

Preparing for opening night: temporal boundary objects in textually-mediated professional practice

Elisabeth Davies and [Pamela J. McKenzie](#)
Graduate Program in Library and Information Science
Faculty of Information and Media Studies
University of Western Ontario
London, Ontario, Canada

Abstract

The authors report on two projects in which the role of documents as temporal boundary objects mediating information practices across multiple timelines was explored. It has been suggested that studying workplace documents will uncover the information practices of professionals beyond traditional information needs and uses studies. Two workplaces were studied: a professional theatre production and a midwifery clinic. Both settings are communities constructed partly through textual dynamics and both have a pre-production phase leading to an *opening night*. In the theatre setting, qualitative interviews with the cast and crew and document analysis of the prompt book were the means of data collection. The midwifery clinic setting was investigated by means of interviews and follow-ups with 16 midwife-client pairs and document analysis of the antenatal record. Preliminary thematic analysis pertaining to time and information was conducted on interview transcripts and the relevant documents. It was possible to show several instances of both the prompt book and the antenatal record being treated as a timeline by the various professionals using them. The authors conclude with a discussion of the temporal aspects of professionals' information practices as revealed by these two projects and encourage further document-focused research.

Introduction

Professional work can be considered to be definable in terms of the texts used and characterized by textual dynamics; that is, 'the idea that written discourse is produced by a complex of social, cognitive, material, and rhetorical activities; in return, written texts dialectically precipitate the various contexts and actions that constitute the professions'. ([Bazerman and Paradis 1991](#): 4). However, as Davenport and Cronin ([1998](#): 270) observe, many library and information science studies of workplace information practices 'uncouple texts from work flow and are premised on a consumption model that, by positing *needs* (which must be satisfied by an external source), alienates professionals at work (*users*) from the texts (*information*) that constitute that work...'

Davenport and Cronin ([1998](#), 266) suggest that a more fruitful approach would look at 'the interaction and intersection of the diverse texts that constitute work in a given domain.' Such an approach would focus on 'the world of work *per se*, not at *information seeking*, *information needs*, *information uses*, and *information use environments*.' They suggest that a useful analytical concept for such an approach would be *boundary objects*, abstract or concrete objects which both inhabit several intersecting social worlds and satisfy the informational requirements of each of them. Boundary objects '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' ([Star and Griesemer 1989](#): 393). Objects held in common by different communities of practice or professionals are used differently by the members of each

group but their commonalities are crucial to ongoing cooperation between and among groups who are invested in the same project ([Wenger 1998](#)).

In this paper, we examine documents as boundary objects in two workplace contexts, a professional theatre company and midwifery clinics providing prenatal care. Although these settings are very different, we argue that they share a surprising number of temporal and textual characteristics. A study of these characteristics can inform our understanding of the information work that takes place within the contexts.

Time, text and collaborative work

There are any number of ways to construct the document-centred workplace in theoretical terms. We consider documents in workplace practice to function as both co-created texts produced through and contributing to the work of discourse communities ([Bazerman and Paradis 1991](#)) and as physical objects ([Latour and Woolgar 1986](#); [Harper and Sellen 1995](#)) with particular affordances. Our emphasis here is consistent with Smith's argument that texts are active and reveal the social organization of their creators and users.

Texts are not seen as inert extra-temporal blobs of meaning, the fixity of which enables the reader to forget the actual back and forth work on the piece or pieces of paper in front of her that constitute the text as a body of meaning existing outside time and all at once... The text is analyzed for its characteristically textual form of participation in social relations. The interest is in the social organization of those relations and penetrating them, discovering them, opening them up from within, **through the text**. ([Smith 1990](#): 4 - emphasis in original).

We will use the article by Star and Griesemer ([1989](#)) as the guide for incorporating the concept of boundary objects into this discussion of document-centred workplaces. In library and information science, the concept of the boundary object has been considered in the study of scholarship in interdisciplinary fields ([Palmer 1996](#)), including library and information science itself ([Dervin 2003](#); [Hall 2003](#)), and of classification systems both within and outside libraries ([Bowker and Star 1999](#); [Albrechtsen and Jacob 1998](#)).

For Star and Griesemer ([1989](#): 414) the central analytical question raised by the study of boundary objects in collaborative work is: 'How do heterogeneity and cooperation coexist, and with what consequences for managing information?' Based on our previous research on social theories of time ([McKenzie and Davies 2002](#)), we would amend this question to include an inquiry into the ways that documents as both text and object serve as boundary objects mediating information work across multiple timelines.

Multiple timelines are involved in complex work. There is a sequence of events which begins and ends differently depending on one's specific job; different words describe what appear to be the same segments of calendar time; extensions into the past and future differ for each individual; there are periods of intense cooperation and isolation, and different participants measure time in different units. Library and information science research has largely ignored this multiplicity of times in studying the information needs and uses of professionals. There is a strong assumption that time is the same for all the professionals in a particular workplace: that the shift is the same length or the project is the same duration. Some of the aspects of multiple times in social groups that may affect information practices include: deadlines, scheduling, seasonal adjustments, e.g., vacation time, and group dynamics ([McKenzie and Davies 2002](#)).

Sociologist of time Barbara Adam advocates a 'move beyond the time of clocks and calendars... to make explicit what constitutes a largely unreflected aspect of contemporary social science: time embedded in social interactions, structures, practices and knowledge, in artefacts, in the mindful body, and in the environment' ([1995](#): 6). Time has been a consideration in the systems-approach to information seeking and design (e.g., [Reddy and Dourish 2002](#)) while a number of process models of information seeking (e.g., [Westbrook, 1996](#); [Kuhlthau 1993](#); [Ellis 1993](#); [Wilson 1997](#)) consider time implicitly. One element often not explicitly mentioned in information behaviour studies of professionals is that professionals work in organizational structures such as institutions, corporations, or private practice, and within these overarching structures, in formal and informal groups such as departments, communities of practice, task forces, crews, and teams. Membership in one or more of these organizational structures or groups may account for more differences in information practices than membership in a particular profession because of the way time is constructed and perceived by the members. Solomon's ([1997](#)) ethnography of a planning unit over three annual planning sessions revealed the importance of time not only in sense-making but also in group

development. Solomon's work seems to stand alone in its explicit recognition of the importance of time in workplace information practices.

Yakura (2002) pointed out that workplace timelines and schedules can function as 'temporal boundary objects', mediating time in project-based work.

[U]nlike the boundary objects that have been reported on in other studies, timelines have special narrative qualities. Because timelines portray a series of events in time with a clear beginning, middle, and end, they satisfy the minimal conditions for narrative, conveying the relationship of events over time. The narrative logic of the timeline suggests that once you start, you will finish; the tasks and milestones are portrayed as flowing linearly and progressively... Although the image of a timeline reifies and provides a sense of concreteness, each participant in a project is free to interpret the timeline from his or her own perspective and fill in the gaps in different ways. This combination of concreteness and flexibility is critical to the operation of a timeline as a boundary object for different subcultures or communities (Yakura 2002: 958-959).

We take Yakura's concept of the temporal boundary object as a useful analytic tool and extend it beyond timelines to explore the intersection of work, text, time, and information in studies of two workplace settings. The first setting is a professional theatre production in Toronto, Canada, studied in Davies's doctoral research into how the script mediates the professional activities of creative theatre professionals. The second setting is prenatal midwifery clinics, from McKenzie's study of midwife-client communication in the Canadian province of Ontario, funded by the Faculty of Information and Media Studies of The University of Western Ontario and the Social Sciences and Humanities Research Council of Canada. The study seeks to understand the information work that goes on when Ontario midwives and their pregnant clients meet for prenatal visits.

Some introductory comparisons between the two workplace communities will provide some context for the fuller discussion of boundary objects. First, both are communities, constructed in large part through textual dynamics and, therefore, able to be studied through the text which '[carries] the threads and shreds of the relations it is organized by and organizes' (Smith 1990: 4). Secondly, both working communities are organised around a preparation and pre-production phase preceding *opening night*, in one case the opening of the play and in the other the birth of a baby. These two characteristics invite a specific focus on the role of documents as boundary objects mediating time and information in workplace communities.

Both studies employ qualitative research methods: interviews and document analysis. Qualitative or naturalistic research assumes that 'realities are multiple, constructed, and holistic' (Lincoln and Guba 1985: 37) and it is here that multiple social times may be recognized. Both projects are early in data analysis. Audio-recordings of prenatal visits and interviews have been transcribed, and this paper reports on our analysis of references to textual and temporal boundary objects. Data collection and analysis conform to ethical guidelines on research on human subjects of The University of Western Ontario and the Social Science and Humanities Research Council of Canada. In order to protect anonymity and confidentiality, we have used pseudonyms or generic identifiers throughout.

Theatre setting

Davies interviewed the principal production professionals on a single theatrical production in Toronto in 2003: the theatre's artistic director, director of the play, set and costume designer, lighting designer, stage manager, and one of the two cast members. With the exception of the artistic director of the theatre, all the interviewees are freelancers; that is, they are hired on per-production contracts. Davies also had access to the show's *prompt book*, which is the stage manager's version of the entire production.

There is a general timeline of activity in the production of a professional play and the principal phases of activity are identified below. Once a script has been selected for production, *Pre-production* lasts for several months while planning, budgeting, auditioning the cast, and hiring designers and crew members is done. Pre-production primarily involves the director, production manager, and technical director whose job is to oversee the crew and construction.

With the hiring complete, the *Production* phase begins. Designers submit their final designs to the theatre for costing. Sets, props, and costumes are built to designers' specifications.

The week before rehearsal begins is the stage manager's *Prep Week*. He or she creates the rehearsal schedule and

ensures that everything from the rehearsal space to the number of copies of the script to the correct contact information for every member of the company is available.

Two to three weeks before opening, the *Rehearsal* period begins. The final week, depending on the amount of rehearsal time and the scheduling of the spaces, is *Tech Week*. Tech week involves every member of the company who was present during the Production phase. The designers return to ensure the look, feel and sound that they had imagined actually works in the theatre space.

Many theatres offer audiences the opportunity to see *Previews* of the show before the official opening. Previews are, officially, part of the Rehearsal phase since there is a rehearsal during the day and a performance at night. It is in previews that the director and designers see the show for the last time. Once it opens and throughout the *Run*, the entire show is in the control of the stage manager.

The day of, or sometimes the day after, the final performance, the construction crew ensures that the sets, costumes etc. are disassembled or stored properly. The work of the stage manager and actors is finished on closing.

A professional theatrical production generates a lot of paper. A variety of documents act as boundary objects in the senses described by Star and Griesemer (1989). These boundary objects have temporal qualities that affect and reflect the information practices of the people sharing them. The documents are not the show—the performances are the show. However, theatre is an ephemeral art and once the show closes, nothing remains but the various documents.

The prompt book is the single place where documents from all the various production specialists reside. The stage manager enters the production process during Prep Week and stays with the show through its rehearsal and run. By the end of the run, the stage manager's documentation is collected into the prompt book and is retained by the theatre as the official record of the show's production. It is, essentially, the history of the production.

Prop and costume inventories, rehearsal, technical and performance schedules, ground plans, the script of the play with all modifications, records of every prop, movement, costume change, light, sound and visual cue that occurs on every page of the script, individual show reports written after every performance before an audience, medical information about the cast, as well as contact lists for the cast, crew and permanent employees of the theatre are just some of the documents in the prompt book. Many of these documents relate to the temporal nature of information practices. An example from the director is the *Scene Breakdown* which affects how rehearsals will be scheduled depending upon which characters are in which scenes of the play. Another example is the stage manager's recording on the rehearsal schedule of the number of workdays that exceed twelve hours for members of Canadian Actors' Equity Association.

The script itself is an object that is held in common by all the contributing production professionals but which has different meanings depending on which professional is using it. Ultimately, all the contributing parties are attempting to create a sense of time and place. A script is chosen by the artistic director of the theatre to fit into a full season of dramatic productions. The director, Karen, however, measures time in pages of script for each day of rehearsal: 'I can block five pages a day, so I have fifteen days, five pages a day - how long is the script?'

After the script, arguably the most important single document is the set designer's ground plan of the stage and set. Copies of the ground plan are used by all the production professionals for different reasons and in different ways. For example, the director and stage manager use it to record *blocking*: the actors' physical movements onstage. Sound and lighting designers use these blocking notes as a reference as they coordinate the timing of sound and lighting effects with actors' movements.

For me I always think of lighting as setting a rhythm too, following the rhythm of the music that's included in the piece and/or the rhythm that the actors set: the rhythm of the play. (Charlotte, Lighting Designer)

The play is not just measured in pages or scenes but also in minutes and seconds when it comes to designing and then running light and sound cues. The cue sheets for lighting, sound, and visual effects tell the stage manager when to call for the various effects during a performance. The timing is to the second, their start often hinges on a movement or a line from an actor. However, as Yakura (2002: 968) points out with regard to timelines, the moment cue sheets are created they are *wrong*. Human beings do not move or speak exactly the same way in every

performance, so the stage manager juggles approximately eighty cues in this particular show and adjusts on the fly. Note the number of different people involved in the task described by the stage manager: stage manager, actors (at least, implicitly), director, and designers.

If the timing of the show changes enough that I need to move the call of a cue then I'd change that... 'Cause the pace of the show is changing and to keep the rhythm the way everybody wants it to be. Sometimes you have to advance the cue a couple of words or delay it a couple of words but that's always with the agreement of the director and the designer involved. (Lois, Stage Manager)

For the most part, theatre production professionals present the paperwork representing their work in standardized ways. Schedules are often in calendar form, lists are in table form, cue sheets are in landscape-format chronological charts with references to pages and lines in the script and the above-mentioned minutes and seconds of duration, the ground plan and lighting plot are in traditional drafting format. The use of word-processors and computer-assisted drafting applications facilitate standardization. Because their work is recorded and archived by the theatre and may be used in future productions of the same play, theatre production professionals present their work in widely-understandable formats that will have longevity.

In its role as a history, the prompt book is a temporal boundary object in its own right. It is also a repository ([Star and Griesemer 1989](#)) of other documents that act as temporal boundary objects mediating the information practices of professional theatre.

Midwifery setting

Since 1994, midwifery has been a licensed profession in Ontario. Midwives provide government-funded primary care for low-risk women and their babies during pregnancy, home or hospital birth, and for six weeks postpartum. As of 13 January, 2004, there are 250 registered midwives practicing in forty-eight Ontario practices ([College of Midwives of Ontario 2004](#)). In the practices studied here, two or more midwives share the care of each pregnant woman (client).

Prenatal care in Ontario follows a standard timeline. Pregnancies are dated from the last menstrual period and prenatal midwifery visits generally occur once a month for the first twenty-six weeks of pregnancy, once every two weeks until week thirty-six, and then once a week until the birth. There is also a standard timeline for individual prenatal visits: visits generally begin with a discussion of matters of concern to the pregnant woman, proceed to a discussion of issues on which the pregnant woman will need to make decisions (such as place of birth and whether to participate in various forms of prenatal testing), and finish with a physical examination ([Hawkins and Knox 2003](#): 91-2).

Two forms of data were collected for this study. First, one clinical prenatal visit between each participating client and her primary midwife was audio-recorded. Secondly, one to twelve days after the prenatal visit follow-up interviews with each participating midwife and client were conducted and audio-recorded. Each participant was interviewed independently so that her comments were kept confidential. During the follow-up interview, the recording of the office visit was played and the participant was invited to stop the tape whenever she had something to say. To date, data has been collected from sixteen midwife-client pairs. Participating midwives had between one and twenty years of professional experience, and clients ranged from twenty-two to thirty-nine weeks pregnant at the time of their midwifery visit. (For more detail on the study, participants, and methods, please see [McKenzie 2004](#)).

The Revised Antenatal Record ([Ontario Ministry... 2000](#)) is widely used in Ontario prenatal care settings. The record consists of two parts. Part I records the assessment of the pregnant woman at the initial booking visit. Part II, considered here, is used at subsequent appointments, and is central to the prenatal visit for several reasons. The inclusion of timelines enables it to function as a temporal boundary object ([Yakura 2002](#)), coordinating multiple temporalities as well as multiple participants. The record plays a pivotal role in the communication between midwife and client, between the primary midwife and the other midwives sharing the care of the client, and between midwives and other care providers to whom they might refer the client.

The paper antenatal record serves as a repository ([Star and Griesemer 1989](#)) for the traces of clinical tests and procedures, and for inscriptions of measurements taken. The form provides a chart with rows, one for each prenatal

visit, and columns labelled to allow for the standardized recording of data such as the date, the timing of the pregnancy (gestational age in weeks), woman's weight and results of urine tests, and the size of the uterus (symphysis-fundus height, in centimeters). Further components, include a standard size chart recording uterine size against the number of weeks of gestation and a check-list of discussion topics.

The layout of the form suggests a certain order of structuring of each prenatal visit. In a follow-up interview, a midwife observed that:

Often times I'll just go along the page. So first we'll sort out what her gestational period is and then. I'll start with 'So let's just see where you're up to today.' And then I'll do the weight or the urine. Whatever. But first of all. And then after I've done those routine things, I'll do the talking, the topic we need to discuss that week.

The discussion check-list contains topics linked to specific times in the pregnancy. Writing the date can therefore be seen as a signal to discuss a particular topic. One of the first things established in each visit is the gestational age in weeks and days, such an everyday occurrence that the units of time are often left unsaid: 'So... Twenty-three and two. Now. Has anybody talked to you yet about the glucose challenge test?'

In addition to coordinating discussion topics within the clinical visit, the antenatal record serves as a central organizing device for the team of midwives and possibly other practitioners sharing the care of each client. The record is collaboratively contributed to by all the midwives participating in the woman's care, and other participants contribute indirectly as well in the form of records of consultations with doctors, results of various tests, etc. which are inscribed here. A midwife described the way that the record serves as a temporal boundary object used by the midwives sharing the care of a client:

We have a checklist of discussion and the timings for those discussion topics that we use to kind of cue all the midwives that are involved with that particular person so that things don't get missed, so that the person that's seeing that woman at twenty-four weeks, whether she needs discussion about glucose screening, whether she needs prenatal Rho-gam, those sorts of things that need to happen at that time don't get missed by whoever's doing them because they thought it was discussed before so we do have a little tick sheet of things that we're going to talk about and if a midwife happens to talk about it early on because she's got the time or the energy or the client asked the question then it can be ticked, it's already been discussed.

The inclusion of the standard growth chart allows the pregnant woman's measurements to be compared both to her own previous data and to the norm. The rule of thumb—that after twenty weeks the woman's measurement in centimeters is approximately equal to the number of weeks gestation—is documented graphically on the growth chart and recorded in the visit notes, permit an understanding between the midwife and client about the adequacy of her growth.

M4: Thirty-eight [cm] today.

C4: Is that okay?

M4: That's fine. If you compare it to last time, [M4's voice becomes louder: coming closer to tape recorder to check chart] 36 last week.

C4: Baby's small?

M4: Pretty normal. You're thirty-seven [weeks] and two [days].

Although a boundary object may mediate professional work, it does not fully determine it. A boundary object may be interpreted and used differently by various participants. Distinct understandings of the timeline are evident in a midwife's explanation that a client 'puts me off on the wrong foot... She'll ask a question before I've got to that bit... You can't have a flowing, sort of course through the [visit].' Another midwife described how she would use the conventions of the form to initiate a discussion of a sensitive issue: 'My thought is that I'll pretend it's a checklist item and say at this stage in the pregnancy we try to talk [about it]'.

A single document, then, shapes the information exchange between the midwife and pregnant woman. The same document is in turn shaped by the exchange as details are negotiated, recorded, or left unrecorded. As the hub of the pregnant woman's file, the antenatal record co-ordinates and records the work of the various participants and serves as a repository ([Star and Griesemer 1989](#)), referring directly or indirectly to other documents involved.

Discussion

A study of the textual boundary objects used in workplace communities reveals a number of temporal functions common to both settings. A variety of people with different roles contribute to the work in each setting. Each case can be considered to be a project, with a particular timeline, more or less flexible, and with some ordered tasks that must be done either in a specific sequence, at a specific time, or both. The management of the project involves co-ordinating the work and the time of some or all of the other participants. Although documents are integral to both kinds of work, the outcome of the project is not itself a document. In both settings, there is a central boundary object: the script ([Davies 2004](#)) and the body of the pregnant woman with fetus. The task at hand in both settings is to produce out of those boundary objects something new: a play in one case, and a mother and infant as separate bodies in the other. Participants inscribe documentary traces ([Smith 1990](#); [Latour and Woolgar 1986](#)) during the process of doing the work. Some of the traces are designed to be archival, and some ephemeral. Some are essentially private, for the use of a single participant (e.g., the client's pregnancy diary, the actor's notebook), some serve as a means of translation among different participants. Some are kept as an institutional record of the project. Many have temporal boundary-spanning functions. In both cases a central mediating repository document (the prompt book and the antenatal record) has a co-ordinating role with regard to other documents, recording the presence of or evidence from other documents.

The [1986](#) article by Dervin and Nilan on the absence of the user in traditional library and information science research led to a wave of user-focused studies after decades of systems-focused work. For the most part, as Case ([2002](#): 256) points out in his summary of library and information science research into professionals' information needs,

One thing that these studies have in common, however, it is a concern with sources and channels - typically interpersonal channels versus mass and/or specialized media... Despite an effort to examine the process of information seeking, much of it still comes down to "who or what do people consult for information?" This is an old question within the information needs, uses and seeking literature and continues to dominate the discussion of findings.

What seems to have been lost in the focus on human information behaviour is the documents. By focusing on documents as boundary objects in keeping with Davenport and Cronin's call, information studies scholars will be able to address several issues, including:

1. the prominence of documents or texts in many different work settings;
2. the vitality of documents in their natural habitats;
3. the agency of documents;
4. the interpretation of the texts;
5. the presence of documents as physical object; and
6. the role that documents play in the social and temporal organization of a workplace.

The purpose of this paper has been to show that documents may serve as temporal boundary objects in professional practice where various members with differing responsibilities cooperate and collaborate. We demonstrated this by exploring how specific repository documents—the prompt book and the body of the pregnant woman and fetus—contribute to managing information across multiple timelines.

It is not difficult to think of workplaces where work is mediated by a canon document: a construction site and a blueprint, an expedition and a map, a classroom and a report card. Further study of such settings will reveal the complex intersections of temporal, textual, information and work practices.

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