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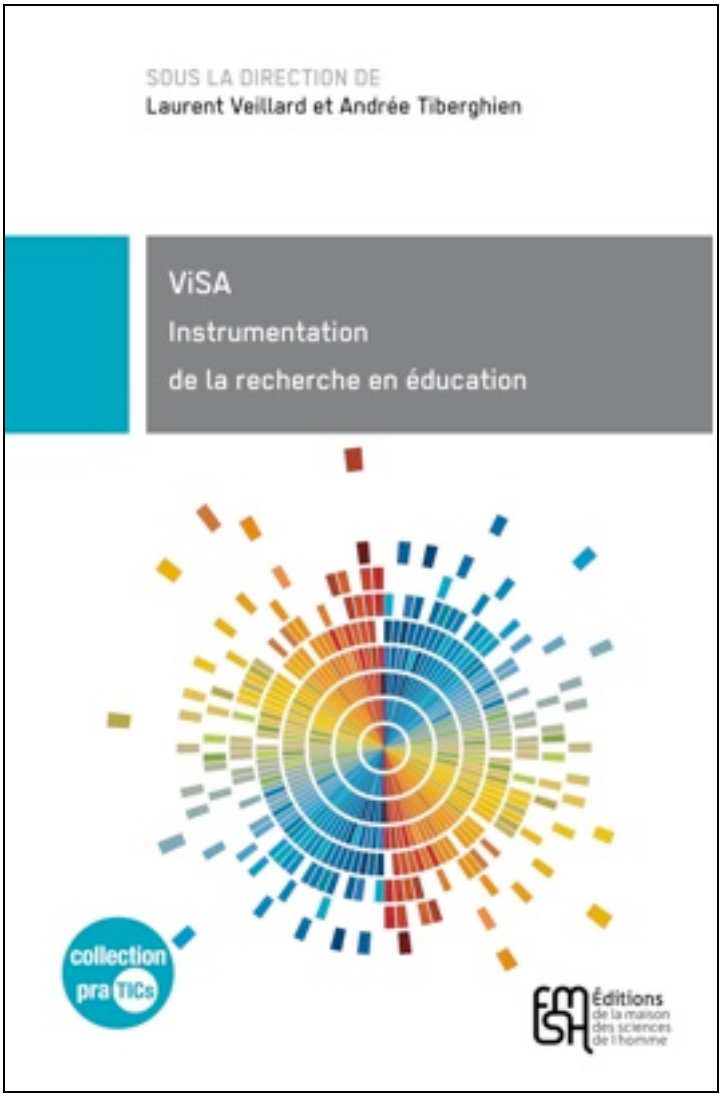

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Metacommunication as a Strategy in Interdisciplinary Research

Literally, metacommunication means communication about communication (Bateson, 1956; Leeds-Hurwitz, 1989). Interaction always has at least two levels, the concrete (the content of a message) and the abstract (discussion of the content). People are capable of managing these two levels simultaneously: speaking (or acting) while at the same time sending a second message explaining how to interpret what is said or done. Metacommunication thus always serves as a qualifier to behavior, rather than simply being more behavior. Any time someone discusses the *process* of communication rather than the specific *content* or information being conveyed, they move to a metacommunicative level. Words can become the subject ("what did you mean when you said X?"), as can activities ("why did you choose X method instead of Y?"), or thoughts ("what were you thinking might be the explanation for our results?").

Going meta (using metacommunication) is a valuable interactional tool since it permits participants to freeze an interaction in order to take the time to analyze what has already occurred, what is occurring currently, or to change what will occur in the future. In this way misunderstandings can become the topic of discussion. As a result, they can be analyzed and, at least some of the time, resolved. Participants retain the ability to resume the interaction at the point where it was stopped, once they have finished discussing it. In this way, varying assumptions and interpretations held by different participants can be verbalized and brought into the discussion as a topic in their own right before any conclusion is reached. As a consequence, metacommunication serves as a time-out from interaction proper.

Metacommunication is the single most important communication concept for scholars engaging in interdisciplinary projects. It permits a move in levels of abstraction in order to sort out misunderstandings, disagreements, or gaps in shared knowledge (as when a technical term is understood to have divergent meanings across disciplines, or when assumptions about how to phrase research questions turn out to be quite different). *Going meta is thus one vehicle for the coordination of knowledge between specializations.* Even researchers who have never investigated the concept of metacommunication, even actors unfamiliar with the term, can still use metacommunication as a strategy. However, teaching collaborators to deliberately pause and put their ongoing interaction on hold in order to shift levels and discuss their assumptions, methods, or processes, should prevent some conflicts of meaning and interpretation, and speed the resolution of others.

Boundary Objects as Tools for Interdisciplinary Research

One part of going meta is the ability to discuss interaction and behavior; another part is learning specialized vocabulary to facilitate that discussion. There is an entire lexicon of terms available to help interdisciplinary researchers discuss their collaborative processes. Of these, "boundary object" has received the greatest attention to date.

Disciplines define themselves by drawing an invisible but nonetheless powerful line of demarcation around the content, methods, and theories typically included, simultaneously distinguishing themselves from other subjects. These boundary lines are social inventions, one small part of the production of knowledge. That is to say the dividing lines between divisions could occur in multiple places; where the actual line is drawn is socially determined. Yet, even when divisions between disciplines are explicitly understood to have been socially constructed fictions, they have a tendency to become reified, appearing solid, even permanent. As a result, they are remarkably hard to ignore, difficult to cross, and nearly impossible to tear down. Similarities in theories, methods, or assumptions come to be ignored, and differences magnified. Thus it becomes important to explicitly attend not only to the construction and maintenance of disciplinary boundaries, but also to the ways in which participants in interdisciplinary projects manage them, especially when they manage to cross them.

To facilitate their analysis of the ways in which participants serving different functional roles were able to collaborate within the context of the University of California at Berkeley's Museum of Vertebrate Zoology in the early 1900s, Star and Griesemer (1989) invented the concept of *boundary objects*, which they defined as "those scientific objects which both inhabit several intersecting social worlds…and satisfy the informational requirements of each of them" (p. 393). In other words, boundary objects serve as vehicles for conversation across disciplinary boundaries. The defining characteristics of boundary objects are that they be "plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites," and that they "have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation." As a result, "the creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds" (Star & Griesemer 1989, p. 393). Specifically for this museum, the different parties included "university administrators, professors, research scientists, curators, amateur collectors, private sponsors and patrons, occasional field hands, government officials, and members of scientific clubs" (p. 392).

What can serve as a boundary object? In their study of the natural history museum, Star and Griesemer proposed a list including:

- species and subspecies of mammals and birds
- the terrain of the state of California
- physical factors in California's environment
- the habitats of collected animal species

They eventually elaborated on four *types* of boundary objects:

- repositories: collections of classified objects, such as a library or museum;
- ideal type: an abstraction, such as an atlas, which does not actually match any actual instance;
- coincident boundaries: objects with the same boundaries but different meanings, such as the maps of California created for drivers and those constructed by ecologists; and
- standardized forms: forms that needed to be completed in order to share information across groups (p. 411).

In sum, boundary objects provide one answer to what Star and Griesemer name the fundamental tension of science: "how can findings which incorporate radically different meanings become coherent?" (p. 392). This requires that boundary objects be Janus-faced, inherently ambivalent (Brand & Jax, 2007), because they must serve (at least) two masters at one time.

Since their invention by Star and Griesemer, others have found the concept useful, and so have proposed many additional items as potential boundary objects, including especially project management tools used "as a means of promoting the sharing of knowledge in practice between diverse groups" (Sapsed & Salter, 2004, p. 1515), to "enable collaborative work" and "facilitate the reading of alternative meanings by different groups" (p. 1519). As the case study described by Sapsed and Salter demonstrated, boundary objects only work when they are maintained by participants representing all relevant groups in a collaboration, for "a boundary object that is lapsed on one side is lapsed altogether" (p. 1527). In other words, like all social constructions, boundary objects require continuous attention from all concerned parties if they are to remain useful. They act as a "partial and temporary bridge which is fairly unstructured when used jointly and highly structured when used within one of the worlds involved" (Trompette & Vinck, 2009a, p. 7; available in French as Trompette & Vinck, 2009b). Boundary objects serve as a mechanism of intersection; they permit the work of coordination between actors drawn from heterogeneous social worlds.

How is the ViSA Database a Boundary Object?

East (2009) points out that the concept of boundary object has not yet been widely adopted by education researchers, "despite the fact that the context of the classroom with its intersection of teacher and student communities is a prime setting for the application of the boundary object concept" (p. 120; one counter example is Buxton et al, 2005). ViSA is an interdisciplinary research project and, like other such projects, if it is to succeed, actors coming from different social worlds must find ways to coordinate activities despite maintaining their differences, for that very diversity is what leads to the innovations resulting from interdisciplinary collaboration.

ViSA can be described as a boundary object in three distinct ways.

1. The *database in itself* is a boundary object in a quite literal sense: it was constructed by researchers in education (interested in the content) working with information technology experts (who introduced the system of metadata) and a computer engineer (who contributed to the architecture and managed its development).

2. The *use of the database* can be described as a boundary object in a more intangible sense since, once constructed, the database permits individual researchers to access videos (and associated information) uploaded by other researchers without the need for direct contact or collaboration.

3. The third way in which the ViSA database can be understood to serve as a boundary object combines these first two, requiring both *use* of the database, and *collaboration*. This function is the result of a recent decision by the ViSA team to encourage "cross analyses" of the same videos corpus by two or three different researchers. The aim is to produce a meta work on these cross-analyses. This third form would be again serve as a more literal sense of the database as boundary object, because it will require researchers to specifically collaborate across various research teams (and, in the process, across communities of practice).

Whereas in case 1, the ViSA database required collaboration across disciplinary boundaries, in case 2 such is no longer the case: the corpus of videos and their associated research can be used by researchers independently of the researcher who initially produced the corpus. In case 3, the video corpus is a boundary object for the researchers who work on the analysis, again requiring collaboration. In addition, in this third case the analysis itself may also become a boundary object for the research network, as it develops a value separate from the data.

Let us return now to the idea that the ViSA videotape database can be described as a *deliberately constructed boundary object* because that is uncommon, and worth attention. ViSA was designed to bring researchers from different starting points together, in order to permit conversations around common interests and concerns. As participants work with the videotapes that make up the database, they need to consider how to ensure the success of their research collaboration. Since boundary objects have as their primary function to "bridge social worlds" (Fleischmann, 2006, p. 78), they can be either constructed, or utilized, with the intent of bringing people together. The majority of the time, boundary objects already exist within at least one community of practice, and so are not deliberately constructed as a tool to encourage collaboration (there is precedent for this in Cobb et al (2003), but it is uncommon). Once the value of deliberately constructing a boundary object for a specific use is understood, it is likely other interdisciplinary projects will also deliberately construct their own boundary objects.

The ViSA database functions as a boundary object because it permits coordination within and between research teams and universities; it increases organizational learning that would not be possible within any one of the contributing organizations alone. Its creation should lead to innovation since, as Appadurai says, "the boundary is the province of invention" (in Wissoker 2000, p. 9). At the same time, like other boundary objects, if it is to continue to function productively, this database will require continued deliberate effort, and careful maintenance over time to ensure that new members of the group also learn to take advantage of what it can offer.

Related Concepts

Since boundaries are central to understanding disciplinary and interdisciplinary research, a set of related terms has come into use. Some of these are older than the term boundary object, rather than being derived from it.

- *Boundary work* refers to the efforts participants make related to boundaries, whether constructing and then maintaining them, or tearing them down (Gieryn, 1983).

- *Boundary rhetoric* describes efforts made to accommodate the various disciplines' discourse traditions (Journet, 1993).

- *Boundary encounters* explains interactions between individuals across the boundary line, whether face-to-face or in mediated contexts (Dillon, 2008, p. 259).

- *Boundary negotiation* refers to efforts to move or dissolve a boundary once it has been established (Callon, 1994)

- *Boundary crossing* describes "the flow of ideas, constructs and innovations across boundaries" (Dillon, 2008, p. 259; see also Postlethwaite, 2007); the term sometimes refers to the process

of individuals originating within one organization or discipline transferring their allegiance to another. And sometimes, when emphasis is placed on elements of transgression, the term used is *boundary blurring*.

- *Boundary spanner* is a term often used for the person who serves as mediator between disciplines, especially in a deliberately constructed interdisciplinary research project (Buxton et al, 2005; Williams, 2002). Most often, boundary spanners are people with prior experience in interdisciplinary research projects who have learned to manage boundary objects as well as other metacommunicative tools (Jeffrey, 2003).

Some of these additional terms may prove useful to participants in the ViSA project as they need to discuss not only their work together, but also reflect upon the process as it develops over time.

Conclusion

Interdisciplinary collaborations can be especially productive since, by definition, they are designed to shine multiple disciplinary lenses on a single phenomenon. At the same time, they spark unanticipated problems because disciplinary training comes to be taken for granted, and members in a group project may not even realize when they do not share basic assumptions, methods, theories, practices. Metacommunication provides a way to address some of these problems by permitting a time out during which difficulties can be negotiated, and the interaction put into abeyance until the matter is resolved. Boundary objects are one among many possible metacommunicative concepts available to encourage reflection upon process rather than discussion of content or results. The concept specifically helps to explain exactly how it is that members of different social worlds find common ground permitting continued collaboration. Like other contexts in which individuals or groups produce and manage information and knowledge, members of the ViSA project may find it valuable to utilize metacommunication to talk explicitly about their process. In this case, the repository of videotapes was a deliberately constructed boundary object, an uncommon innovation. In addition, this particular database can be seen to serve as a boundary object in several different ways, at varying stages of the research process. Both deliberate construction and multiple function merit further investigation in other interdisciplinary research projects.

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