of “liquid” to describe the optimal network environment to enable innovation (Johnson 2011). “Solid” networks are too stiff to pivot toward “the adjacent possible” where new ideas sprout. “Gas” networks are too chaotic. “In a solid, the opposite happens: the patterns have stability, but they are incapable of change. But a liquid network creates a more promising environment for the system to explore the adjacent possible.” (*Ibid*).

More specifically, liquid networks—and the academy organizations that create these—enable individual researchers and teams to explore the adjacent possible; “When the first market towns emerged in Italy, they didn’t magically create some higher-level group consciousness. They simply widened the pool of minds that could come up with and share good ideas. This is not the wisdom of the crowd, but the wisdom of someone in the crowd. It’s not that the network itself is smart; it’s that the individuals get

smarter because they're connected to the network." (*Ibid*). The room makes everyone smarter; these new everyones make the room smarter. You need to find/build that room. When you do, you use demand sharing to pull the information and knowledge you need right now to move ahead in your research.

The liquid network is another way of talking about network diversity, the optimal mix of strong ties, weak ties, and strangers in direct communication (See: Ruef 2002) that is a key predictor for innovation in the global elsewhere your research can call home. How do you get this home? The most reliable starting place is to build a culture of organizational learning into your organization. Double-loop governance is a durable platform on which to develop liquid networks across the academy, or in your lab or your department, and at your learned society.

"Double-loop" governance is one example of the type of organizational governance you can establish within the open science culture of academy organizations. Here are some ideas and some suggestions as to why you might want to consider this form of governance as the heart of your network, laboratory, department, school, college, university, science funding agency, learned society, scholarly commons, etc.

A double-loop governance system brings the values, the vision, and the underlying assumptions of an organization into an open and transparent decision cycle. Double-loop governance is an application of (and a facilitator for) organizational double-loop learning (Argyris and Schön 1978; [Argyris](#) 1977; Accessed September 15, 2020). As you will see, learning is not just a public good produced by the academy, but a logic that can create open, innovative governance for the academy.

Four practices at the heart of double-loop governance

This sensemaking/decision process is characterized by the following:

1. distributed (shared) participation and control;
2. free and informed choices;
3. public testing of evaluations; and,
4. an ability to manage conflict on the surface of discussion threads.

Members in an organization with double-loop governance have the ability to redirect, refocus, and recommit to the values and the vision of their organization. Double-loop

governance creates actual peers for a peer-to-peer network. Membership is well-defined, and provided with responsibilities and rewards.

Double-loop organizations on the open web tend towards do-ocracies and value contributions over any other kind of clout. Decision-making—to the level of deciding underlying assumptions—is distributed rather than top-down. Contributions to decisions and work toward goals (software code contributions, etc.) can be used to measure the value of members, and to reward their service. The metrics for acquiring merit are ideally well-described and collectively fashioned.

“These studies [of peer communities building software and platforms] describe governance structures grafted over these systems: usually meritocratic—mostly “do-ocracy” (government by those who show up and do the work); heavily consensus oriented (but requiring only rough consensus rather than creating a veto-rich environment of absolute consensus, and only among those who do the work and show up); a substantial degree of irreverence; redundant pathways so as to avoid conclusive decision making; rare use of formal processes; never of law or managerial fiat” (Benkler 2013).

A great example of this is [StackExchange](http://stackexchange.com). Clay Shirky (available at http://archive.org/details/drupalconchi_day2_keynote_clay_shirky), describes how StackExchange uses double-loop governance to engage its members. Double-loop organizations on the web are better able to discover and reward emergent leadership and harvest the long-tail of community participation.

Much of the added value of a double-loop governed organization comes from the quality of interpersonal interactions and shared culture and meaning, the extra amount of available trust, and the additional flexibility that distributed decision making provides. This value does not arrive without additional costs (which are described below). For ventures that are designed to solve a single problem and then end, these costs may not be appropriate. But for academy organizations looking to grow creativity and innovation across decades, the returns on these costs are significant.

A closer look at double-loop governance

The Handbook didn’t invent double-loop governance. So let’s look at the history of this notion. It will not take long before you can start to imagine the activities that will drive new governance practices for your organization. A bit of jargon here. Sorry. Double-loop governance puts into practice what Argyris calls a “Model II style” of “theory-in-

use”. A “theory-in-use” cultural practice describes the actual logic behind actual decisions, as opposed to any announced (but not actually performed) theory. Do not let the terminology trip you up here. Theories *in use* simply describe the way people really make their decisions, even when they claim to have other reasons and rationales.

Theories in use

A “Model II style theory-in-use” cultural practice is characterized by valid information, free and informed choice, and internal commitment (Smith 2001). Model II supports double-loop learning: an ability to question an “organization’s underlying norms, policies and objectives.” (Argyris and Shön 1978; quoted in Smith 2001). This ability—which all nimble online organizations require to keep up with changing codes and capabilities—needs to be established as a cultural goal of the organization. And for this, it needs to be a visible part of the organization’s governance scheme. You’ll find out how to do this very soon.

A Model I “theory-in-use” for Argyris (1982) represents a set of strategies—personal and social—that include: control over the actions and emotions of others, maximize winning among peers, and rationality as an alibi for maintaining the status quo. These strategies activate mostly unexamined (and usually unexaminable) assumptions, creating everyday practices while *actively resisting reflection*. “[I]ndividuals must cover up that they are acting as they are.... In order for a cover-up to work, the cover-up itself must be covered up” (Argyris 2004).

Various experts have described the “covering-up the cover-up” aspect of interpersonal relationships in companies (and universities, etc.). They all point to this as the primary obstacle to any transformative change. Until hidden assumptions (personal and institutional) are revealed and understood, any other changes are temporary and ineffective. Finite-game theorists (such as Carse 1987 and Sinek 2019) describe this situation as a role that the person forgets is only a role; like a stage actor somehow *becoming* the character they play on the stage. In *Leadership and Self-Deception* (2010), this hiding is a fundamental betrayal of the humanity of other workers; a betrayal that puts the leader “in a box” where they can only blame others, and treat them as less-than-human. In sociology this situation describes the unreflective “habitus” (Bourdieu 1990) that individuals acquire from their cultural surroundings. The psychologist Carl Rogers (1961) calls this the “social self” that the child builds to defend them against outside threats.

An individual learns Model I “theory-in-use” strategies and covering-up in childhood—it’s common wherever parenting techniques teach conflict avoidance— and throughout life they become ever more skilled at these strategies. This is one reason why change (personal or organizational) is much more difficult than simply announcing the desire to change. Individuals are skilled at resisting changes; at an active disregard for what they do not wish to know. As Argyris notes, most people caught in Model I excel in “skilled unawareness and skilled incompetence” (2004).

“Skilled incompetence,” Argyris (1986) claims, is why clearly stated plans executed with skill might end up failing to meet their goals. The reason is that the actual, but hidden (with the hiding also hidden) goal has been met: conflict has been avoided, nobody in a position of power got upset, and a whole list of unspoken assumptions remained unnoticed, and their unnoticed condition remained unspoken about.

The stated goal, perhaps a restructuring of the office work, or a whole new way of communicating decisions, never really had a chance. Model I “theory-in-use” strategies promote and enable only a single loop of learning. Basically your organization continues to get better at incompetence, to excel in unawareness. There is change possible in this loop, as long as this change supports emotional control, opportunities for winning inside the loop, and a default to reasonableness. Over time, change can be visible. Take a look at the Ford Thunderbird image below.

What 24 years of single-loop learning did to the Ford Thunderbird

1955

1979

How much skilled incompetence is visible here?

Single Loop Management

Model I “theory-in-use”-based organizational management provides a single loop of internal communication and learning. Goals, strategies and techniques are attempted and their outcomes evaluated. On the basis of this evaluation, new goals, strategies, and techniques are attempted. All changes happen within the loop. The goal is to improve results using the current methods. This is essential mid-Twentieth Century business management guidance. How business *was* done.

This is also, in part, why so many Twentieth Century corporations are no longer here. Disruptive innovation and other rapid market changes cannot be addressed through efficiency alone. John Kao (2002) describes it this way, “We all want benchmarks to get the job done more efficiently. But this does not lead to disruptive, game-changing innovation, the stuff of which organizational renewal and competitiveness under conditions of uncertainty are all about.”

Government science agencies are also good examples of single-loop governed, problem-focused, service-delivery organizations. They work under externally-mandated goals and priorities. Even their single-loop quest for greater efficiency is sometimes constrained by legislative demands and regulatory road-blocks. These constraints provide a motivation for agencies to partner with double-loop online organizations, or double-loop universities. Agencies can borrow disruptive innovation capabilities built into these external groups. The hope, however, for open science, is that these partnership can also seed culture changes inside science agencies.

How to grow a double-loop culture in your university or agency

Tony Hsieh is famous for saying “your culture is your brand” (2010). Your vision statement, including your core values, is the center of your organization: “We believe that it’s really important to come up with core values that you can commit to. And by commit, we mean that you’re willing to hire and fire based on them” (Ibid). When “your governance is your culture,” the members can more fully commit to the organization. This makes many subsequent (and consequent) tasks that much easier.

Done well, culture is not just an asset, it is an engine for double-loop learning within the organization, and that, in turn, is the engine for shared knowing. Lehr and Rice (2002) make the following observation; “Double-loop learning is where knowledge is generated from information.” Done poorly, culture becomes either decorative or punitive (something that employees are required to memorize). Vision and value statements can and should be early Loop 2 outcomes.

Single-loop organizations also have vision statements. What they lack is the built-in capability to question the underlying assumptions of these. Charters, statements of values, and constitutions are all indicators of double-loop governance, although the amount of double-loop capabilities rests in how much reflexive authority they give to members.

Vision and action

The vision statement, as Sinek reminds (2009) us, is the public statement about *why* an organization exists. Mission statements/business plans are Loop 1 outcomes. The mission statement tell us how the organization “intends to create [the] future” (Ibid). The “how” is firmly in Loop 1. This is further articulated in business and strategic plans, and then in policies that direct activities.

The “why” lives in Loop 2, and is embodied in the values expressed through the vision statement. The why—the vision, expressed as values—is often described as the “culture” of the organization. Beyond the “why” in the academy, we find a host of “just causes” (Sinek 2019). These are imbedded into the research of every scholar, and into the process of teaching new scholars to learn more about through infinite play. Just causes are the “why” imbedded into the thirst for new knowledge, the promises of new understanding, and the joy of discovery. Above we saw that learning is integral to culture-making. There are models for learning that apply directly to intentional learning (and knowing) within organizations.

Schein (2010) puts it this way: “When we examine culture and leadership closely, we see that they are two sides of the same coin; neither can really be understood by itself. On the one hand, cultural norms define how a given nation or organizations will define leadership—who will get promoted, who will get the attention of followers. On the other hand, it can be argued that the only thing of real importance that leaders do is to create and manage culture; that the unique talent of leaders is their ability to understand and work with culture; and that it is an ultimate act of leadership to destroy culture when it is viewed as dysfunctional.”

“Human beings learn their theories-in-use early in life, and therefore the actions that they produce are highly skilled. Little conscious attention is paid to producing skilled actions; indeed, conscious attention could inhibit producing them effectively. This leads to unawareness of what we are doing when we act skillfully.

The unawareness due to skill and the unawareness caused by our unilaterally controlling theories-in-use produce a deeper unawareness; namely, we become unaware of the programs in our heads that keep us unaware. The results are skilled unawareness and skilled incompetence” (Argyris 2004).

Double-loop governance defeats self-deception and clever leadership

The main obstacle to culture change is the built-in, skilled incompetence of leaders on your team, in your department, at your lab, heading up your college, running your agency, or funding your research. It turns out that most of us (this is widespread) have gotten really good at sabotaging efforts to change the culture of our organizations. The bulk of business leadership literature seeks to address this. You don’t need to go there.

Brené Brown, speaking on a recent podcast , put it this way: “The biggest barrier to effective teams is not professional development. It is personal development. And to put it in the most bluntest terms I can, people do not take care of their shit. People are not doing their own work on what it is that gets in the way of them fully showing up as the kind of people we need in teams and the kind of leaders we need. It is what makes or breaks a team and it’s what makes or breaks culture or leaders is how well do you know yourself, how willing are you to show up vulnerably in relationship with other people; learn, listen, and grow” (Slack Variety Pack [Episode 22](#)).

The idea that you can be skilled in incompetence as well as competence has probably occurred to many in the academy who have seen peers become administrators with dubious results. But that is not what Argyris is getting at. The anthropology-professor-turned-provost with zero management skills is simply incompetent. No skilling implied. However, the dean who can deftly manage a whole room of professors in order to get buy-in on a new endeavor is likely to be extraordinarily skilled at his incompetence. He has just surrendered the opportunity to open up the actual confrontation that might trigger an honest conversation as the start for the process of change. He can never move the group into implementing a new plan with full success. He simply succeeds in avoiding blame and pretending that everyone likes him: it’s the same skill he used when he was a school-boy at six years old, and he’s only gotten better at it.

What he succeeds in is not upsetting anybody in the process of announcing a program that will fail as certainly as all the others he has offered. The dean’s people skills have deflected the real issue: change will be painful. It will challenge individuals to step up and “learn, listen, and grow.” Any conversation where nobody gets at all upset is probably a conversation without effect. We will see how double-loop governance uses

conflict to achieve transparency and change. You can also check out the section on congruence ([Congruence](#)) for more about how a congruent organization can help each member “take care of their shit.”

Argyris puts it like this: “The ability to get along with others is always an asset, right? Wrong. By adeptly avoiding conflict with coworkers, some executives eventually wreak organizational havoc. And it’s their very adeptness that’s the problem. The explanation for this lies in what I call skilled incompetence, whereby managers use practiced routine behavior (skill) to produce what they do not intend (incompetence). We can see this happen when managers talk to each other in ways that are seemingly candid and straightforward. What we don’t see so clearly is how managers’ skills can become institutionalized and create disastrous side effects in their organizations” (Argyris 1986).

If the worst administrators are just incompetent, and the best ones seem to be skilled at their incompetence, how does anything change? When you boot-strap a double-loop governance to your organization, the practice of doing this creates an engine of change (when needed) and a transparent foundation for stability in the future.

Five ways that double-loop governance can save your organization from itself

1. Double-loop governance makes every member a caretaker of the vision and values for the online organization.

Your values are not just a bulleted list on your website nor a poster on the wall. They are the deep logic of why your organization exists. When you create the knowledge loop that includes questioning and reaffirming your values into every decision, then your staff and volunteers can celebrate these values. Membership includes embracing the values, and entering into the ongoing conversation about them that keeps them current and vital.

2. Double-loop governance makes a virtue out of transparent decision making.

Transparent here means available to all members (not necessarily public). Practically, transparency includes time and place availability. Members are told when and where a decision is being made. For an online organization, this might be a set period of time to edit a certain wiki, or a set period in which to vote online. The management of critical-path decisions may (and usually should) devolve to active subgroups charged with delivering the outcomes. These subgroups need to maintain their own transparent

decision process. A great example here is Wikipedia, where each entry contains the edited text, a history of edits, and a discussion page about the text and its edits.

3. Double-loop governance brings conflict to the surface.

Conflict avoidance is a major source of “unusual routines” (Rice and Cooper 2010) in general, including those that create institutional guilt. Conflict can arise in many forms. Personal issues surrounding time commitments, responsibility and authority, and expectation management cannot be avoided through double-loop governance alone, but they can be openly addressed and resolved in a manner that promotes reflective learning among those involved. Evaluation conflict avoidance happens when tests of deliverables are either postponed, curtailed, or done in private.

Double-loop governance supports open and thorough testing, and the disclosure of competing interpretations. Conflict is rapidly promoted to the surface of discussions, where voices of dissent become available to all members. Resolution is commonly achieved through a working consensus, not 100% agreement, but something more robust than a simple majority. Conflicts over the underlying assumptions of the organization can result in new values and a new vision: the organization is free to pivot toward a novel direction at any time.

4. Double-loop governance accelerates failure to ensure success.

Remember that double-loop governance supports double-loop learning. Single-loop learning focuses on avoiding failure. Double-loop learning focuses on using failure to recalibrate the underlying assumptions of the activity, this promotes the act of failing as a learning device, and a logic of rapid iterations of activities with open testing. In software development efforts, double-loop governance actively supports agile development decisions. In all endeavors, the ability to fail quickly and recover takes the fear out of trying new strategies. This almost guarantees a better final result.

5. Double-loop governance supports do-ocracy and emergent leadership.

Good organizations find ways to recognize and reward achievements and contributions, better organizations also reach out and cultivate leadership on their edges. One of the benefits of the network effect is an ability to reach out beyond the founding team and find people who have similar interests and valuable skills. As the network expands, the chances of encountering tomorrow’s leadership improves. When these people become engaged in activities and outcomes, they need to have a clear path to leading subgroups and then larger groups, and ultimately the organization.

“Some self-veiling is present in all finite games. Players must intentionally forget the inherently voluntary nature of their play, else all competitive effort will desert them.

From the outset of finite play each part or position must be taken up with a certain seriousness; players must see themselves as teacher, as light-heavyweight, as mother. In the proper exercise of such roles we positively believe we are the persons those roles portray. Even more: we make those roles believable to others” (Carse 1987).

Double-loop governance and infinite play

All of the features of double-loop governance will assist you with infinite play.

Distributed (shared) participation and control frees you from choosing a leader and following orders. *Free and informed choices* come out of real conversations you have, which reach deep into underlying assumptions, where complexity can only be probed, not explained. Your governance can resist rules in favor of shared values and emerging norms. *Public testing of evaluations* removes the back-channel maneuvers that finite game players use to “win” over others. *An ability to manage conflict on the surface of discussion threads* opens up the express lanes for continual changes to reflect the emergent nature of doing science as a collaborative enterprise.

Members in an organization with double-loop governance have the ability to redirect, refocus, and recommit to the values and the vision of their organization. Their organization becomes a learning resource for their own personal growth. If this does not resemble your current workplace, then you have good reasons to become an open-science culture change agent.

Bibliography: Open Scientist Handbook References