

# Boundary objects and organizational knowledge: A discursive perspective

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## Abstract

It is posited that boundary objects, as inscribed artefacts, can be thought of as forms of text. In this paper a discourse-analytic framework is employed to explore the processes of sharing knowledge across boundaries. Three discursive approaches are used to re-analyze existing contributions to the boundary objects literature. First, 'intertextual analysis' (Allen, 2000) is applied to Brown's (2004) work on public inquiry reports. Second, 'recontextualization' (Bernstein, 1996) is used to reconsider Sapsed and Salter's (2004) work on project management tools. Finally, Gantt charts (Yakura, 2002) are re-examined using Iedema's (1999) concept of 'formalization'. The power implications of a discursively nuanced account of boundary objects are discussed and the benefits resulting for a 'boundary objects as text' perspective are also presented.

**Keywords:** boundary objects, knowledge, discourse, texts.

**Suggested track:** C. Knowledge sharing within and across organizations and cultures.

## Introduction

According to Star and Griesemer (1989), "boundary objects act as anchors or bridges" (p. 414). Beyond this, we might also think of them as being 'texts' insofar as they are inscribed artefacts that in some shape or form capture, codify and/or represent some other, often tangible, object(s) to facilitate interaction across different social worlds. For example, the classification records used in Berkeley's Museum of Vertebrate Zoology (Star & Greisemer, 1989) are boundary objects that operate as textual representations that enable objects (i.e. animals) to be categorized and consumed by diverse groups of actors. An overtly textual, document-based orientation to boundary objects is also apparent in other studies, i.e. instances where they are constituted as: medical records

(Berg & Bowker, 1997), engineering drawings (Henderson, 1991), activity based costing systems (Briers & Chua, 2001), and Gantt charts (Yakura, 2002).

Treating boundary objects as texts promotes the consideration of context and the processes of text production and text consumption. In particular, a discursive approach of this kind encourages us to explore the way in which any given boundary object (i.e. a text) is located and implicated in a wider spatial, temporal and relational context or 'textscape' (Keenoy & Oswick, 2004).

In this paper insights derived from the field of 'organizational discourse analysis' (Grant, et al, 2004) are used as a means of offering an alternative framing of the concept of 'boundary objects' (Star, 1989, 1991; Star & Griesemer, 1989) and their role in knowledge formation and sharing. More specifically, this contribution seeks to locate three emerging strands of research on boundary objects within a discourse analytic framework. The three strands being: the 'pragmatic view' of knowledge boundaries (Carlile, 2002); the notion of 'boundary infrastructures' (Bowker & Star, 1999); and, the identification of 'temporal boundary objects' (Yakura, 2002).

There are four main parts to this paper. First, drawing on the concept of 'intertextuality' (Kristeva, 1980), the connectedness of a given boundary object, as a form of text, to other previous texts is explored. Second, consideration is given to the way in which knowledge sharing across boundaries involves a discursive process of 'recontextualization' (Bernstein, 1996). Third, the projective imperatives involved in the formation of boundary objects are examined using the notion of 'discursive formalization' (Iedema, 1999). Finally, the paper concludes with a discussion of the wider implications of adopting a discourse-analytic approach to the study of boundary objects and their role in knowledge formation and knowledge sharing.

### **Boundary Objects as Intertextual Phenomena**

Intertextuality provides a way of thinking about a text as incorporating elements of previous texts and as forming part of a weave of implicated texts. Building upon Bakhtin's work on 'dialogism' (1981), Julia Kristeva formulated the concept of intertextuality in the late sixties. For her, a piece of text is a permutation of texts insofar as elements of other texts are contained within it (Kristeva, 1980). Indeed, this is consistent with Barthes (1977) observations on the origin of the word 'text' as "a woven fabric" (cited in Allen, 2000:6).

Although a popular means of analyzing and critiquing texts, intertextuality remains a rather loosely defined phenomenon (Allen, 2000; Worton & Still, 1990). Nevertheless, as Allen points out: “Intertextuality seems such a useful term because it foregrounds notions of relationality, interconnectedness and interdependence in modern cultural life” (2000:5). Arguably, exploring the relationship between texts is equally valuable within the context of knowledge sharing. It provides a means of apprehending the embedded, interwoven and multivocal nature of boundary objects and enables us to develop more complex and context-sensitive understandings of the processes of social construction and negotiation which lead to their formation.

Viewed from an intertextual perspective, boundary objects can be considered in terms of their historicity and their interconnectedness to other boundary objects. Moreover, intertextual analysis represents a potentially valuable means of developing Bowker and Star’s (1999) work on how multiple boundary objects coalesce to form ‘boundary infrastructures’ (i.e. interwoven networks of boundary objects).

An example of how intertextual analysis can be applied to boundary objects is to be found via a re-examination of the work of Brown (2004). He presents a discursive analysis of the public inquiry report into the Piper Alpha disaster (i.e. an industrial incident that destroyed an offshore oil platform). Although Brown’s work does not explicitly treat inquiry reports as boundary objects, they can nevertheless be thought of as such insofar as they facilitate interaction across different social worlds. This facilitation is apparent in the way in which these reports link together, and are consumed by, a range of different communities of stakeholders, including politicians, members of the general public, lawyers, academics, corporations, regulatory bodies, and particular professional groups with a specific vested interest in the subject matter of a given report (e.g. social workers, scientists, police, engineers).

An intertextual reconsideration of Brown’s research reveals the interconnectedness of the report into the Piper Alpha disaster (a.k.a. The Cullen Report) and other public inquiry reports. Brown demonstrates how the Cullen Report uses “highly convention-governed sensemaking narratives that employ various forms of verisimilitude in order to bolster their authority” (2004:95). Brown, albeit in an indirect and unacknowledged way, engages with a particular variant of intertextual analysis referred to as ‘architextuality’ (Genette, 1997). Adopting an architextual approach facilitates an

analysis of how the Cullen Report reproduces and adheres to the implicit conventions, modes of enunciation and discursive genres present in previous public inquiry reports. The dominant architextual structure of these reports being that: they make provenance claims (e.g. concerning who commissioned the report, the authoritative status and qualifications of those preparing it, and so on); they make claims regarding comprehensiveness (e.g. in the case of the Cullen Report evidence was taken from 217 witnesses); and, interpretations are presented as 'facts' which accumulate to reveal the 'truth' of what actually happened.

By looking at the genesis of the Cullen Report we are able to see how it functions as a boundary object and to get a sense of how it, as an implicated part of a wider body of inquiry reports, helps to create and sustain a particular 'boundary infrastructure' (Bowker & Star, 1999). In the example of the public inquiry report, the boundary infrastructure is maintained through an interwoven network of boundary objects (e.g. public inquiries, official reports of regulative bodies and adjudication documents) that "depoliticizes disaster events, legitimates social institutions, and lessens anxieties by concocting myths that emphasize our omnipotence and capacity to control" (Brown, 2004:95).

### **Boundary Objects and the Recontextualization of Knowledge**

Bernstein (1990; 1996) has demonstrated how a specific discourse that circulates in one particular community is 'recontextualized' when translated to another. His original work focused upon the recontextualisation of practical discourses into educational settings to produce pedagogic discourses that offered leverage for educationalists. Similarly, Thomas (2003) has looked at the way in which knowledge generated in an academic context is transferred and translated to a management practitioner context. In effect, the process of recontextualization involves a sophisticated discursive shift in which the same discourse comes to mean different things in different contexts.

Because recontextualisation is concerned with the analysis of discourse across different contexts, it has obvious resonances with the study of boundaries and the processes of exchange between different 'communities of practice' (Lave, 1991; Lave & Wenger, 1991; Brown & Duguid, 1991). When superimposed on boundary objects, 'recontextualization' helps to provide an understanding of the communicative practices that generate knowledge boundaries and the necessary translations across social worlds. Moreover, this discursive approach resonates with Carlile's (2002) 'pragmatic

view of knowledge' and offers scope for further interrogation of the assertion that: "What we see at a pragmatic knowledge boundary is not just a matter of processing more knowledge, but processes for transforming knowledge" (Carlile, 2002:453). Previous work has examined the recontextualising role of discourse across professional and organizational boundaries (e.g., Linell, 1998; Sarangi, 1998; Scheuer, 2001), but the implications for the study of boundary objects have been somewhat overlooked.

On the surface, Genette's (1997) conception of 'architextuality' appears to be remarkably similar to Bernstein's (1990) description of the process of 'recontextualisation'. However, the subtle difference between these two perspectives is that Genette emphasizes how a text results from a blending of an amalgam of discursive modes, styles and genres while Bernstein concentrates on how a discourse in a particular domain, locale or genre is reconfigured, appropriated and used within a different context. In terms of boundary objects, intertextuality privileges the processes of production (e.g. how a particular boundary object comes to be formed and developed) while recontextualisation emphasises the processes of consumption (e.g. who uses the boundary object and in what ways).

Although recontextualization involves the processes of 'transferring' and 'translating' knowledge, it actually has more to do with 'transforming knowledge' (Carlile, 2004) insofar as the shift of context and meaning gives rise to 'creative abrasion' (Leonard-Barton, 1992) and the need to 'negotiate practice' (Brown & Duguid, 2001). In short, a change of context typically stimulates a discernible change in the knowledge itself, rather than simply sharing knowledge or making it more explicit.

If we take Sapsed and Salter's (2004) study of the problematic use of project management tools as boundary objects within a global program of a major computing corporation, it is possible, albeit tentatively, to consider how their conclusions might be alternatively framed in terms of the impact of recontextualisation. Sapsed and Salter (2004) suggest that the geographically dispersed nature of the teams involved in the program was central to the failure of the project management tools. Hence, they claim:

"The paper argues that in dispersed programs where there is no opportunity for face-to-face interaction, and/or ambiguous lines of

authority, project management tools will be ineffectual as boundary objects and prone to avoidance” (Sapsed & Salter, 2004:1515).

While this assertion may well be true, it is perhaps only part of the explanation. Elsewhere, they mention that “the services organization was predominantly at the Colorado site, while the operations core was in California, with other peripheral sites leaning to one more than the other” (Sapsed & Salter, 2004:1526). Arguably, the problem is possibly as much to do with the recontextualization of a ‘services discourse’ into an ‘operations context’, and vice versa, as it is to do with geography. This inference seems to receive indirect support in Sapsed and Salter’s observation that: “For some program managers the organization interests were a more significant factor than geography” (2004:1526). The ‘recontextualization viewpoint’ is further reinforced by a specific respondent:

“...to this point we haven’t had a lot of geocentric differences, it’s been mostly between the different organizations. The service side doesn’t care nearly so much what the supplier processes are, for example, but they should care because if you need spare parts to go and fix something the suppliers are typically the ones who are supplying the depots so you want to make sure they’ve got their processes in place so that you can get pretty quick access to your spare crews or whatever” (Program Manager, cited in Sapsed & Salter, 2004:1526).

This extract indicates that dispersal (i.e. “geocentric differences”) is less of a problem than the problems arising between organizations. Therefore, the ‘project management’ boundary object difficulties between, for example, the ‘services organization’ in Colorado and the ‘operations core’ in California might be said to be primarily attributable to the transformation of knowledge across different communities of practice, i.e. recontextualisation, rather than the transference of knowledge between dispersed locales.

### **Boundary Objects and Discursive Formalization**

To a certain extent, the real-time use of boundary objects has a kind of spontaneity and unpredictability that transcends the predetermined positions, orientations and agendas of specific social actors and the conventions of the text itself. In this regard, the utility

and meaning of a particular boundary object is often captured in the moment. This involves a real-time accomplishment of collective sensemaking (Weick, 1995) and the processes of social negotiation associated with 'dialogical scripting' (Oswick et al, 2000). Pearce and Cronen (1979) tackle the question of real-time texts (e.g. boundary objects) in a slightly different way. For them, discursive moments are not quite as improvised as the sensemaking and scripting approaches would have us believe. They argue that there is a 'coordinated management of meaning' (Pearce & Cronen, 1979; Pearce, 1989) in operation within discourse that is partially improvised, but it is nevertheless inextricably linked by the presence of four underlying imperatives (i.e. prefigurative forces, practical forces, contextual forces and implicative forces) that simultaneously enable and constrain the interaction.

Although Pearce and Cronen's work primarily engages with the 'present', the notion of 'implicative forces' clearly has projective overtones insofar as it is concerned with social actors weighing up the potentially negative and positive consequences of their discursive actions for themselves and for others and acting accordingly. Looking forwards in this manner has significant implications for how actions and decisions relating to a boundary object will unfold in terms of the twists and turns in the conversation and the path, or paths, that are ultimately taken.

The concept of 'formalisation' (Iedema, 1999) also has a bearing on the future-oriented framing of boundary objects. This arises because 'discursive formalization' (Iedema, 1999) impacts upon the creation of texts in the present by evoking the future. Iedema's work draws attention to the importance of the modes of capturing and representing (i.e. formalizing) discourse in shaping and configuring the actual interaction and, hence, the text itself. The activity of minute-taking is used by Iedema to illustrate this process. He shows how the formalization of meetings, via minute taking, mediates the actual dialogue insofar as the anticipation of the how the minutes will represent the discussion actually influences the discussion in real time. In effect, the minutes (which will appear in the future) are shaping, albeit partially, the discursive construction of the meeting (which is occurring in the present). This formalization process is arguably mirrored in the creation of boundary objects as texts. Boundary objects are typically the outcome of a process of formalization insofar as discussions and negotiations between communities of practice over time come to be represented, recorded and solidified as inscribed artefacts (e.g. written specifications, charts, maps, diagrams, and so on).

Moreover, given that these artefacts have projective implications their construction in the present is mediated by the future.

For example, the construction of Gantt charts as 'temporal boundary objects' (Yakura, 2002) entails projective commitments to future outcomes. After all, as Sapsed and Salter (2004) indicate: "A Gantt chart suggests how much work will be done by which time, by whom, with implications for how resources are deployed and over what duration" (p. 1530). The real-time development of this form of boundary object in the present is very clearly mediated by concerns about future accountability. Albeit less obviously, processes of 'formalization' are also at work in the construction of boundary objects that do not appear to have strong temporal connotations. If, for instance, we take the case of medical records as boundary objects (e.g. Berg & Bowker, 1997), it is entirely conceivable that their real-time construction and use is significantly influenced by future accountability. This 'eye to the future' is the manifestation of a certain apprehensiveness about who gets to see the records (e.g. patient access due to data protection and freedom of information requirements) and also the fear of legal action. The net result is the actual nature and function of the medical record, as a boundary object, is affected by the process of formalisation.

## **Discussion and Conclusions**

The advent of 'critical discourse analysis' (Fairclough, 1992; 1995; 2003) has produced a three-part approach to discourse where a discursive event "is seen as being simultaneously a piece of text, an instance of discursive practice, and an instance of social practice" (1992:4). The deployment of this critical approach draws attention to both the centrality and pervasiveness of power in developing a discursively nuanced account of boundary objects. Arguably, there are important power dynamics associated with the 'intertextuality', 'recontextualization' and 'formalization' perspectives when applied to boundary objects.

The intertextual analysis of public inquiry reports demonstrates how dominant interests can become embedded within boundary objects which, when viewed collectively (i.e. as a boundary infrastructure), discursively reproduce and reinforce 'hegemonic power relationships' (Boje, 1995; Mumby & Stohl, 1991). In the case of public inquiry reports, the privileged discourse legitimates social institutions and the omnipotence of the state, and marginalises alternative readings of events. More generally, the use of intertextual approaches enables us to consider the processes by which particular boundary objects



replicate, or challenge, pre-existing power relationships and how they coalesce to form, or disrupt, prevailing boundary infrastructures.

The application of recontextualisation to the study of boundary objects draws attention to the power asymmetries between communities of practice. In doing so, it reveals “how inequalities in power determine the ability to control the production, distribution and consumption of particular texts” (Oswick et al, 2000:1116).

As indicated earlier, recontextualisation is inextricably linked to the ‘transformation of knowledge’ (Carlile, 2004) and, as a consequence, it offers considerable potential for contestation. This arises because the process of transforming knowledge across boundaries produces novelty that “generates different interests between actors that impede their ability to share and assess knowledge” (Carlile, 2004:560). Hence, as illustrated in the reframing of the Sapsed and Salter’s (2004) study of project management tools as boundary objects presented earlier, recontextualisation provides a valuable means of interrogating and understanding the discursive processes that promote and inhibit the successful transformation of knowledge between different contexts (i.e. communities of practice).

The discursive process of formalization has power implications, but these are primarily concerned with the manufacture of conditions of possibility. The future orientation of formalization means that social actors engage with boundary objects in ways which are not necessarily aligned to the mutual generation and dissemination of knowledge between different groups. More specifically, the practical, everyday use of boundary objects resulting from formalization is likely to encourage groups and individuals to indulge in strategic behaviour which seeks to maximise the projective establishment control and minimize the scope for negative outcomes, such as high risk, low status, and the subordination of personal needs to those of others. In the case of Gantt charts (Yakura, 2002; Sapsed & Salter, 2004), the strategic behaviour employed is likely to focus on establishing and maintaining control over tasks and timelines (e.g. making sure timelines are not ‘too tight’). By contrast, the primary driver of strategic behaviour in the case of medical records (Berg & Bowker, 1997) is more likely to be a concern with avoiding risk and liability.

Analysis of the discursive formalization of boundary objects offers a route into understanding the way in which the real-time accomplishment of knowledge sharing is

achieved. Moreover, it also helps to illuminate how knowledge generation across boundaries can become compromised, or at the very least influenced, by the projective concerns of groups of stakeholders.

In conclusion, this paper outlines the potential for applying a repertoire of text-related approaches to the study of knowledge at the boundaries between communities of practice. In particular, it advocates the deployment of a discourse-analytic framework that engages with the 'fine grain' of the formation and use of boundary objects. It is hoped that this methodological orientation will encourage further research that explores the dynamic, embedded and political imbued nature of boundary objects.

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